Special Publication No. 2020-06

Subsistence Wildlife Harvests in Deering, Noorvik, and Shishmaref, Alaska, 2017–2018

by
Daniel Gonzalez
Elizabeth H. Mikow
and
David Koster

February 2020

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 Division of Subsistence reports. All others, including deviations from definitions listed below, are noted in the text at first mention, in the titles or footnotes of tables, and in figures 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. states	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

SPECIAL PUBLICATION NO. 2020-06

SUBSISTENCE WILDLIFE HARVESTS IN DEERING, NOORVIK, AND SHISHMAREF, ALASKA, 2017–2018

by

Daniel Gonzalez and Elizabeth H. Mikow
Alaska Department of Fish and Game Division of Subsistence, Fairbanks

and

David Koster
Alaska Department of Fish and Game Division of Subsistence, Anchorage

Alaska Department of Fish and Game
Division of Subsistence
1300 College Road
Fairbanks, Alaska 99701

February 2020

Development and publication of this manuscript were partially financed by
ADF&G Division of Wildlife Conservation

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.

Daniel Gonzalez and Elizabeth H. Mikow
Alaska Department of Fish and Game Division of Subsistence
1300 College Road, Fairbanks, AK 99701-1551 USA

and
David Koster
Alaska Department of Fish and Game Division of Subsistence
333 Raspberry Road, Anchorage, AK 99518-1565 USA

This document should be cited as:
Gozalez, D., E.H. Mikow, and D. Koster. 2020. Subsistence wildlife harvests in Deering, Noorvik, and Shishmaref, Alaska, 2017–2018. Alaska Department of Fish and Game Division of Subsistence, Special Publication No. 2020-06, Fairbanks.

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.
If you believe you have been discriminated against in any program, activity, or facility please write:
ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK, 99811-5526
U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA, 22203
Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW, MS 5230, Washington, D.C. 20240
The department's ADA Coordinator can be reached via phone at the following numbers:
(Voice) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648,
(Juneau TDD) 907-465-3646, or (Fax) 907-465-6078
For information on alternative formats and questions on this publication, please contact:
ADF&G Division of Subsistence at http://www.adfg.alaska.gov/index.cfm?adfg=contacts.anchorage

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDIX TABLES

ABSTRACT

This report summarizes the results of big game subsistence harvest surveys conducted in Deering, Noorvik, and Shishmaref in the spring of 2018. 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 survey asked heads of households in each community about their harvests of caribou, moose, other large land mammals, and furbearers between April 2017 and March 2018. Researchers documented the number, sex, and harvest timing for these subsistence resources as well as observations, if any, of unhealthy animals. Reported results were expanded to account for unsurveyed households. In the 2017–2018 study year, Deering hunters harvested an estimated 342 caribou, or 254 edible pounds per person. In Noorvik, hunters harvested 250 caribou, or 65 lb per person. Shishmaref's estimated harvest was 376 caribou, or 96 lb per person.

Key words: caribou, moose, brown bear, black bear, furbearers, Deering, Noorvik, Shishmaref, WAH, Western Arctic caribou herd, subsistence hunting

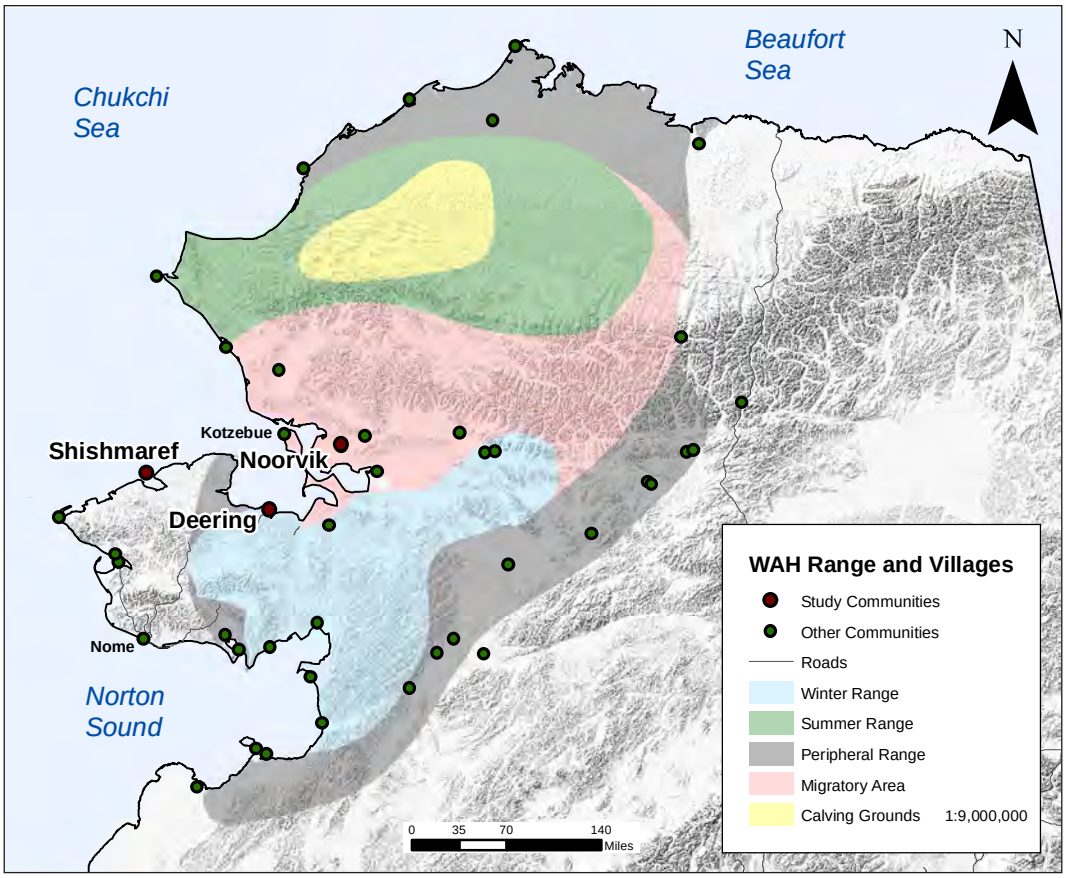

Figure 1.–Western Arctic caribou herd range and study communities, 2018.

INTRODUCTION

Caribou *Rangifer tarandus* are an important subsistence resource for communities in the Northwest, Arctic, and Interior regions of 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 Utqiaġvik (formerly 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 the largest caribou herd in Alaska (ADF&G, Division of Wildlife Conservation 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 was estimated at 325,000 caribou. The July 2013 census counted 235,000 animals, a decrease of about 27% since 2011 (ADF&G, Division of Wildlife Conservation 2014). 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 census conducted in the summer of 2016 estimated the herd to be at 201,000 animals. Researchers estimated the annual rate of decline for the herd to be 5% between 2013 and 2016. That was lower than the estimated 15% annual rate of decline between 2011 and 2013 (Western Arctic Caribou Herd Working Group 2016). Biologists did find that calf production in 2016 was very high, calf weights were greater than

any previous year, and the proportions of calves and adult females surviving the winter were the highest recorded since 2007. ADF&G Division of Wildlife Conservation upgraded their camera equipment from film to digital format before the 2017 photocensus. The new digital format allows biologists to take higher resolution photos and capture images in a wider range of light conditions; therefore, herd information accuracy is expected to increase (Western Arctic Caribou Herd Working Group, 2017). The results of the July 2017 photocensus presented a minimum count of 239,055 caribou, meaning that the herd size increased for the first time since its peak population in 2003.[1] After applying a statistical method for estimating abundance from the minimum count photocensus, biologists announced the population increased from the 2016 count by 29% to an estimated total of 259,000 caribou. Biologists were unsuccessful in completing a photocensus in 2018: they cited cool temperatures, high winds, and limited insect harassment as likely reasons that caribou did not aggregate. Biologists looked at two other indicators to assess herd growth: adult cow survival and calf recruitment. Adult cow survival during 2017–2018 was estimated at 71%, or 15% lower than 2016–2017; this survival rate was one of the five lowest since 1983 (Western Arctic Caribou Herd Working Group 2018; 2019). Biologists found that calf recruitment rates were high in 2017–2018, as they have been since 2016. These two indicators pointed to mixed signs of growth: they suggest "that the herd has likely experienced a temporary setback in growth that may be compensated for by more young animals recruiting into the herd in the years to come" (Western Arctic Caribou Herd Working Group 2018).

The role of caribou in the nutritional, cultural, and economic health of northwestern Alaska communities varies. 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. In communities located along key migration routes, residents might take caribou during several months of the year, but residents of communities more distant from these routes may have only occasional access to the WAH. 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 others. Subsistence harvesters adapt to local conditions. Therefore, interannual variation in harvest numbers and characteristics is not uncommon, even within a single community.

Regulatory Context

Alaska is unique in the nation in having both state and federal laws that prioritize customary and traditional subsistence hunting and fishing over other consumptive uses. Aboriginal hunting and fishing rights were extinguished by the Alaska Native Claims Settlement Act (ANCSA) in 1971, and the lack of legal protection of Alaska's subsistence way of life was noted by the Alaska State Legislature and U.S. Congress. Concerned over competing commercial and recreational uses, both bodies subsequently adopted laws intended to protect opportunities for customary and traditional uses of fish and wildlife in the state.

In 1978, the Alaska State Legislature adopted priorities for subsistence uses of fish and game over other consumptive uses, including a subsistence fishing priority under AS 16.05.251(b) and a subsistence hunting priority under AS 16.05.255(b). In 1980, the U.S. Congress adopted a similar subsistence priority in the Alaska National Interest Lands Conservation Act (ANILCA). In 1986, the Alaska Legislature adopted a statute establishing a rural subsistence priority consistent with ANILCA's so that the state could manage all subsistence uses on state and federal land. In 1989, the state statute establishing a rural subsistence priority was ruled unconstitutional in *McDowell v. State of Alaska*.[2] In 1992, the Alaska Legislature adopted the current subsistence statute, AS 16.05.258. After the rural priority statute was ruled unconstitutional, the federal government began managing subsistence uses by rural residents on federal public lands and waters.

The Alaska Board of Fisheries (BOF) and the Alaska Board of Game (BOG) adopt and revise state subsistence regulations throughout Alaska. Fishing and hunting statutes and regulations have been further refined by subsequent court rulings. Federal subsistence regulations are promulgated by the Federal

1. Hansen, A. 2018. "Western Arctic caribou herd increases after years of decline—ADF&G Press Release." Accessed March 30, 2018. http://www.adfg.alaska.gov/index.cfm?adfg=pressreleases.main
2. *McDowell v. State of Alaska*. 785 P. 2d 1 (Alaska 1989).

Subsistence Board, although certain subjects must be addressed by regulations of the secretaries of Interior and Agriculture.

The practical consequence of this arrangement is that subsistence users must often consult both state and federal regulations for the lands on which they are hunting and fishing. This can become confusing, even for agency personnel. State regulations generally apply on most lands, and exclusively on state and private lands, which include ANCSA corporation lands.[3] Federal subsistence regulations apply to federally qualified subsistence users[4] on federal public lands. On most federal public lands, all Alaska residents may hunt and fish under state regulations and bag limits, unless the lands have been closed by federal regulation. In certain national parks and monuments, hunting and fishing may be restricted to certain federally qualified subsistence users.

The study communities are located within state game management units (GMUs) 22 and 23: Deering and Noorvik are located within GMU 23, and Shishmaref is located within GMU 22E (ADF&G 2017). During the 2017–2018 regulatory year, Alaska resident hunters targeting caribou in GMU 22 on state lands were required to apply for registration permit hunt RC800[5], which was first introduced in 2016–2017. The registration permit hunt (RC800) set an annual bag limit of 20 caribou (up to five per day, no calves could be taken); furthermore, it required permit holders to report within 15 days of taking the legal bag limit or within 15 days after the end of the season. In GMU 23, a caribou registration permit hunt (RC907) replaced the general season hunt of previous years for the 2017–2018 regulatory year. However, caribou bag limits on state-regulated lands in GMU 23 remained the same as those in 2016–2017: Alaska resident hunters could take five caribou per day with no annual limit. The regulations specified that bulls could not be taken October 15 through January 31; cows could not be taken June 1 through July 14 north of and including the Singogalik River drainage and April 1 through August 31 in the remainder of Unit 23; and no calves could be taken. From 1990 through 2015, hunters in GMU 23 could harvest five caribou per day with a closed season for cows from May 16 to June 30. RC907, like other registration permit hunts, required hunters to report successful harvests online, by telephone, by pre-paid mail, a drop box at the Kotzebue ADF&G office, or in person. Unsuccessful hunters, and those who did not hunt, were required to submit their report by July 15. State regulations also specify one controlled use area (CUA) in GMUs 22 and 23. During the 2017–2018 study year, the Noatak CUA was redefined as a corridor extending five miles on either side of and including the Noatak River beginning at the mouth of the Agashashok River and extending upstream to the mouth of the Nimiuktuk River. In 2017–2018, this area was closed to the use of aircraft in any manner for big game hunting from August 15 to September 30. Under 2017–2018 state regulations, nonresident hunters hunting for caribou in Units 22 and 23 were limited to one bull (per hunt area), and they needed a harvest ticket, a big game hunting license, and a metal locking tag. Sixty-day seasons for nonresidents, each with a one-bull bag limit, occurred simultaneously (August 1–September 30) in Unit 22D[6] and Unit 22E[7]. The same nonresident hunt openings occurred in Unit 23. Regulations in GMUs 22 and 23 can vary by specific subunits and geographic areas, and more detail can be found in the ADF&G 2017–2018 Alaska hunting regulations booklet.

Federally qualified users hunting on federal public lands in GMU 22 during the 2017–2018 regulatory year could harvest five caribou a day with no allowable harvest of calves (Federal Subsistence Management Program 2016). In GMU 23, the Federal Subsistence Board passed Temporary Special Action WSA17-03,

3. However, ANCSA corporations and individual allotment owners may limit access to Native-owned lands, like any other landowner. NANA, Inc. has placed restrictions on access to its lands for hunting, fishing, and trapping by nonshareholders.
4. Federal qualifications include being a rural Alaska resident domiciled in a community determined to have customary and traditional use of a fish stock or game population.
5. Comparisons between registration permit data and harvest survey data will occur in future years.
6. That portion of the Kuzitrin River drainage (excluding the Pilgrim River drainage) and the Agiapuk River drainage.
7. That portion east of and including the Sanaguich River drainage.

which closed certain federal public lands to hunting of caribou by non-federally qualified hunters.[8] The lands closed to non-federally qualified users included a ten-mile-wide corridor along the Noatak River from the western boundary of the Noatak National Preserve upstream to the Cutler River, the Eli River drainage, the Agashashok River drainage and the Squirrel River drainage (Western Arctic Caribou Herd Working Group 2017). Regulations for federally qualified users hunting on the majority of federal public lands in GMU 23 during the 2017–2018 regulatory year allowed for bull harvest from July 1 to October 14 and from February 1 to June 30. Cow harvest was allowed from July 15 to April 30; however, cows accompanied by calves could not be taken between July 31 and October 14. Regulations varied slightly in the portion of GMU 23 which includes all drainages north and west of and including the Singogalik River drainage. In this area, bulls could be harvested from July 1 to October 14 and from February 1 to June 30. Cow harvests were allowed from July 31 to March 31; however, cows accompanied by calves could not be taken between July 31 and October 14. Under both state and federal hunting regulations, hunters in GMU 23 may harvest caribou from a boat moving under power and may take swimming caribou with a firearm using rimfire cartridges. These exceptions to general hunting regulations reflect the customary and traditional caribou hunting practices of the residents of Unit 23.

It is the statutory responsibility of ADF&G Division of Subsistence to provide information to the public, agencies, the Alaska Board of Fisheries, and the Alaska 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 trading, 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 effects 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 has gathered big game harvest information in selected Kotzebue and Norton Sound area communities.

8. McKee, C. 2017. "Federal Subsistence Board approves partial closure of Federal public lands to caribou hunting in Unit 23." U.S. Department of the Interior, Federal Subsistence Management Program – Archive. Accessed November 19, 2019. https://www.doi.gov/subsistence/news/general/federal-subsistence-board-approves-partial-closure-federal-public-lands

METHODS

In 2018, division staff collected subsistence harvest information in three communities in the Western Arctic caribou herd range: Deering, Noorvik, and Shishmaref (Figure 1). All data were processed and analyzed by the division. Survey data were expanded to account for unsurveyed households.

Survey timing was designed to coincide with the end of a major harvest period. Deering, Noorvik, and Shishmaref households were asked about their harvest of caribou, other large game, and furbearers between April 2017 and March 2018. Fieldwork occurred in all study communities between late March and early May 2018. Funding for the big game survey was provided by ADF&G divisions of Wildlife Conservation and Subsistence.

The division's policy is to seek community approval before conducting local research. Division of Subsistence obtained community approval from the traditional councils of all study communities. ADF&G Subsistence Research Specialist (SRS) Elizabeth Mikow and SRS Daniel Gonzalez traveled to Noorvik in March 2018 to train local surveyors and help administer surveys. In Noorvik, ADF&G hired local residents Hannah L. Coffin, Kirk Sampson, Floyd Mulluk, Jeff L. Melton Sr., Jeffery Melton Jr., Micheal T. Brown Sr., Jack W. Stone Jr. Kaydin Barr, and Paul Brown III to update the household list and complete surveys. SRS Mikow and SRS Gonzalez traveled to Shishmaref in early May 2018, where they trained local surveyors and helped administer surveys. In Shishmaref, ADF&G hired local residents Cody R. Nayokpuk, Alice Schultze, Patrick Iyatunguk, Joel Magby, Perry Lee Weyiouanna, Anthony Fernandez, Bert Iyatunguk, Tiffany Irene Magby, and Gloria Pootoogooluk. SRS Mikow and Fish and Wildlife Technician III Kathleen Roush visited Deering in May of 2018. In Deering, ADF&G hired local residents Calvin D. Moto II, Pauline Dewey, and Alice Jones.

Survey Design in 2018

The Division of Subsistence standard method for collecting harvest information in smaller communities is through a census: that is, an attempt to survey every household, usually by talking to the head or heads of each household.

Confidentiality is protected by using randomly assigned household numbers instead of names on the survey form. Before starting the project, survey workers compile an updated list of every household present in the community during the study period. Participation in surveys is voluntary: people may refuse to answer any or all questions. Surveyors try to contact each household on three separate occasions. If no contact is made, then that household is recorded as "no contact." There are a variety of reasons why 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, and they make appointments for surveys when necessary.

The big game survey used in 2018 (Appendix A) gathered demographic information for each household member: the age, sex, and relationship to the head(s) of household, whether members were Alaska Native, and whether members hunted for caribou during the study year (Table 1).

The survey included questions about harvests and uses of caribou, moose *Alces alces*, brown bear *Ursus arctos*, black bear *Ursus americanus*, wolf *Canis lupus*, and wolverine *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, muskox and Dall sheep were left off the survey. Harvest amounts for big game resources, excluding furbearers, are reported both in numbers of animals harvested and edible weight (see Table 2 for conversion factors). Researchers also asked about sharing (i.e., if a household gave away a resource to other households or if the household received one). Harvest locations were recorded by ADF&G Division of Wildlife Conservation Uniform Coding Unit (UCU). These units are geographical areas that can vary in size from 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 this study period, as in the previous

Table 1.–Demographic characteristics of sampled households in study communities, Alsaka, 2017–2018.

Characteristics	Community		
	Deering	Noorvik	Shishmaref
Sampled households	46	100	110
Eligible households	53	133	141
Percentage sampled	86.8%	75.2%	78.0%
Household size			
Mean	3.5	4.0	3.8
Minimum	1.0	1.0	1.0
Maximum	9.0	17.0	12.0
Age			
Mean	29.4	32.5	30.3
Minimum[a]	1.0	1.0	0.0
Maximum	80.0	92.0	92.0
Median	27.5	27.0	26.0
Sex			
Estimated male			
Number	103.2	304.0	307.1
Percentage	56.3%	57.9%	57.5%
Estimated female			
Number	80.0	221.4	227.4
Percentage	43.7%	42.1%	42.5%
Alaska Native			
Estimated households[b]			
Number	53.0	133.0	141.0
Percentage	100.0%	100.0%	100.0%
Estimated population			
Number	177.4	445.5	473.0
Percentage	96.9%	84.8%	88.5%

Source ADF&G Division of Subsistence household surveys, 2018.

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 one head of household identifies as Alaska Native.

Table 2.–Usable pounds per unit resource, study communities, 2017–2018.

Resource	Units	Usable pounds per unit
Black bear	ind	88
Brown bear	ind	86
Caribou	ind	136
Moose	ind	538
Muskox	ind	593

Sources: ADF&G, Division of Subsistence and Kawarek, Inc., Subsistence Hunting Harvest Survey GMU 22.

year's survey, respondents were given the option of naming a season of harvest. At times, season of harvest (for example, fall) is the most detail that can be obtained; in previous studies this has been merely recorded as "unknown." Surveys typically took five to ten minutes to administer.

Cooperative harvests are common in rural Alaska, and hunters sometimes pool resources, particularly fuel, for the hunting effort. In order to avoid double-counting harvests, harvests are attributed to the household of the hunter who actually shot the animal. For some resources, particularly caribou, that level of detail is difficult to obtain because hunting parties often harvest many animals: in this case, respondents were asked about how many animals were their share of the total harvest.

Sample achievement varied in the three communities: 87% of Deering households, 75% of Noorvik households, and 78% of Shishmaref households participated in the survey (Table 1).

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[9] 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 two times by different staff members. As the first step in data validation, the two versions were compared and corrected according to the actual values recorded on paper surveys. Once entered and validated, data were then extracted using SPSS version 21.0 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 of 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 percentage 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:

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

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

where:

$t_{\alpha/2}$ = Student's *t* statistic for given alpha level (α) of n–1 degrees of freedom. The commonly accepted standard is to use 1.96; however, for very small populations, fewer than about 140, the appropriate value must be identified from a look-up table (Cochran 1977). In this case our sampling frame is households, therefore this standard applies to the number of sampled households. Built-in SPSS functions were used to do this by community for this analysis.

$S_{\bar{x}}$ = the sample standard deviation

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

n = sample size for a community

N = total 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 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.

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

Percentages of households that reported use of caribou varied little between the three study communities. In Shishmaref, 97% of households reported using this resource, followed by 94% in Deering and Noorvik (Table 3). Deering is situated inside of the commonly understood winter range of the Western Arctic caribou herd (Figure 1). Noorvik is located in the herd's migratory range. Shishmaref is located west of the winter and peripheral ranges. Although access to caribou may be more difficult for hunters in communities in the migration area of the range or outside of the current range altogether, traditional food distribution networks based on sharing and barter may account for the high levels of use. There was greater variability in the percentage of households that hunted caribou between communities. Shishmaref had the highest percentage of households attempting to harvest caribou (67%), followed by Deering (63%) and Noorvik (59%; Table 3).

The percentages of households that reported harvesting caribou varied between the three study communities. In Noorvik, 40% of households harvested caribou during the study year (Table 3). In Deering (57%) and Shishmaref (54%), the percentages of households that harvested caribou were significantly higher than in Noorvik. Household success rates (roughly measured by dividing the percentage of households that harvested caribou by the percentage of households that attempted to do so) were significantly higher in Deering than Shishmaref and Noorvik during the study year. In Deering and Shishmaref, 90% and 80% of hunting households were successful in their efforts, respectively (Table 4). In Noorvik, 68% of hunting households successfully harvested caribou.

Individual hunter success rates were lower in each community than household success rates, likely due to the presence of multiple hunters in a single household. In Deering, 43 of the estimated 55 caribou hunters (77%) were successful (Table 4). Individual hunter success rates were lowest in Noorvik: 79 of the estimated 169 caribou hunters (47%) were successful. For individual Shishmaref hunters, the success rate was 54% (88 of the estimated 161 caribou hunters).

However, these rough measures of success do not account for other measurements of effort such as the number of trips made, instances of trips made with no harvest, distance traveled, and money spent on gasoline and other supplies. The prevalence of sharing subsistence food accounts for the difference between percentages of harvest and use in the three study communities. For example, although 40% of households in Noorvik harvested caribou, 94% used the resource during the study year.

Total caribou harvest by community ranged from 250 animals in Noorvik to 376 in Shishmaref. Looking at results in terms of per capita harvests (pounds per person) allows comparisons of results between communities with different population sizes as well as results from a single community over time. Deering harvested the most caribou per capita during the study year: an estimated 254 lb per resident. Shishmaref harvested the second most caribou per person (96 lb per capita), followed by Noorvik (65 lb per capita).

Table 3.–Estimated harvest and use of caribou, study communities, 2017–2018.

	Percentage of households					Estimated harvest			
Community	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total amount	Mean amount per household	Pounds per capita	95% CI harvest
Deering	93.5%	63.0%	56.5%	58.7%	71.7%	342.2	6.5	254.0	14.6%
Noorvik	94.0%	59.0%	40.0%	40.0%	80.0%	250.0	1.9	64.7	14.2%
Shishmaref	97.3%	67.3%	53.6%	62.7%	77.3%	375.6	2.7	95.6	11.2%

Source ADF&G Division of Subsistence household surveys, 2018.

Table 4.–Caribou hunting success and effort by community, 2017–2018.

	Community		
	Deering	Noorvik	Shishmaref
Estimated households			
Total	53	133	141
Hunting			
number	33.4	78.5	94.9
percent	63.0%	59.0%	67.3%
Successful			
number	30.0	53.2	75.6
percent	89.7%	67.8%	79.7%
Estimated hunters			
Total	55.3	169.0	160.9
Percent of population	30.2%	32.2%	30.1%
Successful			
number	42.6	78.6	87.5
percent	77.1%	46.5%	54.3%
Hunters per			
All households	1.0	1.3	1.1
Hunting households	1.7	2.2	1.7
Successful households	1.8	3.2	2.1
Harvest per			
All households	6.5	1.9	2.7
Hunting households	10.2	3.2	4.0
Successful households	11.4	4.7	5.0
Population	1.9	0.5	0.7
All hunters	6.2	1.5	2.3
Successful hunters[a]	8.0	3.2	4.3

Source ADFG Division of Subsistence household surveys, 2018.

a Individual hunter success was derived by attributing at least 1 harvested carbou per hunter identified in each household. In instances where the number of hunters exceeded harvested caribou for a household, the number of successful hunters was set to the number of caribou actually harvested. This number is meant to represent the maximum estimate of successful hunters in the community.

Detailed information on the harvest and uses of caribou and all other resources queried during the survey is available in Appendix B.

The survey asked about sex and month of harvest. For a complete breakdown of caribou harvest by sex and month, see Appendix C. 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, a large number of animals harvested by a particular hunter or household (in the case of caribou), and which member of the household answers the survey questions. Although surveyors attempt to speak to the hunters, they are at times unavailable, and another household head may respond to the survey questions. A hunter may be out of town, for example, and although the spouse can provide the number of caribou harvested, he or she may not be able to recall the sex or the exact month the caribou was harvested. Often, the season of harvest (for example, fall) is the most detail that can be obtained.

The majority of Deering's harvest was bulls (51%); the remaining harvest was composed of cows (44%) and caribou of unknown sex (5%; Table C1). Month of harvest data are available for 13 caribou (4% of the harvest); these took place in April, July, and October 2017 and March 2018 (Figure 2; Table C1). A number of respondents were able to recall the season, but not the month of harvest; 51% of the harvest (175 caribou) was taken during unknown winter months, 13% (44 caribou) during unknown spring months, 16% (55 caribou) during unknown summer months, and 5% (18 caribou) during unknown fall months. An additional 11% of the harvest (37 caribou) occurred during unknown seasons.

In Noorvik, 41% of the harvest was bulls, 56% was cows, and 3% was caribou of unknown sex (Table C2). No harvests were reported for April, May, June, and July. August and September harvests together composed 62% (154 caribou) of the total caribou harvest during the study year (Figure 3; Table C2). Another 8% of the harvest (20 caribou) occurred in March; harvests in this month were the third greatest of the study year. Some respondents were able to recall the season, but not the month of harvest; four caribou (2% of the harvest) were harvested during unknown winter months, five caribou (2%) were harvested during unknown spring months, and eight caribou (3%) were harvested during unknown fall months. An additional 2% of the harvest (five caribou) occurred during unknown seasons.

The majority of Shishmaref's harvest was bulls (68%); the remaining harvest was composed of cows (19%) and caribou of unknown sex (14%; Table C3). No harvests were reported for May, June, and October. Harvests in April and July (10 caribou) together composed 3% of the total caribou harvest. Harvests in August and September (42 caribou) accounted for 11% of the total harvest. November harvests (3 caribou) totaled slightly less than one third of December harvests (10 caribou); 3% of the harvest occurred in these months. Combined harvests in January, February, and March accounted for 13% of the total harvest; 17 caribou were harvested in each of those months (Figure 4; Table C3). Some respondents were able to recall the season, but not the month of harvest; 17% of the harvest (65 caribou) occurred during unknown winter months, 2% (9 caribou) were harvested during unknown spring months, 9% (33 caribou) during unknown summer months, and 28% (105 caribou) occurred during unknown fall months, and n additional 13% of the harvest (47 caribou) occurred during unknown seasons.

Caribou harvests took place in 14 UCUs near the study communities in 2017–2018 (Figure 5). Harvest by location is broken down by community in tabular form in Appendix D; figures 6, 7, and 8 show harvest apportioned to the UCUs for each community separately. The survey did not ask where the caribou were hunted, but rather where they were killed. Thus, these data do not represent the totality of areas searched. The UCU data indicate the most common generalized harvest areas for the study year. In any year, hunters may use a vastly larger (or smaller) area than reflected in these maps.

In Deering, 56% of the harvest (191 caribou) took place in the UCU where the community is located (Figure 6; Table D1). Hunters identified three additional UCUs as areas where caribou were harvested during the study year. In an adjacent UCU to the south and east of Deering that contains the Kugruk River, hunters harvested 84 caribou (25% of the estimated harvest). Six caribou (2% of the estimated harvest) were harvested in a UCU that contains the community of Buckland. The last UCU reported by hunters is situated north and west of the community of Deering; hunters harvested one caribou in this area (>1% of

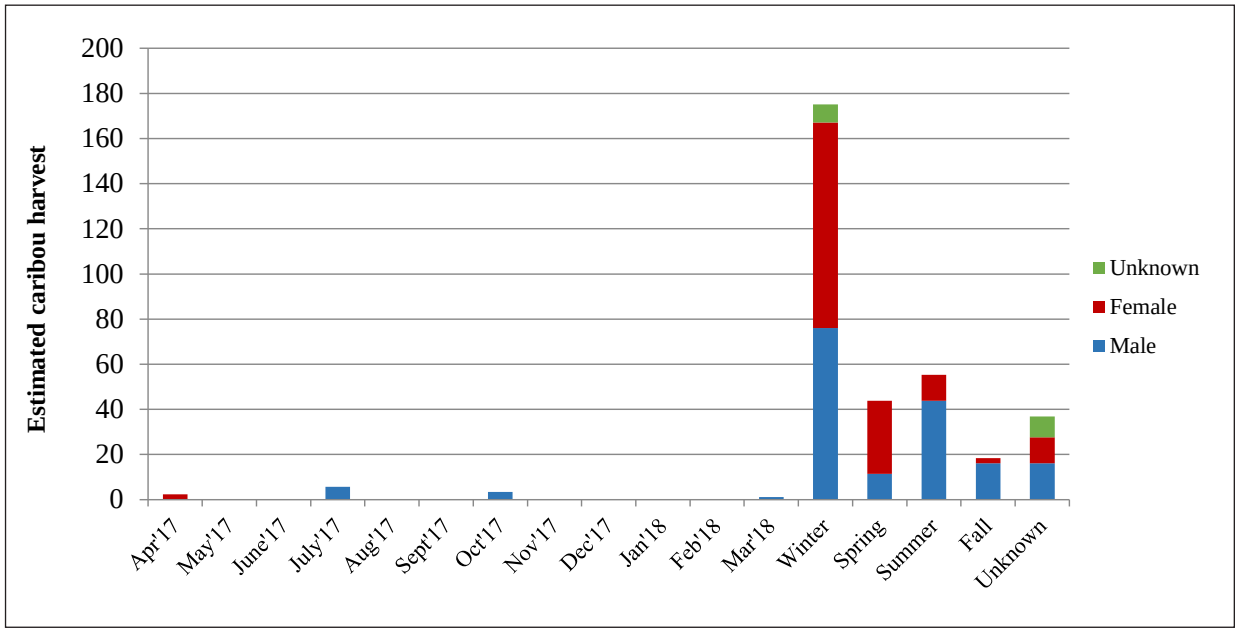

Figure 2.–Caribou harvests by sex and month of harvest, Deering, 2017–2018.

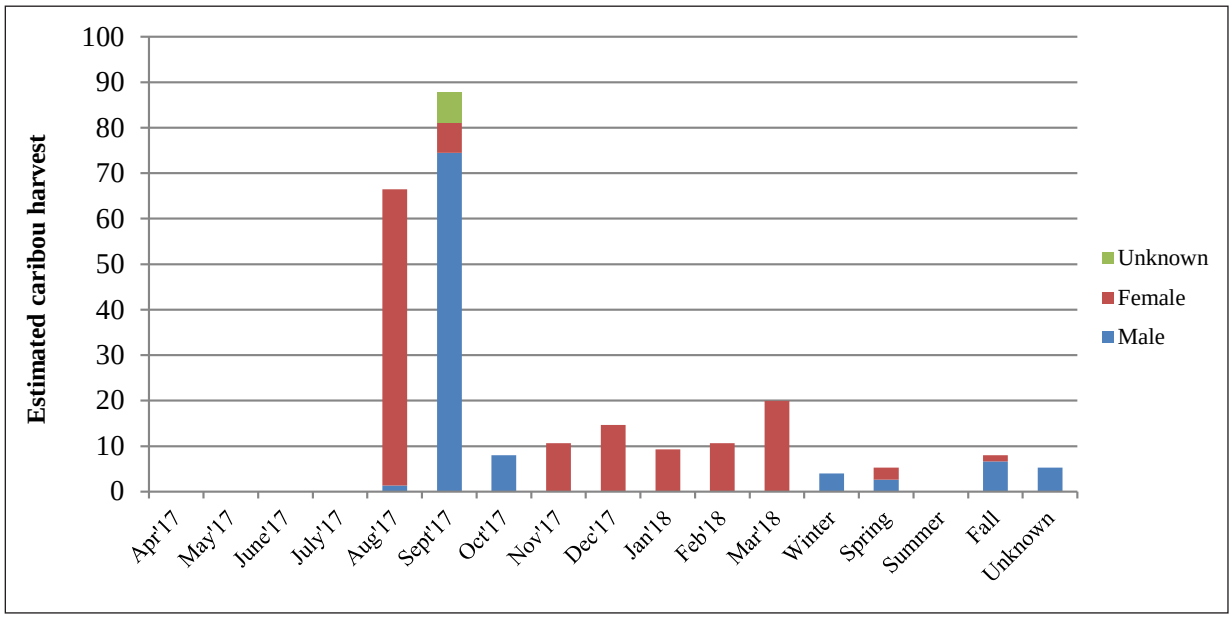

Figure 3.–Caribou harvests by sex and month of harvest, Noorvik, 2017–2018.

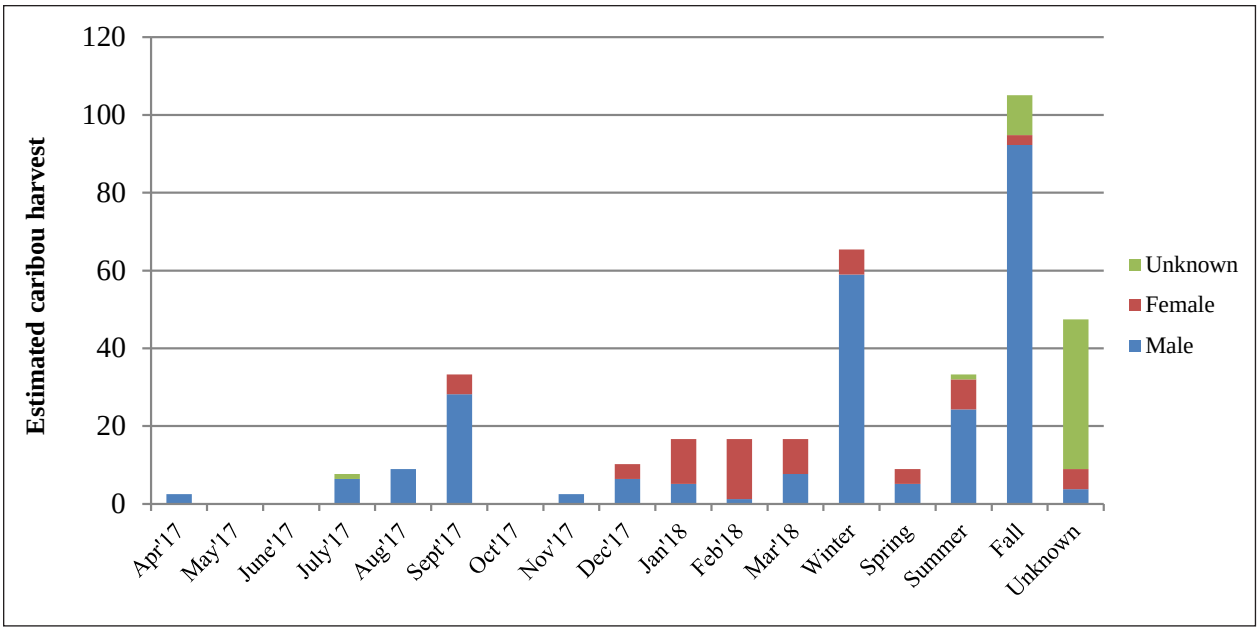

Figure 4.–Caribou harvests by sex and month of harvest, Shishmaref, 2017–2018.

the estimated harvest). Harvest location data were not reported for 60 caribou, or 18% of the harvest, during the study year.

In Noorvik, 32% (81 caribou) of the harvest took place in the UCU where the community is located. Hunters identified six additional UCUs as areas where caribou were harvested during the study year. (Figure 7; Table D2). Noorvik residents harvested 68 caribou (27% of the harvest) in an adjacent UCU to the east of the community containing the Kobuk River. An additional 37 caribou (15% of the harvest) were harvested in an adjacent UCU to the south that contains the community of Selawik and Selawik Lake. Twenty-five more caribou (10% of the harvest) were harvested in another adjacent UCU to the west of Noorvik that contains the city of Kotzebue and the Baldwin Peninsula. Two of the three remaining UCUs identified by hunters accounted for 11 caribou (4% of the harvest) each; these UCUs contained the community of Buckland and the area north and northwest of the community of Kiana. Noorvik hunters harvested the fewest caribou in the UCU containing the mouth of the Noatak River (seven animals, or 3% of the harvest). Harvest location data were not reported for 11 caribou, or 4% of the harvest, during the study year.

In Shishmaref, 62% (233 caribou) of the harvest took place in a UCU containing the Serpentine River, southeast of where the community is located. This UCU is located west of the peripheral range; the herd did spend time on the Seward Peninsula during the study year.[10] Presence of the herd west of the peripheral range was also reported in 2014: a key respondent from Shishmaref told researchers that caribou were observed fawning on the Seward Peninsula (Braem et al. 2017). Hunters harvested caribou across four other UCUs (Figure 8; Table D3). Eighty-seven caribou (23% of the estimated harvest) were harvested in a UCU to the east of Shishmaref; this UCU contains Cowpack River and Cape Espenberg. Smaller harvests were reported in the UCU containing the community of Buckland (six caribou), the UCU containing the Goodhope River (one caribou) and the UCU containing the Arctic River and Sanaguich River (one caribou). Harvest location data were not reported for 46 caribou, or 12% of the harvest, during the study year.

10. D.A. Hansen, ADF&G Wildlife Biologist, personal communication with E.H. Mikow, December 4, 2019.

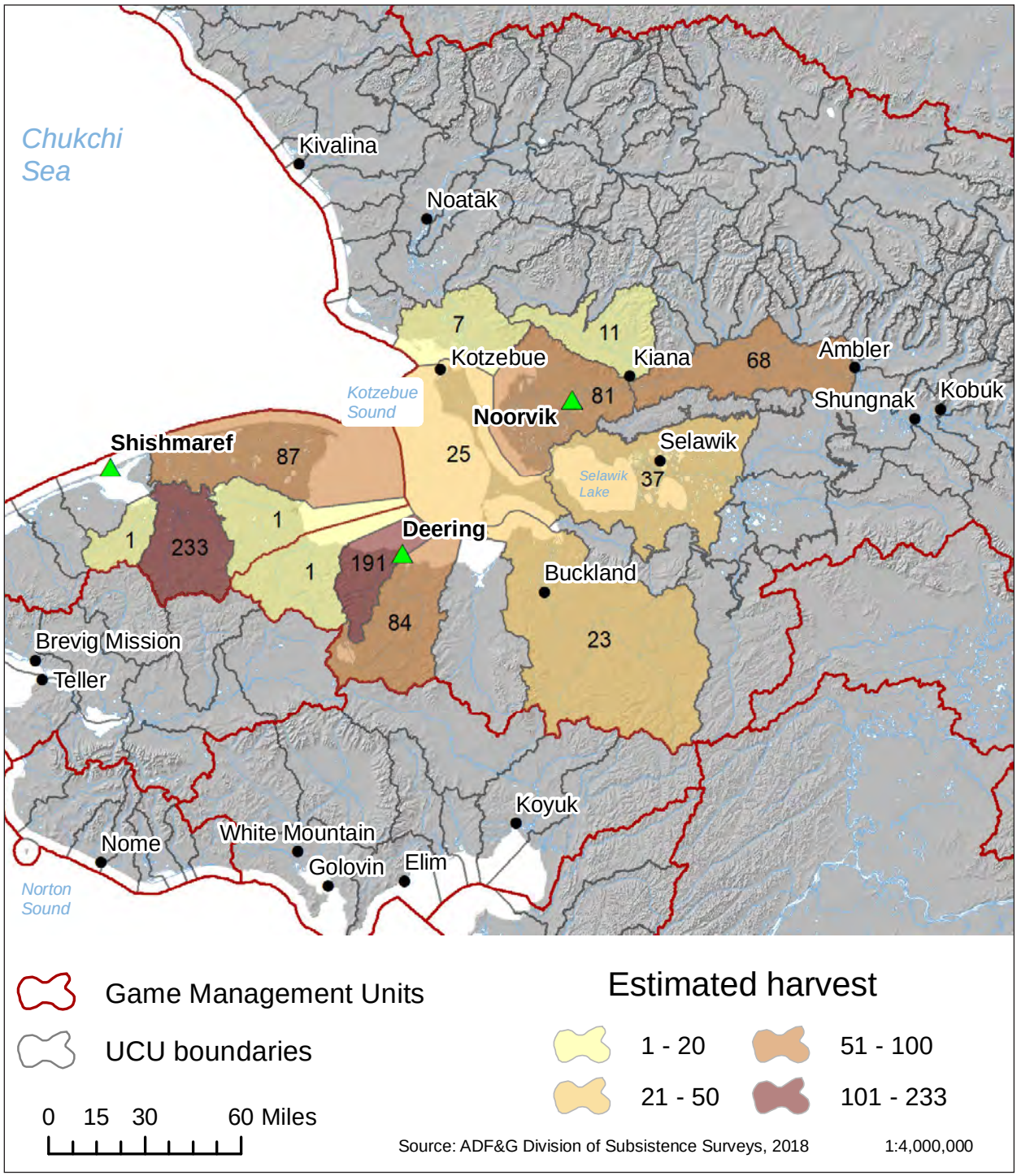

Figure 5.–Caribou harvests by UCU, study communities, 2017–2018.

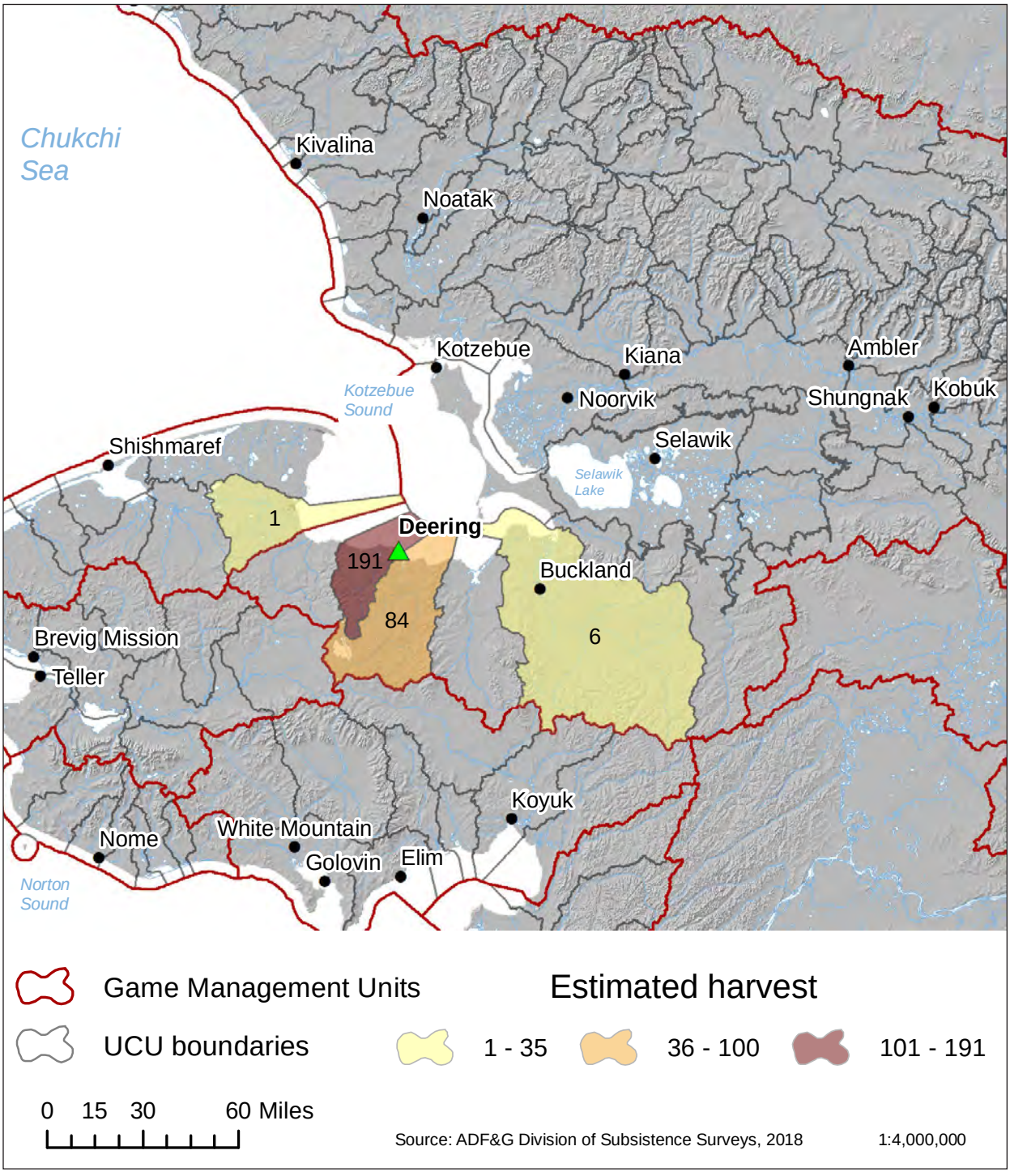

Figure 6.–Caribou harvests by UCU, Deering, 2017–2018.

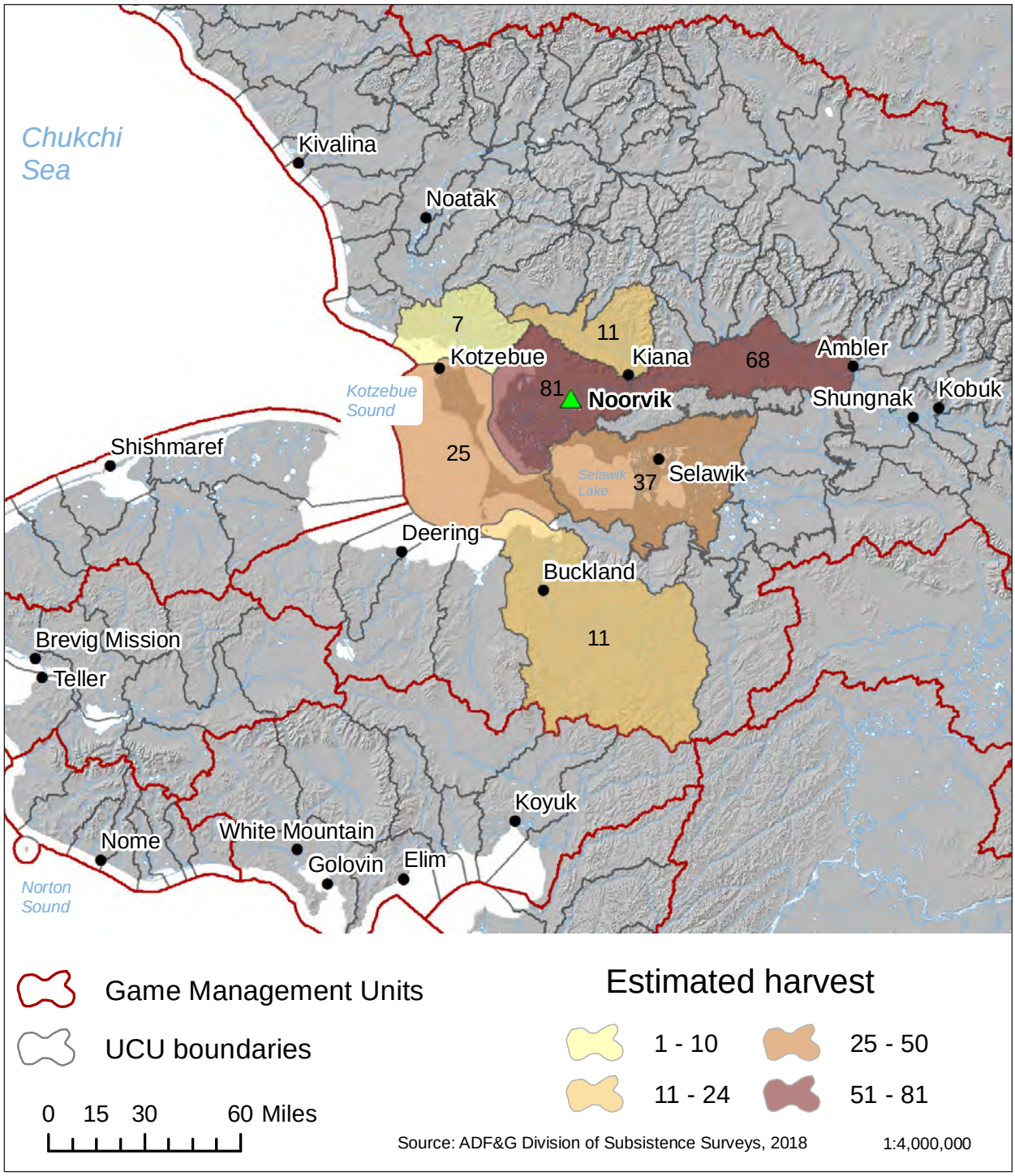

Figure 7.–Caribou harvests by UCU, Noorvik, 2017–2018.

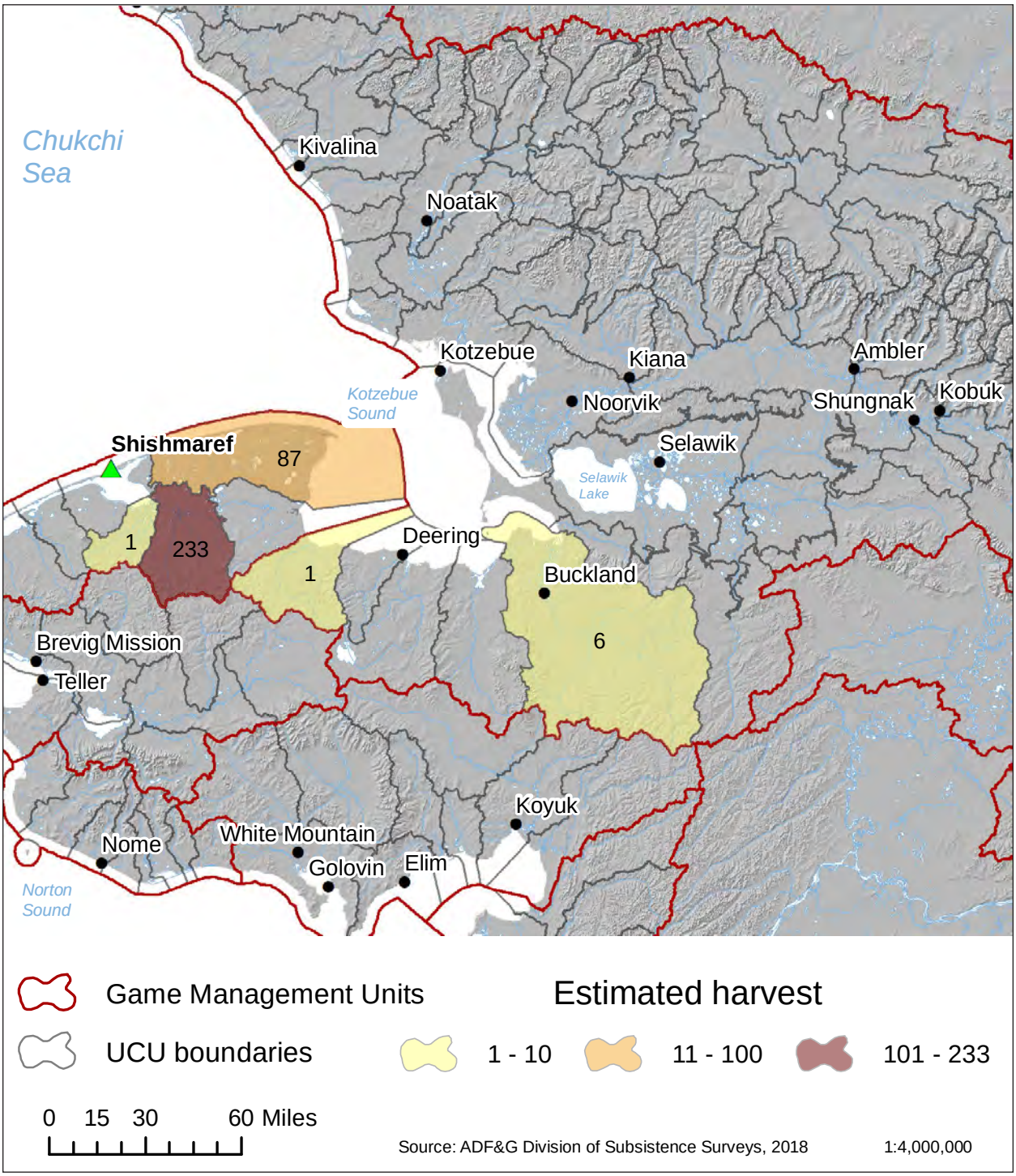

Figure 8.–Caribou harvests by UCU, Shishmaref, 2017–2018.

Moose and Other Big Game

Rates of use for moose varied much more between the study communities than rates of use for caribou (tables 3 and 5). Only 33% of households in Deering and 44% of households in Shishmaref reported using moose. Significantly more households reported using moose during the study year in Noorvik (54%) than the other study communities (Table 5). In all three communities, much smaller percentages of households attempted to harvest moose compared to households that attempted to harvest caribou (tables 3 and 5).

Success rates were significantly lower in Shishmaref and Deering for moose than those for caribou (tables 3 and 5). Of the 25% percent of Shishmaref households that hunted moose during the study year, 41% had success. In Deering, 9% of households attempted to harvest moose and 75% of those households were successful. In Noorvik, 38% of households attempted to harvest moose and 61% of those households did so successfully; this rate of successful harvest is similar to that of caribou for the study year. Harvests were 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.

During the study year, Deering households harvested five moose (14 lb per capita), Noorvik households harvested 36 moose (37 lb per capita), and Shishmaref residents harvested 15 moose (16 lb per capita; Table 5). In Deering, hunters harvested four moose in the fall and one moose in August (Table C4). In Noorvik, equal harvests occurred in August (13 moose) and September (13 moose); each month represents 37% of the total moose harvest for the study year (Table C5). The other 26% of the harvest took place in October (one moose), unknown fall months (three moose) and unknown months (five moose). In Shishmaref, 50% of the moose harvest (eight moose) occurred in September (Table C6). Another 25% (four moose) were harvested in unknown winter months. The other harvests took place in unknown fall months (three moose) and August (one moose).

Overall, study communities reported harvesting moose in eight UCUs in 2017–2018 (Figure 9). Harvest information by UCU for study communities presented in tabular form can be found in Appendix D. In Deering, 100% of the harvest (five moose) occurred in the UCU containing the community and the Inmachuk River (Figure 10; Table D4).

In Noorvik, 82% of the harvest (29 moose) occurred in the UCU containing the community (Figure 11; Table D5). Three moose (8%) were harvested to the northeast of the community in an area containing the Squirrel River and the community of Kiana. Hunters harvested an additional three moose (8%) in an UCU to the northeast of Kiana, and one moose (4%) in the UCU containing the Ambler River.

Shishmaref moose harvests occurred in three UCUs. Nine moose (58% of total estimated moose harvest) were harvested in the area to the southeast of the community that contains the Serpentine River (Figure 12; Table D6). Three moose (17%) were harvested in an UCU to the east of the community that contains the Cowpack River and Cape Espbenberg. A moose was also harvested by Shishmaref hunters in an UCU encompassing the Arctic and Sanaguich rivers. Harvest location information was unattainable for three moose harvested by Shishmaref hunters.

Table 5.–Estimated harvest and use of moose, study communities, 2017–2018.

	Percentage of households					Estimated harvest			
Community	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total amount	Mean amount per household	Pounds per capita	95% CI harvest
Deering	32.6%	8.7%	6.5%	6.5%	26.1%	4.6	0.1	13.5	31.4%
Noorvik	54.0%	38.0%	23.0%	25.0%	45.0%	35.9	0.3	36.8	14.5%
Shishmaref	43.6%	24.5%	10.0%	5.5%	39.1%	15.4	0.1	15.5	20.1%

Source ADF&G Division of Subsistence household surveys, 2018.

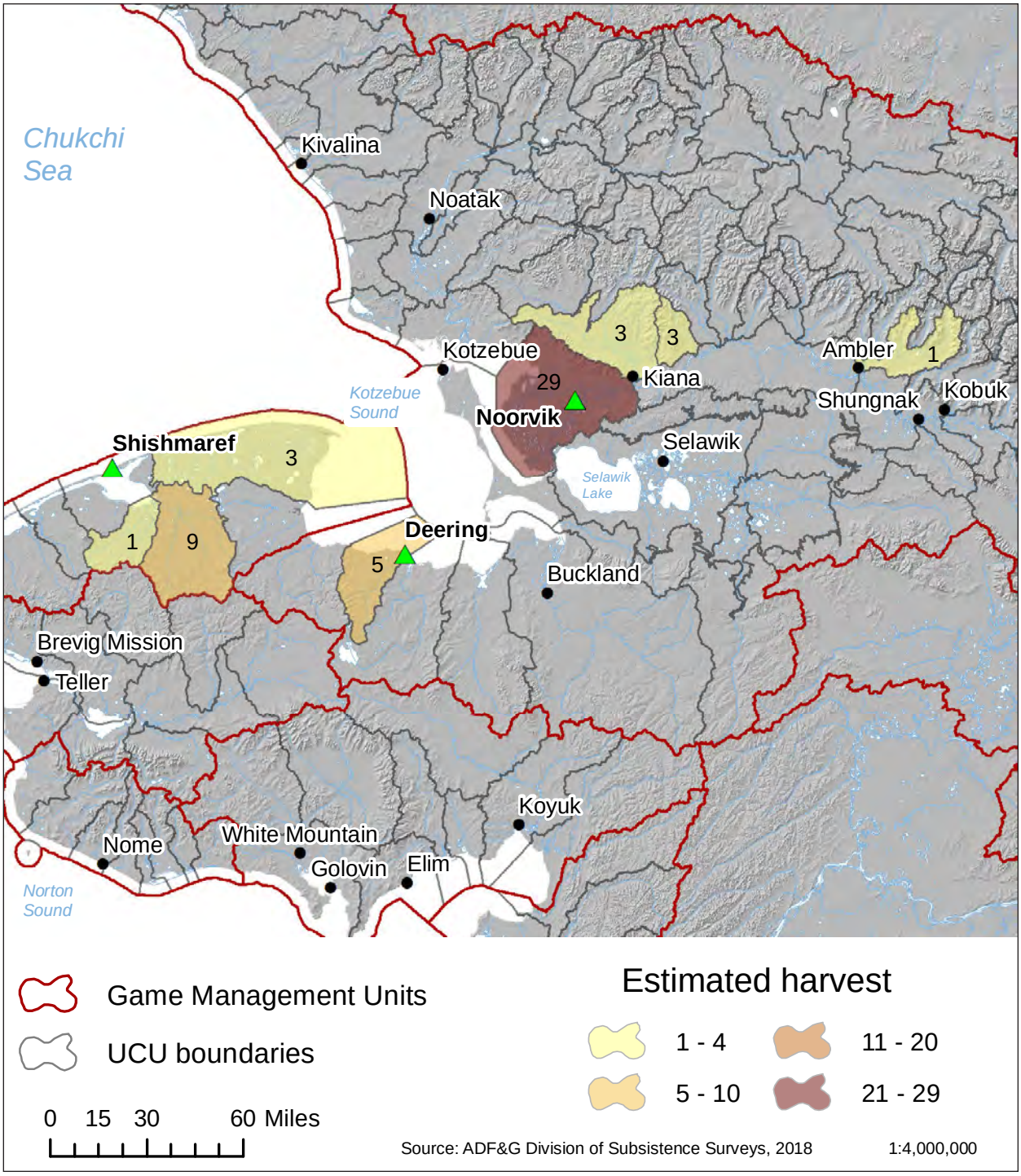

Figure 9.–Moose harvests by UCU, study communities, 2017–2018.

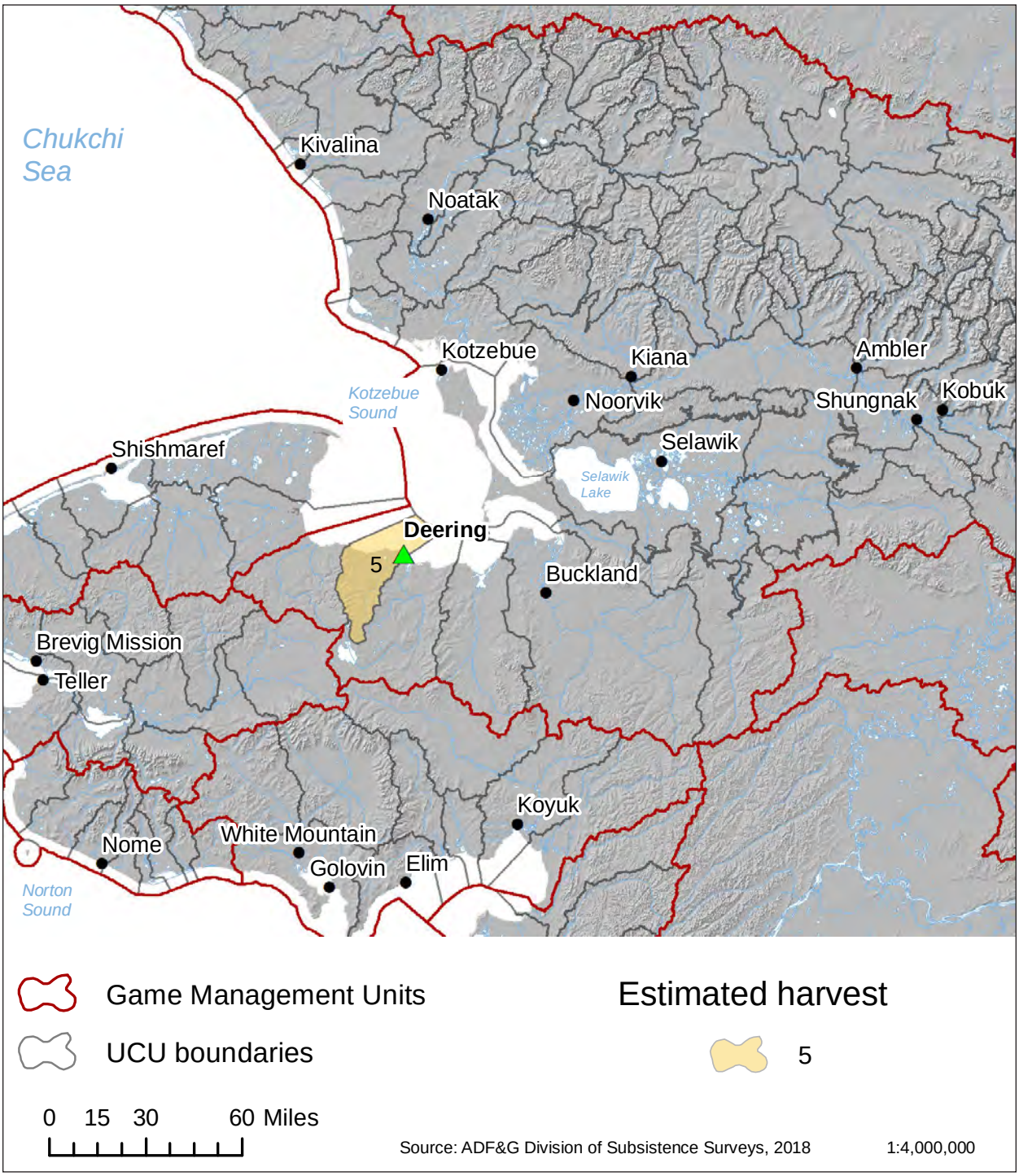

Figure 10.–Moose harvests by UCU, Deering, 2017–2018.

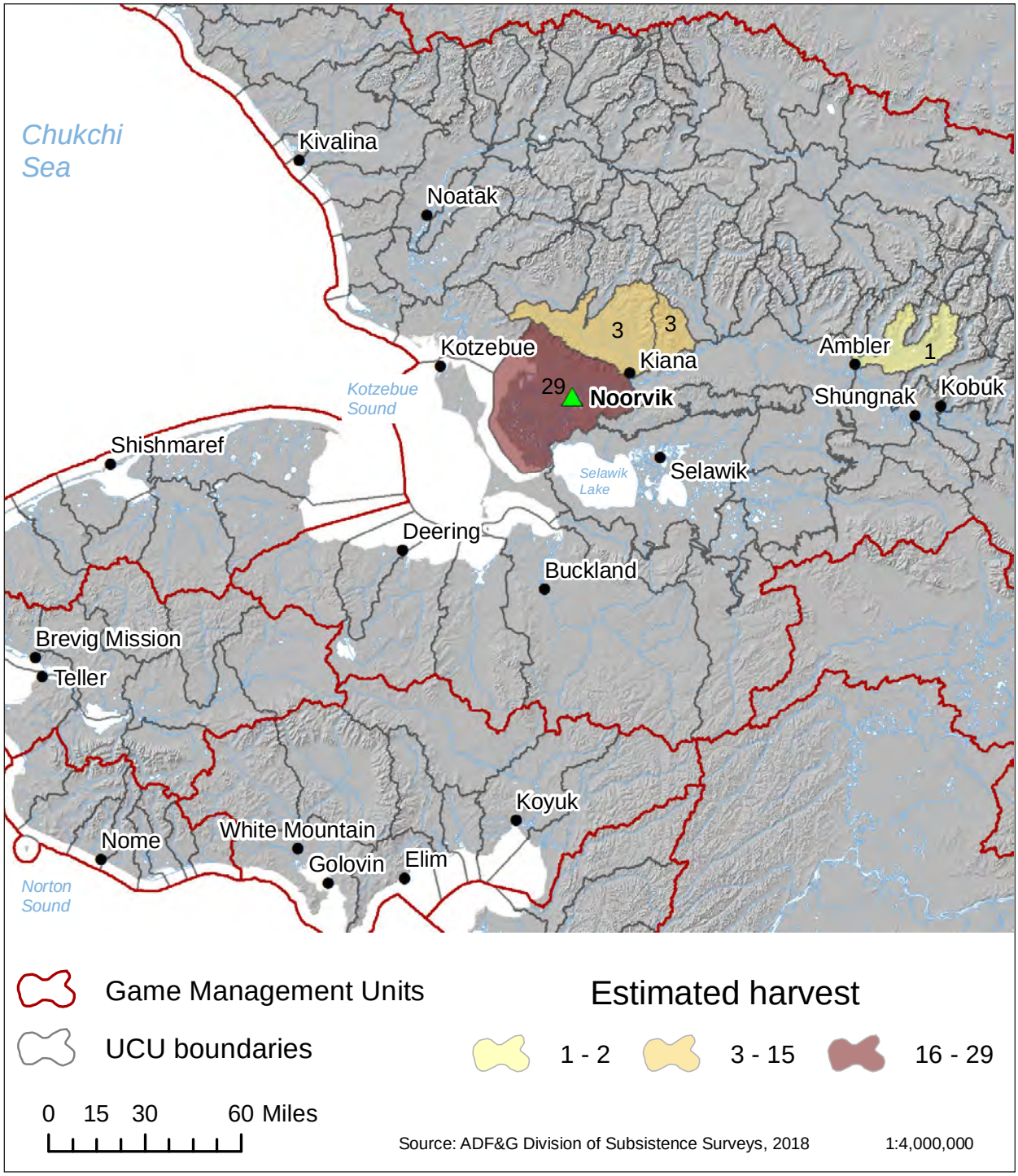

Figure 11.–Moose harvests by UCU, Noorvik, 2017–2018.

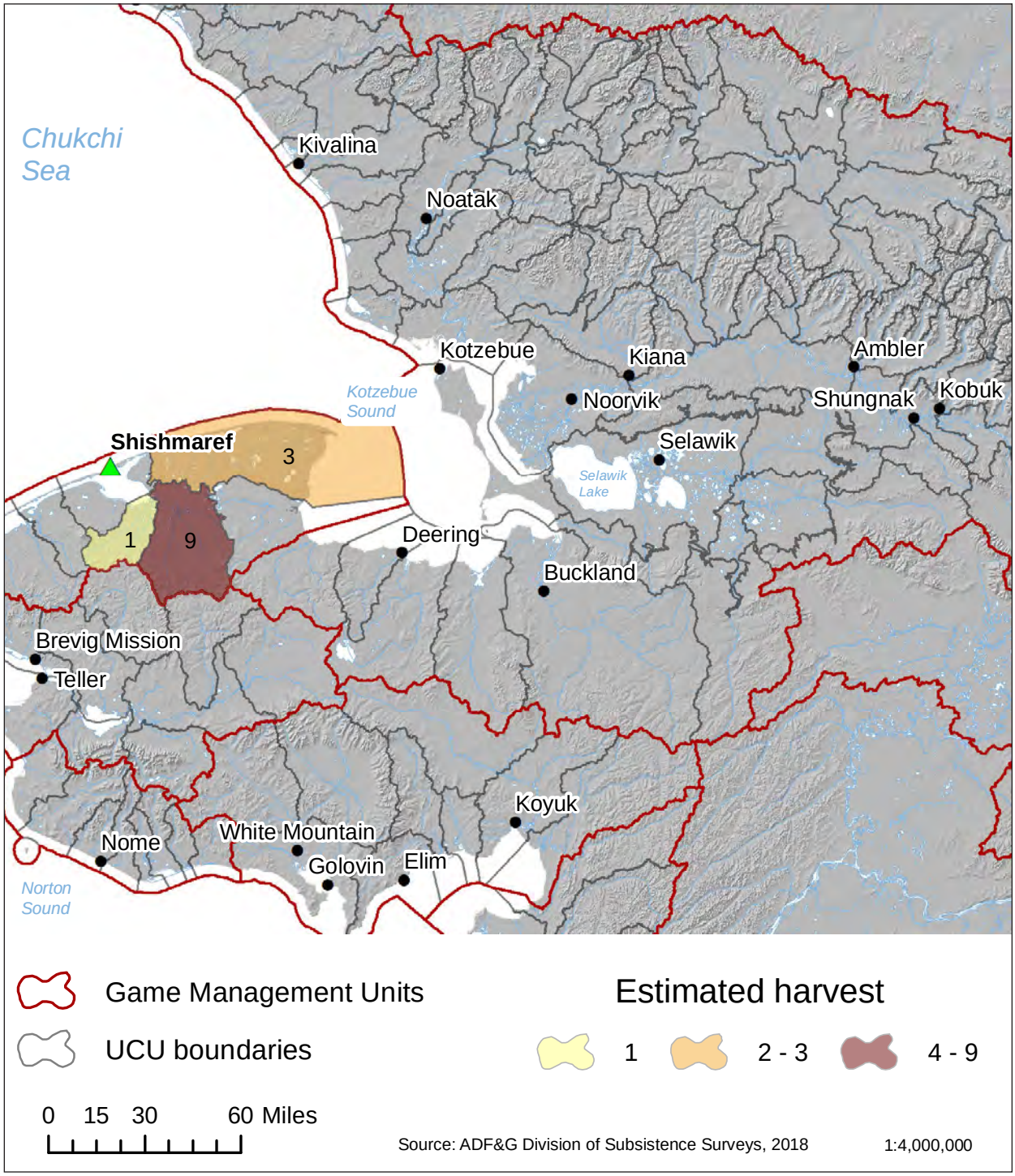

Figure 12.–Moose harvests by UCU, Shishmaref, 2017–2018.

Respondents in all three study communities reported no or very limited harvest and use of brown and black bears during the study year. In Deering, no households used or attempted to harvest bears (Table B1). In Noorvik, 7% of households used brown bear and 3% used black bear in 2017–2018; an estimated five brown bears and no black bears were harvested (Table B2). Shishmaref residents reported no use or harvest of any bears (Table B3).

Furbearers

The survey asked about the harvest and use of two furbearers: gray wolf and wolverine. Deering residents harvested one wolf and one wolverine (Table B1). Both species were harvested and used by 2% of households. In Noorvik, three wolves were harvested during the study year; 2% of households attempted harvest and successfully harvested this resource (Table B2). Residents in Shishmaref harvested three wolves and three wolverines; harvest and use rates were 2% for both resources (Table B3).

Summary of Respondent Comments

Following the survey, some respondents in Deering, Noorvik, and Shishmaref provided comments and concerns, and some themes emerged across the study communities. Respondents in all three communities voiced concerns about predator populations in the region. In Deering, and Noorvik, respondents shared their observations that wolf populations have increased locally; they suggested and requested that actions be taken to reduce the local wolf populations. In Shishmaref, as many as 17% of comments mentioned high brown bear populations; for some hunters, increasing brown bear sightings and interactions have hindered their ability to harvest caribou and tent camp in the region. A respondent in Noorvik had heard that there are too many brown bears in the region; in this case, the respondent planned on harvesting a brown bear when the season started.

Air traffic during hunting season was a common topic among respondents in Noorvik and Shishmaref. Comments varied from requests that air traffic be limited during hunting season and in hunting areas to complaints about planes flying over and redirecting the herd's migration. One Shishmaref respondent expanded upon this, adding that "small planes flying around, we don't need that, they scare away our hunt after we spend lots of money on gas."

Comments about regulations varied between the three study communities. In Deering, respondents were interested in additional permits to hunt muskoxen, extending the filing season for moose harvest tickets, and lower hunting license fees. In Noorvik, a respondent told surveyors that the moose hunting regulations should be changed to one bull any size (instead of a 50-inch rack); they mentioned that those bigger bulls are better breeding stock, that the quality of the meat is better in younger bulls, and that subsistence hunters are not seeking a trophy-sized bull. In Shishmaref, a few respondents wanted caribou hunting to be open further west: one mentioned near the Nuluk River, and two mentioned as far as the community of Wales. Respondents in Deering and Noorvik said the fall migration is happening later and taking different routes; particularly in Noorvik, this was accompanied by comments about not getting enough caribou. A full list of comments can be found in Appendix E.

Comparing the 2017–2018 Results with Previous Survey Data

For this section, harvest data are presented from the Community Subsistence Information System, a repository of Alaska community harvest information compiled by ADF&G Division of Subsistence.[11] Study year 2017–2018 was the fifth year of big game harvest data collection for Deering; the community had been previously surveyed for the 1994 (Magdanz et al. 2002), 2007 (Braem 2011), 2011–2012 (Mikow et al. 2014), and 2013 (Braem et al. 2017) study years. This study year was the fourth year of big game harvest information in Noorvik, which had been surveyed for the 2002 (Georgette et al. 2004), 2008–2009 (Braem 2012a), and 2012 (Braem et al. 2017) study years. Finally, this was the eighth year in which big

11. Alaska Department of Fish and Game (ADF&G) Division of Subsistence, Juneau. "Community Subsistence Information System: CSIS." Accessed November 19, 2019. https://www.adfg.alaska.gov/sb/CSIS Hereinafter *ADF&G CSIS*.

game harvest information was collected for Shishmaref; the community had been previously surveyed for the 1982 (Sobelman 1985), 1989 (Conger and Magdanz 1990), 1995 (Paige et al. 1996), 2000 (Georgette et al. 2017), 2006 (Ahmasuk and Trigg 2008rev.), 2009 (Braem 2012b), and 2014 (Braem et al. 2017) study years.

Because both community size and harvest volumes vary from year to year, per capita harvest is a useful analytical measure for comparison. Although individuals likely use less or more in reality, a per capita analysis controls for any effects of community population size on total harvest and allows a comparison of the harvest per person between multiple years of data, and between communities of different sizes.

Deering hunters harvested 254 lb of caribou per person during the 2017–2018 study year (Table 3), which was the second highest harvest of the five study years (Figure 13). The lowest per capita harvest of caribou on record in Deering was 1994 (131 lb) and the highest was 2013 (430 lb). Deering hunters harvested 14 lb of moose per person in 2017–2018 (Table 5), which was more than the per capita harvest in 2013 (6 lb), and less than that in 1994 (56 lb). No harvests of moose were reported in the 2007–2008 and 2011–2012 study years.

Caribou harvest information for Noorvik prior to this study was limited to three years of data across a spread of 11 years; during this time estimated harvests were consistent, varying by a maximum of 24 lb per capita. Noorvik hunters harvested 65 lb of caribou per capita during the 2017–2018 study year (Table 3), which was the lowest harvest of the four study years (Figure 13). The relatively low level of harvest is not representative of a lower dependence on caribou; more likely it is a result of the irregular fall migration

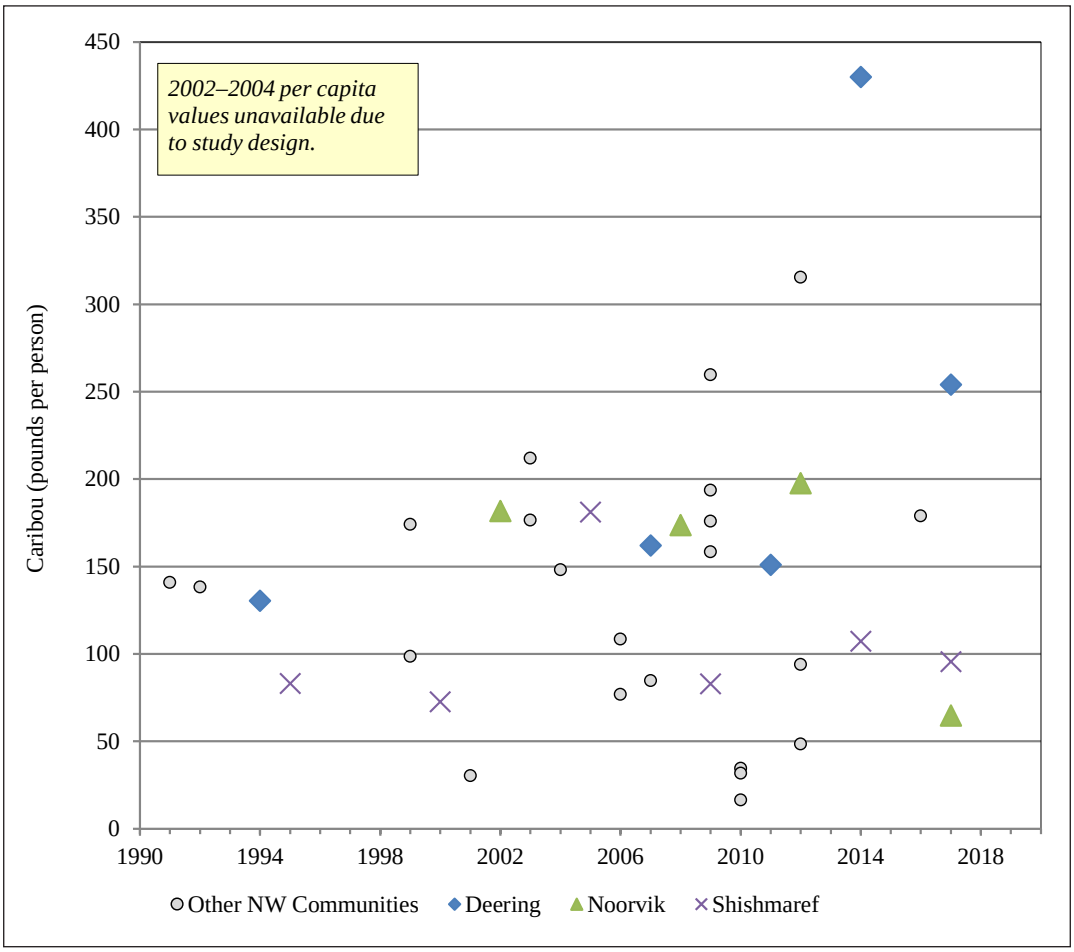

Figure 13.–Per capita caribou harvests, study communities and other Northwest Alaska communities, 1990–2017.

reported by respondents and echoed around the region. Noorvik hunters harvested an estimated 182 lb per capita in 2002, 174 lb in 2008–2009, and 198 lb in 2012. Noorvik hunters harvested 37 lb of moose per capita during the study year (Table 5), which was the second highest recorded harvest. They harvested an estimated 41 lb per person in 2002 and 22 lb in both the 2008–2009 and 2012 study years

Shishmaref hunters harvested an estimated 96 lb of caribou per capita during the 2017–2018 study year, which was the third highest harvest of the seven study years (Table 3; Figure 13). For the other study years, caribou harvests were estimated at 57 lb per capita in 1989, 83 lb per capita in 1995, 73 lb per capita in 2000, 181 lb per capita in 2006, 82 lb per capita in 2009–2010, and 107 lb per capita in 2014.[12] Shishmaref hunters harvested 15 lb of moose per capita during the study year, which was the second lowest harvest recorded over the six study years for where harvests were estimated (Table 4). Estimates for the other study years were 45 lb per capita in 1989, 65 lb per capita in 1995, 44 lb per capita in 2000, 14 lb per capita in 2006, 31 lb per capita in 2009–2010, and 16 lb in the 2014 study year.[13]

The utility of these data to assess long term trends increases with the number of years for which large land mammal harvest information exists for a specific community. In this case, the quantity of caribou and moose harvest data for Shishmaref may suggest harvest trends: fewer years of harvest data in Deering and Noorvik do not allow for the same level of detail.

Between 1989 and 2018, Shishmaref hunters have harvested increasing quantities of caribou and decreasing quantities of moose. Starting in the mid-1990s, the Seward Peninsula experienced the return of the Western Arctic caribou herd in large numbers and a loss of reindeer herds. The continued local availability of this resource may explain the upward trend in harvests. In addition, declining moose harvest rates in Shishmaref may in part be related to the increased availability of caribou locally. A Shishmaref resident and key respondent in the 2014 comprehensive harvest study told researchers that children in the household preferred caribou and that residents rarely target moose due to the availability of caribou on the Seward Peninsula (Braem et al. 2017). Another key respondent from that study explained to researchers that because local rivers are so shallow, hunters must use a jet motor to access moose during open water ADF&G Division of Wildlife Conservation periods. However, because Shishmaref is a coastal community, most residents own propeller motors that function better in deeper waters and use less gasoline. In addition to preference and access, regulations may have affected harvest levels between 2002 and 2008. In response to low moose populations in Unit 22E hunting seasons were reduced by three months from August 1–March 31 to August 1–December 31 on state and federal lands for the 2002–2003 regulatory year (ADF&G 2004). Prior to this change, January, February, and March were the primary months for moose hunting by hunters in GMU 22E, where Shishmaref is located (Hicks 1998): snow and ice provided access to moose habitat that boats could not. In 2008, state regulations for moose were liberalized to include a longer hunting season (August 1–January 31; ADF&G 2009); and in 2010 federal regulations changed moose season on federal lands to August 1–March 15 (U.S. Fish and Wildlife Service 2010).

The five available data points for Deering suggest that hunters have harvested less moose and more caribou over time. The availability of caribou on the Seward Peninsula may have played a role in this harvest trend. Deering, like Shishmaref, also lost reindeer with the return of the Western Arctic caribou herd to the Seward Peninsula. In addition to the increased availability of caribou, moose density and calf recruitment in most of GMU 23 remained low from the mid-1990s through at least 2013 (Harper and McCarthy 2014). The harvest data available from Division of Subsistence studies indicate that effort in moose hunting has decreased in Deering. In 1994, 40% of Deering households tried to harvest a moose; since then the percentage of households attempting to harvest moose has ranged between zero and nine percent.

In Noorvik, represented here by only four data points, moose harvest quantities appear to be declining over time. For caribou, three of the four study years reported similar harvest quantities, ranging at most by 24 lb per capita. The current study year alone is not enough to imply a downward trend in total harvest and is likely a result of the herd migration timing and routing. Comments from Noorvik residents collected by

12. ADF&G CSIS.
13. ADF&G CSIS.

this survey describe not seeing any caribou because the herd took different migration routes and migrated late. Only a few caribou in the fall migration turned south; the majority did not cross the Kobuk and instead stayed north and wintered in Gates of the Arctic National Park and Preserve and on the North Slope (Western Arctic Caribou Herd Working Group 2018). For moose, the study years with lower harvest are also the years with lowest percentages of households attempting to harvest moose. Forty-four percent of households attempted to harvest moose in 2002; 38% attempted in this study year. In contrast, only 18% of households attempted to harvest moose in 2008–2009, and 23% attempted in 2011–2012. More years of harvest data would help determine moose harvest trends in Noorvik. Ethnography would also contribute immensely to understanding caribou and moose harvest patterns and practices in all communities that participate in this project.

Harvest areas for all three communities have remained largely consistent over time, based on caribou harvest area maps going back as far as 2007–2008 for Deering (Braem 2011), 2008–2009 for Noorvik (Braem 2012a), and 2009–2010 for Shishmaref (Braem 2012b). Deering hunters reported harvesting caribou close to Buckland in this study; previous maps indicate that Deering hunters had not gone further west than the site of Candle and the Kiwalik River drainage. Some Noorvik hunters reported harvesting caribou on the Hotham Peninsula in 2017–2018, which is a notable difference between study years. Shishmaref hunters, like Deering hunters, also reported harvests near Buckland during this study year; previous study years showed no caribou harvests in this area.

These harvest surveys provide critical information for managing these important resources, and they offer an opportunity to open dialogue between local subsistence users and managers. Survey respondents shared perceptions about nonlocal user groups, management of the resource, intensive management, and changes to abundance and migratory patterns of the WAH. Respondents in all study communities emphasized the dependence of their communities on big game resources and the overwhelming importance of subsistence to their households. In the future, this project will include ethnographic interviews with key respondents in study communities. These interviews will focus on topics like hunter access, environmental changes that affect hunting practices, change in health and abundance of animals, and hunter adaptations. The addition of ethnographic interviews in future study years will help these reports expand upon feedback from local user groups, further contextualize existing and future harvest data, and provide insight into caribou and other large land mammal harvest patterns for years that lack harvest data.

REFERENCES

ADF&G

2004. *Moose management report of survey-inventory activities 1 July 2001–30 June 2003*. Alaska Department of Fish and Game Division of Wildlife Conservation, Federal Aid in Wildlife Restoration Grants W-27-5 and W-33-1, Study 1.0: Juneau.

2009. *Moose annual survey and inventory. The status of moose and factors influencing their population. Federal Aid annual performance report 1 July 2008–30 June 2009*. Alaska Department of Fish and Game Division of Wildlife Conservation Project 1.0: Juneau.

2017. *2017–2018 Alaska hunting regulations governing general, subsistence, and commercial uses of Alaska's wildlife.*

ADF&G, Division of Wildlife Conservation

2012. *Western Arctic caribou herd numbers 325,000 animals in recent survey.* [press release] July 3, 2012.

2014. Western Arctic caribou herd numbers 235,000 animals in recent survey. [press release] May 12, 2014.

Ahmasuk, A. and E. Trigg

2008rev. [2007] *Bering Strait region local and traditional knowledge pilot project: a comprehensive subsistence use study of the Bering Strait region*. Kawerak, Inc., North Pacific Research Board Project No. 643: Nome, Alaska.

Braem, N.M.

2011. *Subsistence wildlife harvests in Deering, Alaska, 2007–2008.* Alaska Department of Fish and Game, Division of Subsistence Special Publication No. SP2011-002: Fairbanks.

2012a. *Subsistence wildlife harvests in Noorvik, Shungnak, and White Mountain, Alaska, 2008–2009*. Alaska Department of Fish and Game, Division of Subsistence Special Publication No. SP2011-003: Fairbanks.

2012b. *Subsistence wildlife harvests in Ambler, Buckland, Kiana, Kobuk, Shaktoolik, and Shishmaref, Alaska, 2009–2010.* Alaska Department of Fish and Game, Division of Subsistence Special Publication No. SP2012-003: Fairbanks.

Braem, N.M., E.H. Mikow, and M.L. Kostick

2017. *Chukchi Sea and Norton Sound Observation Network: harvest and use of wild resources in 9 communities in Arctic Alaska, 2012–2014.* Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 403: Fairbanks.

Cochran, W.G.

1977. *Sampling techniques, 3rd edition.* John Wiley & Sons: New York.

Conger, A.O. and J. Magdanz

1990. *The harvest of fish and wildlife in three Alaska communities: Brevig Mission, Golovin, and Shishmaref.* Alaska Department of Fish and Game, Division of Subsistence, and the U.S. Fish and Wildlife Service.

Federal Subsistence Management Program

2016. *Federal subsistence management regulations for the harvest of wildlife on federal public lands in Alaska, effective 1 July 2016–30 June 2018.* U.S. Department of the Interior, Office of Subsistence Management: Anchorage.

Georgette, S., K. Persons, and A. Ahmasuk

2017. *Subsistence wildlife harvests in four communities on the western Seward Peninsula, Alaska 2000–2001*. Alaska Department of Fish and Game, Division of Subsistence Special Publication No. 2017-007: Fairbanks.

Georgette, S., K. Persons, E. Shiedt, and S. Tahbone

2004. *Subsistence wildlife harvests in five northwest Alaska communities, 2001–2003.* Alaska Department of Fish and Game, Maniilaq Association, and Kawerak, Inc.

Magdanz, J.S., C.J. Utermohle, and R.J. Wolfe
2002. *The production and distribution of wild food in Wales and Deering, Alaska.* Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 259: Kotzebue.

Mikow, E., N.M. Braem, and M. Kostick
2014. *Subsistence wildlife harvests in Brevig Mission, Deering, Noatak, and Teller, Alaska, 2011–2012.* Alaska Department of Fish and Game, Division of Subsistence Special Publication No. 2014-02: Fairbanks.

Paige, A.W., C.L. Scott, D.B. Andersen, S. Georgette, and R.J. Wolfe
1996. *Subsistence use of birds in the Bering Strait region, Alaska.* Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 239: Juneau.

Sobelman, S.S.
1985. *The economics of wild resource use in Shishmaref, Alaska.* Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 112.

U.S. Fish and Wildlife Service
2010. *Subsistence management regulations for the harvest of wildlife on federal public lands in Alaska, effective July 1, 2010–June 30, 2012.*

Western Arctic Caribou Herd Working Group
2016. Caribou Trails (16).

2017. Caribou Trails (17).

2018. Caribou Trails (18).

2019. Caribou Trails (19).

APPENDIX A–SURVEY INSTRUMENT

WESTERN ARCTIC CARIBOU HERD SUBSISTENCE SURVEY

DEERING, ALASKA

APRIL 2017 to MARCH 2018

COOPERATING ORGANIZATIONS

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

(877) 646-7320

NATIVE VILLAGE OF DEERING

PO BOX 36089
DEERING, AK 99736

(907)363-2138

We are doing this survey to better understand subsistence in Alaska. Similar surveys have been conducted in more than 100 Alaska communities, including Deering, Kotzebue, Kivalina, Noatak, Shungnak, Shishmaref, Teller, 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:	DEERING	110
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 APRIL 2017 to MARCH 2018…
…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*	Did this person hunt for caribou last year[1]? *circle*	Comments
HEAD 1	SELF	M F		Y N	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	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	Y N	
04		M F		Y N	Y N	Y N	
05		M F		Y N	Y N	Y N	
06		M F		Y N	Y N	Y N	
07		M F		Y N	Y N	Y N	
08		M F		Y N	Y N	Y N	
09		M F		Y N	Y N	Y N	
10		M F		Y N	Y N	Y N	
11		M F		Y N	Y N	Y N	
12		M F		Y N	Y N	Y N	
13		M F		Y N	Y N	Y N	
14		M F		Y N	Y N	Y N	
15		M F		Y N	Y N	Y N	

1 "LAST YEAR" means between April 1, 2017 and March 31, 2018.

PERMANENT HH MEMBERS: 01 **DEERING: 110**

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 APRIL 2017 to MARCH 2018…
…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*	Y N	Y N	Y N	Y N		BULL COW ?		
211000000								
						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?

DO NOT FORGET TO FILL IN THE STOP TIME! _____

INTERVIEW SUMMARY:

COMMENTS: 30	DEERING: 110

APPENDIX B–HARVEST AND USE OF LARGE AND SMALL LAND MAMMALS

Table B1.–Harvest and use of large and small land mammals, Deering, 2017–2018.

Resource	Percentage of households					Harvest weight (lb)[a]			Harvest quantity (individual)		
	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total	Per household	Per capita	Total	Per household	95% CI (±%)
Land mammals	95.7%	63.0%	56.5%	58.7%	78.3%	49,018.1	924.9	267.6	349.1	6.6	19.1%
Large land mammals	95.7%	63.0%	56.5%	58.7%	78.3%	49,018.1	924.9	267.6	346.8	6.5	19.2%
Black bear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - boar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - sow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - unknown	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear - boar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear - sow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear - unknown	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Caribou	93.5%	63.0%	56.5%	58.7%	71.7%	46,538.6	878.1	254.0	342.2	6.5	14.6%
Caribou - bull	47.8%	47.8%	47.8%	43.5%	30.4%	23,661.0	446.4	129.2	174.0	3.3	22.1%
Caribou - cow	43.5%	43.5%	43.5%	41.3%	26.1%	20,527.1	387.3	112.1	150.9	2.8	20.7%
Caribou - unknown	43.5%	13.0%	6.5%	13.0%	39.1%	2,350.4	44.3	12.8	17.3	0.3	43.6%
Moose	32.6%	8.7%	6.5%	6.5%	26.1%	2,479.5	46.8	13.5	4.6	0.1	31.4%
Moose - bull	6.5%	6.5%	6.5%	6.5%	0.0%	2,479.5	46.8	13.5	4.6	0.1	44.0%
Moose - cow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Moose - unknown	26.1%	2.2%	0.0%	0.0%	26.1%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox	2.2%	0.0%	0.0%	0.0%	2.2%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox - bull	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox - cow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox - unknown	2.2%	0.0%	0.0%	0.0%	2.2%	0.0	0.0	0.0	0.0	0.0	0.0%
Small land mammals	4.3%	4.3%	4.3%	2.2%	0.0%	0.0	0.0	0.0	2.3	0.0	51.2%
Wolf	2.2%	2.2%	2.2%	2.2%	0.0%	0.0	0.0	0.0	1.2	0.0	73.2%
Wolverine	2.2%	2.2%	2.2%	0.0%	0.0%	0.0	0.0	0.0	1.2	0.0	73.2%

Source ADF&G Division of Subsistence household surveys, 2018.

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

Table B2.–Harvest and use of large and small land mammals, Noorvik, 2017–2018.

Resource	Percentage of households					Harvest weight (lb)[a]			Harvest quantity (individual)		
	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total	Per household	Per capita	Total	Per household	95% CI (±%)
Land mammals	96.0%	63.0%	48.0%	47.0%	86.0%	53,782.5	404.4	102.4	293.9	2.2	17.6%
Large land mammals	96.0%	63.0%	48.0%	47.0%	85.0%	53,782.5	404.4	102.4	291.3	2.2	17.4%
Black bear	3.0%	1.0%	0.0%	0.0%	2.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - boar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - sow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - unknown	3.0%	1.0%	0.0%	0.0%	2.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear	7.0%	5.0%	4.0%	4.0%	3.0%	457.5	3.4	0.9	5.3	0.0	34.7%
Brown bear - boar	4.0%	4.0%	4.0%	3.0%	0.0%	457.5	3.4	0.9	5.3	0.0	48.7%
Brown bear - sow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear - unknown	3.0%	1.0%	0.0%	1.0%	3.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Caribou	94.0%	59.0%	40.0%	40.0%	80.0%	34,005.4	255.7	64.7	250.0	1.9	14.2%
Caribou - bull	22.0%	22.0%	22.0%	14.0%	17.0%	13,927.8	104.7	26.5	102.4	0.8	23.3%
Caribou - cow	20.0%	20.0%	20.0%	17.0%	10.0%	19,173.3	144.2	36.5	141.0	1.1	29.4%
Caribou - unknown	57.0%	22.0%	3.0%	13.0%	56.0%	904.4	6.8	1.7	6.7	0.1	65.1%
Moose	54.0%	38.0%	23.0%	25.0%	45.0%	19,319.6	145.3	36.8	35.9	0.3	14.5%
Moose - bull	20.0%	21.0%	20.0%	13.0%	11.0%	16,457.4	123.7	31.3	30.6	0.2	21.0%
Moose - cow	3.0%	3.0%	3.0%	2.0%	2.0%	2,862.2	21.5	5.4	5.3	0.0	60.0%
Moose - unknown	31.0%	14.0%	0.0%	10.0%	32.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Small land mammals	4.0%	2.0%	2.0%	2.0%	1.0%	0.0	0.0	0.0	2.7	0.0	69.5%
Wolf	4.0%	2.0%	2.0%	2.0%	1.0%	0.0	0.0	0.0	2.7	0.0	69.5%
Wolverine	1.0%	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, 2018.

a. A harvest weight of 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.–Harvest and use of large and small land mammals, Shishmaref, 2017–2018.

Resource	Percentage of households					Harvest weight (lb)[a]			Harvest quantity (individual)		
	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total	Per household	Per capita	Total	Per household	95% CI (±%)
Land mammals	99.1%	67.3%	54.5%	62.7%	87.3%	59,353.3	420.9	111.0	396.1	2.8	14.4%
Large land mammals	99.1%	67.3%	54.5%	62.7%	87.3%	59,353.3	420.9	111.0	391.0	2.8	14.5%
Black bear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - boar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - sow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Black bear - unknown	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear - boar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear - sow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Brown bear - unknown	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Caribou	97.3%	67.3%	53.6%	62.7%	77.3%	51,077.9	362.3	95.6	375.6	2.7	11.2%
Caribou - bull	45.5%	45.5%	44.5%	40.9%	30.9%	34,516.8	244.8	64.6	253.8	1.8	14.7%
Caribou - cow	12.7%	12.7%	12.7%	11.8%	5.5%	9,588.0	68.0	17.9	70.5	0.5	30.4%
Caribou - unknown	48.2%	18.2%	4.5%	19.1%	44.5%	6,973.1	49.5	13.0	51.3	0.4	65.1%
Moose	43.6%	24.5%	10.0%	5.5%	39.1%	8,275.4	58.7	15.5	15.4	0.1	20.1%
Moose - bull	10.9%	10.9%	10.0%	4.5%	7.3%	8,275.4	58.7	15.5	15.4	0.1	27.7%
Moose - cow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Moose - unknown	32.7%	13.6%	0.0%	0.9%	31.8%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox	1.8%	0.0%	0.0%	0.0%	1.8%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox - bull	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox - cow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%
Common muskox - unknown	1.8%	0.0%	0.0%	0.0%	1.8%	0.0	0.0	0.0	0.0	0.0	0.0%
Small land mammals	3.6%	5.5%	3.6%	0.0%	0.0%	0.0	0.0	0.0	5.1	0.0	45.8%
Wolf	1.8%	2.7%	1.8%	0.0%	0.0%	0.0	0.0	0.0	2.6	0.0	65.4%
Wolverine	1.8%	4.5%	1.8%	0.0%	0.0%	0.0	0.0	0.0	2.6	0.0	65.4%

Source ADF&G Division of Subsistence household surveys, 2018.

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

APPENDIX C–HARVESTS BY SEX AND MONTH OF HARVEST

Table C1.–Caribou harvests by sex and month of harvest, Deering, 2017–2018.

		2017									2018			Season					
Community	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
Deering	Male	0.0	0.0	0.0	5.8	0.0	0.0	3.5	0.0	0.0	0.0	0.0	1.2	76.0	11.5	43.8	16.1	16.1	174.0
	Female	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.0	32.3	11.5	2.3	11.5	150.9
	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	8.1	0.0	0.0	0.0	9.2	17.3

Source ADF&G Division of Subsistence household surveys, 2018.

Table C2.–Caribou harvests by sex and month of harvest, Noorvik, 2017–2018.

		2017									2018			Season					
Community	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
Noorvik	Male	0.0	0.0	0.0	0.0	1.3	74.5	8.0	0.0	0.0	0.0	0.0	0.0	4.0	2.7	0.0	6.7	5.3	102.4
	Female	0.0	0.0	0.0	0.0	65.2	6.7	0.0	10.6	14.6	9.3	10.6	20.0	0.0	2.7	0.0	1.3	0.0	141.0
	Unknown	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7

Source ADF&G Division of Subsistence household surveys, 2018.

Table C3.–Caribou harvests by sex and month of harvest, Shishmaref, 2017–2018.

		2017									2018			Season					
Community	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
Shishmaref	Male	2.6	0.0	0.0	6.4	9.0	28.2	0.0	2.6	6.4	5.1	1.3	7.7	59.0	5.1	24.4	92.3	3.8	253.8
	Female	0.0	0.0	0.0	0.0	0.0	5.1	0.0	0.0	3.8	11.5	15.4	9.0	6.4	3.8	7.7	2.6	5.1	70.5
	Unknown	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	10.3	38.5	51.3

Source ADF&G Division of Subsistence household surveys, 2018.

Table C4.–Moose harvests by sex and month of harvest, Deering, 2017–2018.

		2017									2018			Season					
Community	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
Deering	Male	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	4.6
	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, 2018.

Table C5.–Moose harvests by sex and month of harvest, Noorvik, 2017–2018.

		2017									2018			Season					
Community	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
Noorvik	Male	0.0	0.0	0.0	0.0	9.3	12.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	5.3	30.6
	Female	0.0	0.0	0.0	0.0	4.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3
	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

Source ADF&G Division of Subsistence household surveys, 2018.

Table C6.–Moose harvests by sex and month of harvest, Shishmaref, 2017–2018.

		2017									2018			Season					
Community	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
Shishmaref	Male	0.0	0.0	0.0	0.0	1.3	7.7	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	2.6	0.0	15.4
	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

Source ADF&G Division of Subsistence household surveys, 2018.

APPENDIX D–HARVESTS BY SEX, MONTH, AND LOCATION OF HARVEST

Table D1.–Caribou harvests by sex, month, and location of harvest, Deering, 2017–2018.

		2017									2018			Season					
UCU	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
22EH000302	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	1.2	0.0	0.0	0.0	1.2
	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
23ZH000201	Male	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.3	8.1	35.7	11.5	4.6	95.6
	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	80.7	1.2	11.5	2.3	0.0	95.6
	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	2.3	0.0	0.0	3.5	0.0	0.0	0.0	0.0	1.2	34.6	3.5	0.0	4.6	0.0	49.5
	Female	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.2	0.0	0.0	0.0	26.5
	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	8.1	0.0	0.0	0.0	0.0	8.1
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	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	5.8	5.8
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	11.5	11.5
	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	2.3	2.3	0.0	0.0	11.5	16.1
	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	3.5	3.5
Missing	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	9.2	0.0	8.1	0.0	0.0	17.3
	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	8.1	3.5	0.0	0.0	0.0	11.5
	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, 2018.

Table D2.–Caribou harvests by sex, month, and location of harvest, Noorvik, 2017–2018.

		2017									2018			Season					
UCU	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
23ZA003101	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	6.7	0.0	0.0	0.0	0.0	0.0	0.0	6.7
	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	0.0	1.3	31.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	6.7	1.3	43.9
	Female	0.0	0.0	0.0	0.0	5.3	0.0	0.0	0.0	13.3	9.3	4.0	5.3	0.0	0.0	0.0	0.0	0.0	37.2
	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
23ZB001201	Male	0.0	0.0	0.0	0.0	0.0	27.9	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	39.9
	Female	0.0	0.0	0.0	0.0	20.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.6
	Unknown	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
23ZB001301	Male	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
	Female	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
	Unknown	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
23ZH000501	Male	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
	Female	0.0	0.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0
	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
23ZH000601	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	4.0	0.0	0.0	0.0	0.0	4.0
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	14.6	0.0	0.0	0.0	0.0	0.0	21.3
	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
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	0.0	0.0	0.0	0.0	0.0	0.0
	Female	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	1.3	0.0	37.2
	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
Unknown	Male	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7
	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
Missing	Male	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
	Unknown	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3

Source ADF&G Division of Subsistence household surveys, 2018.

Table D3.–Caribou harvests by sex, month, and location of harvest, Shishmaref, 2017–2018.

		2017									2018			Season					
UCU	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
22EH000202	Male	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
	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	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
22EH000203	Male	0.0	0.0	0.0	1.3	6.4	17.9	0.0	2.6	2.6	2.6	1.3	2.6	37.2	3.8	12.8	85.9	3.8	180.7
	Female	0.0	0.0	0.0	0.0	0.0	5.1	0.0	0.0	0.0	9.0	12.8	0.0	0.0	1.3	7.7	1.3	3.8	41.0
	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	1.3	10.3	0.0	11.5
22EH000301	Male	2.6	0.0	0.0	5.1	2.6	9.0	0.0	0.0	3.8	2.6	0.0	5.1	15.4	0.0	11.5	3.8	0.0	61.5
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	2.6	2.6	9.0	6.4	0.0	0.0	0.0	1.3	25.6
	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
23ZH000101	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	1.3	0.0	0.0	0.0	1.3
	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
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	6.4	0.0	0.0	0.0	0.0	6.4
	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
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	1.3	0.0	1.3	0.0	2.6
	Unknown	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	5.1
Missing	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	1.3	0.0	2.6	0.0	3.8
	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	34.6	34.6

Source ADF&G Division of Subsistence household surveys, 2018.

Table D4.–Moose harvests by sex, month, and location of harvest, Deering, 2017–2018.

		2017									2018			Season					
UCU	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
23ZH000201	Male	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	4.6
	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, 2018.

Table D5.–Moose harvests by sex, month, and location of harvest, Noorvik, 2017–2018.

		2017									2018			Season					
UCU	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
23ZB001101	Male	0.0	0.0	0.0	0.0	9.3	12.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	25.3
	Female	0.0	0.0	0.0	0.0	2.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.7
	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
23ZB001401	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	2.7	2.7
	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
23ZB001901	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	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
	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

Source ADF&G Division of Subsistence household surveys, 2018.

Table D6.–Moose harvests by sex, month, and location of harvest, Shishmaref, 2017–2018.

		2017									2018			Season					
UCU	Sex	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Win	Spr	Sum	Fall	Unknown	Total
22EH000202	Male	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
	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	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
22EH000203	Male	0.0	0.0	0.0	0.0	1.3	3.8	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	2.6	0.0	9.0
	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
22EH000301	Male	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6
	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	2.6
	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, 2018.

APPENDIX E–RESPONDENT COMMENTS

Deering

Caribou fat because of no snow

Give out more ox permits

Many bearded seal pups wash up dead. Young were starving, walrus young too. In stomach some eels tomcod. Mortality missed by agency surveys not visible from plane surveys but mortality visible as locals walk beaches. Population of wolves increasing killing off muskox calves and moose calves and are targeting goose eggs and affecting the migrating bird population. Muskox calves killed by wolves in march as soon as calves are born. Suggesting shoot more wolves or close off entrance to dens with rocks.

Where were the caribou last fall? Not as much. Quit sport hunters

As long as we can hunt, fish, and Fish and Game don't bother us, no problems

Why don't you guys watch the musk ox

Received caribou

The moose harvest ticket, my husband is gone during July so he can not get moose harvest tickets

Attempted to hunt—unsuccessful. All caribou was received

Wish for lower license fees

I had the opportunity to visit with them during that outing on gun safety and wildlife presentation in the communities. I found them informative and interesting. I enjoyed talking to them.

Extend filing deadline. For moose harvest ticket giveaway

Global warming is real. I am not sure how it is going to affect hunters. He hasn't seen it this in his life time. Ipnatchia river is drying up. Someone needs to study why. If the fish go, we go.

Noorvik

My concern is over harvesting and wanton waste. Educating young hunters the ways that the elders taught them.

We need to set our routing for caribou—change of routing of caribou.

Fall time—transporters aren't following the laws, disrupting the migration, cutting off the caribou.

We did not have motor for our boat last summer/fall to harvest caribou and moose. Thank you for coming to our community.

Fall 2017 many people got skunked, wondering why they were late. Went out everyday. Many people from the Kobuk River villages waiting and waiting. Used so much gas to try and harvest. Predators waiting for the migration herd to start moving. Wolf population has grown. Changing the routes of their migration. Requesting for control of wolf population. Too huge in numbers and dangerous when hungry. Moose are now in town, need help with them too.

Too many big game hunters with plane and hopefully no sports in our Kobuk River. No caribou due to different migration routes

Need more people to go out hunting for the elders and they need help for elders

-continued-

Noorvik, continued

Our herd in our region are not declining

Have ox tag, want to go out. Caribou were late, they took differetn routes, moss grow too slow

Wondering why the caribou never migrate to Noorvik

Private planes flying over the caribou herds

Didn’t see any caribou nearby. Usually can see them from my porch during migrations, passing town. They didn’t pass through this time.

Not getting enough caribous

Not much caribou this year

Thank the people that hunt for me

Just the way the herd travel when hunting season comes around too many planes flying around.

Head of household wants President Trump out of fish and game

Gas, group hunt, split. Receive

Enjoy hunting for my family, thank you

Need to stop sport hunters from upriver stopping the caribou to come down so we can get our caribou

Majority of herds are rerouting to other area due to unknown circumstances

The head of household is concerned about caribou not migrating near Noorvik this fall. Concerns that maybe the sport hunters who hunt from aircrafts maybe cause for the caribou not migrating, or changed route. This past fall just about everyone in this area did not catch caribou and that hurt everyone, as that is the major subsistence gathered food we store for the long winter months. Please help us in doing away with allowing sport hunting in our area, or at least do not allow them to hunt until after our limit

Where they at?

Seems like theres too many bears from what I've heard around here. Will go hunting grizzlies here soon

Doesn’t agree with federal closure, many are friends and family. Non-residents don’t take that much. Moose regs—prefer that it be changed to one bull of any size instead of requiring 50' antlers or more. Subsistence hunters prefer young bulls for meat, not worried about trophies. Big bulls are better breeding stock.

Shishmaref

Worried about people's children where abouts when there are polar bears near town looking for food.

Our global warming is messing up our hunts. Spring is melting too quick to harvest some more

Caribou is good source of food

Can they extend the caribou boundaries towards Wales side and anywhere and anytime of the year and have no limits on the amount you kill

-continued-

Shishmaref, continued

There is too much brown bears around now days. Can't get the caribou

Tell Fish and Game to control the population of bears up the coast and Serpentine by setting a quota per hunter

This will help our community, this survey

Climate change made caribou skinny because of melting and freezing

Don’t really have a hunter in the house. Mainly receive meat from other family members

Too much brown bear now days. It's getting dangerous to camp in a tent.

Keep big game hunter away from other hunters while hunting. They scared away the caribou, bear hunters

How to get ahold of Fish and Game about the collars on the caribou

Too many brown bears

Don't need muskox in Shismaref, they eat our sourdocks, what we eat.

Fall time—always have small planes flying around, we don’t need that. They scare away our hunt after we spend lots of money on gas.

Remove the musk ox. Get rid of brown bear, too many. Since [name] passed there is lack of communication with National Park Service. Thank you. Restrict private aircraft during subsistence season, ie summer/fall time around hot spring traffic. Due to high cost of gas to hunt rarely go hunt

They should open the caribou all the way up to Wales

Need 4 wheelers for hauling

Please keep our caribou hunting ways in our area even if they have put limits on them because they are declining

Is musk ox open or permit?

Too many outsiders trying to hunt big game scaring the animals away

The health of the caribou. Need to get them tested some of the meat had tapeworms and pus on the legs

Concern—to hunt caribou toward the west side by Nuluk

Bring all the muskox to Nunivak Island

People using snow machines to hunt in the late fall while it is closed area

Would like to know where the reindeer are located

I have noticed more caribou have been eating more these past four years in the Serpentine area where we camp

Is there some way to liberate the amount of bears in the summer?

One concern was about the amount of planes flying over hunting grounds

Source ADF&G Division of Subsistence household surveys, 2018.