Alaska Board of Game
On-Time Public Comment Index
Arctic/Western Region Meeting
January 10-13, 2014

Kasigluk Traditional Council PC01

Asa'carsarmiut Tribal Council PC02

Nunapitchuk IRA Council PC03

National Park Service..... PC04

Kawerak, Inc. PC05

Native Village of Mekoryuk PC06

U.S. Fish and Wildlife Service PC07

Samuel Davis..... PC08

Sitnasuak Native Corporation PC09

AK Professional Hunters Association, Inc. PC10

AK Bowhunters Association PC11

AK Trappers Association PC12

Gary Eckenweiler PC13

Gates of the Arctic National Park SRC PC14

Joe Letarte PC16

Mike Wade PC17

U.S. Fish and Wildlife Service, Office of Subsistence Mgt. PC18

Western Arctic Caribou Herd Working Group PC19

Alaska Outdoor Council..... PC20

KTC

Kasigluk Traditional Council
Post Office Box 19
Kasigluk, Alaska 99609
Ph: (907) 477-6405 / 6406 Fax: (907) 477-6212
E-mail: kasigluk.admin@gmail.com

December 27, 2013

Alaska Department of Fish & Game
Board Support Section
P.O. Box 115526
Juneau, Alaska 99811-5526

Fax: 907-465-6094

RE: Lower Yukon Moose Population

Dear Mr. Chairman and Members of the Alaska Board of Game:

AVCP submitted Proposal Three (3) in response to our concerns of the potential over-grazing of willow by moose in the 'Unit 18 Remainder' portion of GMU 18. Our villages along the Yukon River have witnessed the explosive growth of the moose population and the amount of willow the moose are consuming over the winter. They have consumed large swaths of willow shrubs in manner that appears like a large mower was deployed on sandbars and islands. Additionally, due to limitation of new growth willow, moose are beginning to forage on old growth willow in an effort to feed themselves. We are concerned that if the moose population if not curbed, that a population crash may occur due to starvation. We support AVCP Proposal Three (3) to avoid the potential of a crash because we value the moose meat the land provides. Please adopt AVCP Proposal Three.

Sincerely,

Lucy Kassel

Ms. Lucy Kassel
President

Cc; file

Asa'carsarmiut Tribal Council
P.O. Box 32249
Mountain Village, Alaska 99632
(907) 591-2814 Telephone
(907) 591-2811 Facsimile

December 27, 2013

Alaska Department of Fish & Game
Board Support Section
P.O. Box 115526
Juneau, Alaska 99811-5526

Dear Board Chairman and Members of the Alaska Board of Game:

AVCP submitted Proposal Three (3) in response to their concerns of potential over-grazing of willow by moose in "Unit 18 Remainder" portion of GMU 18.

Although we believe that the moose population in "Unit 18 Remainder" is healthy and growing, we do not agree with AVCP's position that over grazing of moose habitat has or is occurring as we have not seen any evidence of that.

We believe that there are periods of good and bad cycles in fish and wildlife populations. Until further evidence suggests that the increased moose population can negatively affect their habitat, we believe that current moose hunting regulations should remain the same.

We appreciate AVCP's concern for its member villages and region; however, we disagree with their current position as it relates to current regulations and our management area.

Thank you for your time and concern.

Sincerely,

James C. Landlord, First Chief

CC:

AVCP Natural Resources
GMU Unit 18 Remainder Villages
File

PC03 1 of 1

Nunapitchuk IRA Council
PO Box 130
Nunapitchuk, Alaska 99641

Date: December 23, 2013

Alaska Board of Game

Dear Mr. Chairman and members of the Alaska Board of Game:

AVCP submitted Proposal Three (3) in response to our concerns of the potential over-grazing of willow by moose in the "Unit 18 Remainder" portion of GMU 18. Our villages along the Yukon River have witnessed the explosive growth of the moose population and the amounts of willow the moose are consuming over the winter. They have consumed large swaths of willow shrubs in manner that appears like a large mower was deployed on sandbars and islands. Additionally, due to limitation of new growth willow, moose are beginning to forage on old growth willow in an effort to feed themselves. We are concerned that if the moose population is not curbed, that a population crash may occur due to starvation. We support AVCP Proposal 3 to avoid the potential of a crash because we value the moose meat the land provides. Please adopt AVCP Proposal 3.

Sincerely,

Tribal Council President

Post-it® Fax Note 7671	Date 12/23/13	# of pages ▶ 1
To Board of Game	From EL. J. Wassillie	
Co./Dept. and AVCP Tim Andrew	Co. Nunapitchuk	
Phone #	Phone # 527-5705	
Fax # 465-6094 And 543-5702	Fax # 527-5711	

United States Department of the Interior

NATIONAL PARK SERVICE
Alaska Region
240 West 5th Avenue, Room 114
Anchorage, Alaska 99501

IN REPLY REFER TO:
7.A.2. (AKRO-SUBS)

DEC 19 2013

Mr. Ted Spraker, Chairman
ATTN: Alaska Board of Game Comments
Alaska Department of Fish and Game
Board Support Section
P.O. Box 115526
Juneau, Alaska 99811-5526

Dear Chairman Spraker:

There are a number of proposals before the Board of Game for your January 10-13, 2014, meeting in Kotzebue that affect or have the potential to affect National Park Service (NPS) areas in the state. We appreciate your consideration of our comments.

As you have heard from the NPS in the past, our mission and mandates differ from the State of Alaska and other federal agencies, and may require different management approaches consistent with NPS enabling legislation and the Alaska National Interest Lands Conservation Act (ANILCA). Consistent with past letters and testimony, the NPS asks that NPS areas be excluded from any regulations you may authorize that implement intensive management objectives in Alaska's hunting regulations. We recognize and appreciate previous Board actions that have not authorized intensive management and predator control activities on NPS managed lands.

Specific comments are below:

Proposal 13: Recommendation: Support with amendment
(Moose: GMU 22E) This proposal changes the winter hunt from January to March. We suggest a closer alignment of the state winter season with the federal subsistence season that is August 1-March 15. This could be partially accomplished by aligning the end of the state and federal season dates. This proposal affects Bering Land Bridge National Preserve.

Proposal 16: GMU 22C: No Recommendation/GMU 22B, D & E: Oppose
(Brown bear: GMU 22) As written, the proposal recommends changes in GMU 22 for harvest limits, changing to 1/year and by opening the season earlier in the spring by an emergency order. However, the ADF&G staff has interpreted this proposal to be for GMU 22C. Since the NPS has no management responsibility within 22C, we have no recommendation for that subunit. Should the discussion include NPS areas in Bering Land Bridge National Preserve in GMU 22B, D & E we do not support lengthening the season at this time.

Proposal 18: Recommendation: Oppose
(Wolf: GMU 22) This proposal would extend the end of the hunting season from April 30 to May 31. As the NPS has commented before, we do not support the hunting season being extended past April 30 as this allows take of vulnerable females and offspring during the pupping season. Additionally, the value of pelts is often quite low from wolves harvested so late in the season. We believe this recommendation is consistent with the ADF&G staff recommendation. Because this proposal affects Bering Land Bridge National Preserve, we ask that NPS lands be excluded if the proposal is adopted.

Proposal 19: Recommendation: Oppose
(Wolverine: GMU 22) The NPS does not support extending the closing date of the hunting season until April 30. It is generally agreed that wolverine are found in low densities and have a low reproductive rate; and conservative season lengths are a reasonable approach to prevent overharvest. Because this proposal affects Bering Land Bridge National Preserve, we ask that NPS lands be excluded if the proposal is adopted.

Proposal 20: Recommendation: Support
(Moose: GMU 26A portions described) This proposal would add 16 days to the season, having it close at the end of September rather than mid-September. We agree that the trend of warmer fall temperatures is affecting hunting opportunities by increasing the chance of spoiled meat in early September. We also agree that warmer temperatures are affecting animal movements on the landscape and that the requested timing of the season is reasonable and responsive to local needs. We support the extension of the season as it allows hunters more flexibility regarding their choice of when to hunt. We also note that the Gates of the Arctic Subsistence Resource Commission supports this proposal. This proposal affects Gates of the Arctic and Noatak National Preserves.

Proposals 24 & 28: Recommendation: Oppose
(Coyote: GMU 26A and GMU 23) These proposals would extend the hunting season to a "no closed season" and expand the harvest limit to "no limit." As the NPS has commented before we do not support extending hunting seasons into the pupping season and allowing the take of vulnerable females and offspring. Additionally, the value of pelts taken during this time period is often quite low. These proposals affect Bering Land Bridge, Gates of the Arctic and Noatak National Preserves. If either of these proposals are supported as proposed, we ask that NPS lands be excluded.

Proposal 25: Recommendation: Oppose
(Muskox: GMU 23 portion) This proposal would expand the hunt area by including the entire Noatak drainage and all areas north and west of the Kobuk River drainage. The NPS is opposed to this proposal based on recent research suggesting that the current management strategies may be leading to a continued and possibly severe population decline in the Cape Thompson muskox population, similar to that experienced by the Northeast Alaska and Seward Peninsula populations (see Schmidt and Gorn 2013, enclosed). The population in the current hunt area has been subject to a fixed quota of six bulls since 2000, and since that time, population growth slowed and then declined. Overall the population declined by approximately 40% over the last

6-8 years. Simply expanding the harvest area to include additional animals within the same population does not address the problem of unsustainable harvest rates within the core population area. A recent analysis of muskoxen population dynamics by Schmidt and Gorn (2013) found that the Cape Thompson core population grew at an exponential rate of 10% between the years 1988 and 2000 during which there was no hunting. Growth slowed to a rate of rate of 2.5% between 2000 and 2005 when the average annual harvest was 1.4 bulls and the average harvest rate was a little under 1% of the population. Between 2005 and 2010, the population declined at a rate of 4% annually, corresponding with an average harvest of 4.3 bulls and an overall harvest rate between 1-2%. A small and declining population (<250 individuals within the core area), low mature bull:mature cow ratios, and low recruitment indicate a need for more conservative management going forward. Expanding the harvest area while maintaining current quotas would not be expected to address any of these problems, particularly if the harvest remains focused in the area closest to Kotzebue (i.e., the core area).

The NPS strongly recommends closing both the federal and state hunts until the core population recovers to ≥400 individuals (2005 levels) and a mature bull:mature cow ratio of at least 60:100. We also recommend replacing the current harvest strategy (based on a percentage of the total population) with a strategy similar to that currently being used on the Seward Peninsula (based on a conservative percentage of the mature bulls in the hunt area – aimed at rebuilding mature bull: mature cow ratios). The NPS suggests a cooperative effort with ADF&G to develop and implement a unified harvest strategy.

Proposal 29: Recommendation: Oppose
(Caribou: GMU 23) This proposal suggests removing the restrictions on buying, selling, or bartering antlers removed from the skull of caribou. Such use of antlers is a long standing issue in the region; it is our understanding that the community has long supported these restrictions. Absent a broad show of regional support to remove the restrictions, we support leaving them in place. This proposal affects Bering Land Bridge, Gates of the Arctic and the Noatak National Preserves.

Proposals 30 & 31: Recommendation: Oppose for GMU 26A in Gates of the Arctic National Preserve/Neutral for GMU 23 and 26A in Noatak National Preserve
(Dall's sheep: GMU 23 & 26A) These proposals would open sheep hunting seasons earlier for residents, either by 10 days (proposal 30) or by 5 days (proposal 31), respectively. In Noatak National Preserve, harvest is limited by quotas for all state and federal hunts except in the Schwatka Mountains where hunter effort, harvest and sheep density have always been low. However, in Gates of the Arctic National Preserve (26A) there is a popular general hunt.

We do not support extending the season in Gates of the Arctic National Preserve, which has the potential of increasing harvest following a large decline in 2013. Estimates from the 2013 NPS survey indicate a 50% decline in total sheep numbers and very low productivity compared with 2009-2012. Surveys conducted by other agencies in other parts of the state also show declines in total numbers and/or markedly low productivity following the prolonged winter and cold May. Should either proposal be supported in GMU 26A, we ask that Gates of the Arctic National Preserve lands be excluded from the season extension.

Proposal 35: Recommendation: Support
(Bears: GMU 22, 23, 26A) This proposal would forbid the use of snares to take bears. We support the intent of this proposal. We also urge the Board to consider removing black bears from their classification as furbearers by deleting them from the definition of furbearers found at 5 AAC 92.990 (21). This proposal would affect Bering Land Bridge, Gates of the Arctic and Noatak National Preserves.

Again, we appreciate the opportunity to provide you with comments on these important regulatory matters and continue to look forward to working with you on these issues. Should you or your staff have any questions, please contact me at 907-644-3505.

Sincerely,

Debora R. Cooper
Associate Regional Director, Resources and Subsistence

Enclosure

cc:
Cora Campbell, Commissioner, ADF&G
Kristy Tibbles, Executive Director, Alaska Board of Game, ADF&G
Pat Pourchot, Special Assistant to the Secretary for Alaska
Geoff Haskett, Regional Director, FWS
Chuck Ardizzone, FWS
Jeanette Koelsch, Superintendent, Bering Land Bridge
Frank Hays, Superintendent, Western Arctic Parklands
Greg Dudgeon, Superintendent, Gates of the Arctic
Dave Mills, Subsistence Team Leader, NPS
Sandy Rabinowitch, Subsistence Manager, NPS
Chris Pergiel, Chief Law Enforcement Officer, NPS-Alaska Region

OPEN ACCESS Freely available online

Possible Secondary Population-Level Effects of Selective Harvest of Adult Male Muskoxen

Joshua H. Schmidt[1]*, Tony S. Gorn[2]

1 U.S. National Park Service, Central Alaska Network, Fairbanks, Alaska, United States of America, 2 Division of Wildlife Conservation, Alaska Department of Fish and Game, Nome, Alaska, United States of America

Abstract

Selective harvest regimes are often focused on males resulting in skewed sex-ratios, and for many ungulate species this strategy is sustainable. However, muskoxen (*Ovibos moschatus*) are very social and mature bulls (≥4 years old), particularly prime-age bulls (6–10 years old), play important roles in predator defense and recruitment. A year-round social structure incorporating large males into mixed-sex groups could make this species more susceptible to the effects of selective harvest if population composition and sex-ratios influence overall survival and reproductive success. Using detailed data collected on the muskox population occupying the Seward Peninsula, Alaska during 2002–2012, we formulated the hypothesis that the selective harvest of mature bulls may be related to documented changes in population composition and growth rates in this species. In addition, we reviewed existing published information from two other populations in Alaska, the Cape Thompson and Northeastern populations, to compare population growth rates among the three areas under differential harvest rates relative to our hypothesis. We found that on the Seward Peninsula, mature bull:adult cow ratios declined 4–12%/year and short-yearling:adult cow ratios (i.e., recruitment) declined 8–9%/year in the most heavily harvested areas. Growth rates in all 3 populations decreased disproportionately after increases in the number of bulls harvested, and calf:cow ratios declined in the Northeastern population as harvest increased. While lack of appropriate data prevented us from excluding other potential causes such as density dependent effects and changes in predator densities, our results did align with our hypothesis, suggesting that in the interest of conservation, harvest of mature males should be restricted until causal factors can be more definitively identified. If confirmed by additional research, our findings would have important implications for harvest management and conservation of muskoxen and other ungulate species with similar life-histories.

Citation: Schmidt JH, Gorn TS (2013) Possible Secondary Population-Level Effects of Selective Harvest of Adult Male Muskoxen. PLoS ONE 8(6): e67493. doi:10.1371/journal.pone.0067493

Editor: Elissa Z. Cameron, University of Tasmania, Australia

Received November 26, 2012; **Accepted** May 20, 2013; **Published** June 20, 2013

Funding: Support for this project was provided by Federal Aid in Wildlife Restoration, the Alaska Department of Fish and Game, Western Arctic Parklands, and the U.S. National Park Service Inventory and Monitoring Program. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests: The authors have declared that no competing interests exist.

* E-mail: Joshua_schmidt@nps.gov

Introduction

Ungulate harvest regimes are often selectively focused on males with the goal of increasing total sustainable harvest [1] and providing increased trophy value. These strategies frequently result in skewed sex and age ratios at the population level [2]. Research on cervid species including moose (*Alces alces*) [3,4] and mule deer (*Odocoileus hemionus*) [5,6] has found little evidence to suggest that these reductions affect productivity, despite large changes to overall population composition. However, exceedingly female-biased sex ratios can have long term demographic and genetic effects on populations [7,8,9,10,11], and in some circumstances these effects can lead to declines in reproductive success [2,8,12] or calf survival and recruitment [7,13,14]. These types of secondary effects are difficult to detect but can have major implications for the long term sustainability of harvested populations.

In contrast to many ungulate species, muskoxen (*Ovibos moschatus*) are quite gregarious and form persistent mixed-sex and age groups throughout the year, although a portion of the males in the population occur in smaller bachelor groups [15,16]. Bulls are considered to be mature at 4 years of age, although they do not attain maximum body mass until they reach approximately 6 years of age [17]. This delayed growth pattern corresponds with observations that the majority of harem bulls in unharvested populations are between 6 and 10 yrs old [17,18] (hereafter: 'prime-age' bulls), resulting in a relatively small number of prime-aged individuals being responsible for most of the breeding [17]. The group-living social structure of muskoxen has been shown to be important for both predator defense [15] and other activities such as foraging [19]. Although females will charge predators [20], mature bulls frequently play a lead role in defending the group [21]. Similar defensive strategies have been observed in other group-living species such as wood bison (*Bison bison athabascae*) [22]. Mature bull muskoxen in general, and prime-aged bulls in particular, often place themselves between the perceived threat and the rest of the group and increase group cohesion during attacks [15,17,23,24,25,26]. Due to their larger size (cows are approximately 40–50% smaller than prime-aged bulls [15,26]), they may be more able to successfully defend against predators, and even if killed during an attack, the remaining group members may escape unharmed. When larger numbers of these individuals occur in a population, survival rates for cows and calves may be increased. These important breeding and leadership functions

suggest that the presence of prime-aged bulls could influence group-level survival and productivity throughout the year.

Research on similar species, such as Cape buffalo (*Syncerus caffer caffer*) and wood bison, also suggests that bachelor groups and higher male:female ratios may perform critical functions by allowing breeding bulls an opportunity to recover during extended reproductive seasons [27,28]. Without a large pool of available prime-aged males, the breeding period could be extended or less successful, and males may experience higher mortality rates due to decreased body condition. When social, reproductive, and defensive roles are considered together, the importance of prime-aged males could make muskoxen and other ungulate species with similar life history strategies much more sensitive to selective harvest of mature males.

Muskoxen formerly occurred throughout much of the Canadian Arctic, Greenland, and northern Alaska, but by the mid to late 1800s muskoxen were absent from Alaska [26,29], and populations in Canada were greatly reduced [15]. Since then, muskoxen have been successfully reintroduced to Alaska, and populations have recovered across much of Canada. However, despite low apparent harvest rates (e.g., 1–6%), population growth rates in the 3 mainland populations in Alaska (i.e., the Seward Peninsula population [SPP], the Northeastern population [NEP], and the Cape Thompson population [CTP]) have all declined over time [30,31,32]. Many potential causes for these changes in population growth have been identified including: density dependence, harsh winter weather and disease [33,34], and increased predation and emigration [33,35]. Interestingly, these declines in population growth rates also occurred after increases in harvest, suggesting that the effects of the selective harvest regimes should be more closely considered as a potential driver as well. However, because basic population metrics and biological information for muskox are lacking in many areas, it can be difficult to identify the primary causal factors related to population trajectory.

Historically, the males-only harvest regimes in Alaska were concentrated on mature bulls (≥4 years of age) due to their higher trophy value and difficulties in distinguishing immature males from females. The tendency for mature bulls, particularly prime-aged individuals, to place themselves between the rest of the group and any perceived threat [21] may have further increased harvest pressure on this segment of the population. Although some basic biological information is lacking, the differences in social structure relative to many other ungulates, the potential for high relative harvest rates of prime-aged males, and the apparent similarities in population trajectories relative to harvest among the 3 Alaska mainland populations led us to formulate the hypothesis that selective harvest of mature bulls may have secondary population-level impacts at the group level, possibly through changes in survival and recruitment rates, leading to subsequent overall population declines. We used abundance and composition survey data from the SPP to estimate the size of the mature bull and yearling components of the population, realized harvest rates (number of mature bulls harvested/estimated number of mature bulls in the population), and recruitment rates (number of short-yearlings) between 2002 and 2012. We also compared population growth rates, harvest rates, and trends in population composition (where data were available) among the 3 mainland populations of muskoxen in Alaska to identify any patterns relative to our hypothesis. Our primary objectives were to: 1) investigate patterns in population composition and growth rates relative to changes in harvest in the SPP; 2) generate a working hypothesis identifying potential mechanisms for secondary impacts of harvest; 3) identify similarities in harvest rates and population trajectories among 3 harvested populations of muskox in Alaska (i.e., the SPP, NEP, CTP); and 4) provide conservative harvest recommendations and suggest further research needed to establish the causal factors of observed population declines.

Materials and Methods

Ethics Statement

This project falls under the definition of a field study as defined by the Animal Welfare Act Regulations§1.1: "Field study means a study conducted on free-living wild animals in their natural habitat. However this term excludes any study that involves invasive procedure, harms, or materially alters the behavior of an animal under study." Our sampling methods were based solely on visual observations from a distance, were non-invasive, and did not harm or materially alter the behavior of the animals observed in this study. Under §2.31, d,1 of the Animal Welfare Act Regulations, field studies are exempt from IACUC review. Because this project met the definition of a 'field study' as defined by the Animal Welfare Act Regulations, a permit was not required. This project also complied with the U.S. National Park Service Planning, Environment, and Public Comment (PEPC) process (PEPC Project ID: 41681).

Study Area

The SPP study area consisted of 5 administrative Game Management Subunits ([GMSUs]; 22B, C, D, E, 23SW) covering 65,232 km^2 of the Seward Peninsula in western Alaska (Fig. 1). For management purposes, all harvest regulations were established at the level of the individual GMSU, as were data collection protocols. The terrain varied from rugged mountains and river valleys to flat coastal wetlands. Spruce forests (*Picea sp.*) occurred in the eastern portions of the SPP study area, while more western areas were treeless and largely tundra covered with willow (*Salix spp.*) thickets along the riparian corridors. During snow free months access to most of the study area is limited, except along the Nome road system in the central Seward Peninsula where almost 645 km of gravel roads can provide hunters access to portions of 22B, 22C, and 22D. Mean monthly temperatures in Nome (in GMSU 22C) vary between −19.3°C and 14.1°C, and average annual snow depth is 158 cm [36]. The NEP survey area consisted of portions of 3 GMSUs (26A, B, C) along the north slope of the Brooks Range in the northeastern portion of Alaska (Fig. 1; see [33,35] for a detailed description). The CTP survey area consisted of a 10,440 km^2 portion of GMSU 23 north of Kotzebue, Alaska encompassing Cape Kruzenstern National Monument and the coastal areas north to Cape Thompson (Fig. 1; see [32,37] for a detailed description).

Seward Peninsula Population

Population Surveys. Abundance estimates between 1983 and 2007 were based on full coverage, minimum count population surveys conducted at regular intervals (i.e., 1983–1985, 1988, 1992, 1994, 1996, 1998, 2000, 2002, 2005, 2007) throughout the SPP study area during spring (generally March and April) when snow coverage was nearly complete and sightability was high [31,38]. Fixed-wing aircraft (e.g., Piper PA-18, Aviat Husky, Cessna 185) were used to cover all known muskoxen habitat at approximately 3.2–4.8 km intervals. Although pilots were allowed to vary search intensity based on knowledge of the survey area and habitat quality, full coverage was required. During 2010 and 2012, transects were established systematically at 4.8 km intervals throughout the entire study area and estimates of abundance were generated using distance sampling theory [31,39]. The new survey method was implemented primarily to reduce cost of future

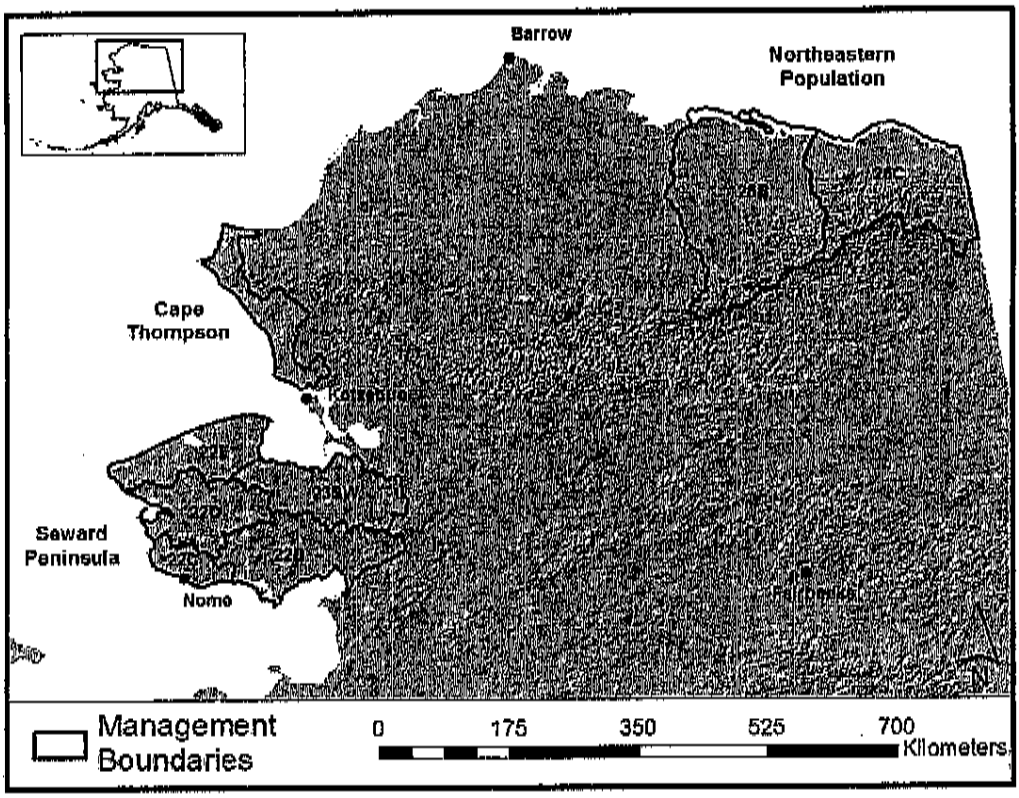


Figure 1. Approximate extent of the 3 Alaska mainland populations of muskoxen. Muskoxen survey and management areas showing the approximate boundaries of each of the 3 Alaska mainland populations (Northeastern, Cape Thompson, and Seward Peninsula) and the relevant Game Management Subunits. Muskoxen in the Northeastern population generally occurred north of the mountains, and small numbers occurred in adjacent areas to the east and west of the delineated boundaries.
doi:10.1371/journal.pone.0067493.g001

surveys and increase the reliability of abundance estimates, while secondarily providing an opportunity to assess potential bias in the minimum counts due to incomplete detection. For analysis, during years when abundance surveys were not conducted, we assumed the GMSU-specific populations grew at a constant rate during the interval between surveys.

Sex and Age Composition Surveys. We conducted composition surveys during March and April, prior to calving, within ≥1 GMSUs in most years between 2002 and 2012. Each GMSU was surveyed ≥3 times between 2002 and 2011, and in 2012 all 5 GMSUs were surveyed. Locations of muskox groups were recorded during the peninsula-wide population survey or during pre-composition surveys designed to locate the majority of the groups within the GMSU of interest. We then randomized this list of known groups and sampled them in order until approximately 15 groups or 200 individuals had been sampled within the GMSU of interest. This was consistent with the sample size recommendations for composition surveys proposed by Czaplewski et al. [40], although we did not conduct a formal power analysis to assess the adequacy of sample size. We used a helicopter (Robinson R44) to land near groups and classified each individual into 1 of 5 sex and age categories: mature bulls (≥4 yrs old), immature bulls (2–3 yrs old), mature cows (≥3 yrs old), immature cows (2 yrs old), and short-yearlings (<1 yrs old). Sex and age categories were based on horn development and body size and are highly reliable when assessed by experienced observers [41]. Bulls >4 yrs of age cannot be reliably differentiated, hence all bulls ≥4 yrs of age were considered to be mature. Population abundance and composition data can be found in [31].

Sex and Age Composition Estimates. We estimated composition (i.e., sex and age ratios) within each GMSU using an individual based estimator, adjusted for estimated GMSU-specific abundance. Because population and composition surveys were often conducted during different years and group sizes fluctuated annually, the number of groups in each sub-population was unknown. This prevented us from using a group based estimator, possibly introducing some bias due to correlation among individuals within groups [42]. We minimized this risk by sampling randomly from all known groups and observing a relatively large proportion of groups and individuals within the sub-population in each unit. Treating the individual animal as the sample unit allowed us to use GMSU-specific abundance point estimates (interpolated between survey years) as a finite population correction factor. Because harvest regulations and composition surveys were GMSU-specific, all analyses except overall trends in abundance were conducted at the level of the individual GMSU.

We conducted composition analyses in a Bayesian framework using a data augmentation approach [43], although in our case, we were able to limit the possible number of individuals in each sex and age class remaining in the sub-unit. We used a multinomial distribution with 3 categories (mature bulls, mature cows, and short-yearlings) to estimate the probability of each individual belonging to one of these sex and age classes. Data were arranged in matrix format with the number of rows equal to the

population estimate and 3 columns, one for each sex and age category. The appropriate category for each observed individual was identified using a 1, with the remaining categories coded as 0s. For example, a mature bull would be coded as 1 0 0, whereas a short-yearling would be coded 0 0 1. Observed animals that did not belong to any of these 3 categories (e.g., an immature cow) were coded as 0 0 0 to indicate that they had been observed but did not belong to any of the main categories of interest. The sex and age of the remaining portion of the estimated number of individuals not included in the composition sample was considered to be unknown. These unknown values were then estimated during each update of the sampler. We estimated ratios for each year and GMSU separately, and mature bull:mature cow and short-yearling:mature cow ratios were calculated during each update of the sampler. We then estimated trends in composition by fitting a generalized linear trend model to a set of 2500 samples from the posterior distributions for the annual composition estimates within each GMSU. This allowed us to estimate rates of change in mature bull:mature cow and short-yearling:mature cow ratios with measures of precision over the study period. The upper and lower 2.5% of estimates were discarded to provide an estimate of the 95% credible interval for each trend. All estimation was conducted with R 2.13.1 [44] and WinBUGS 1.4.3 [45].

Harvest Monitoring. Harvest regulations were applied at the level of the individual GMSU and varied among GMSUs annually. All hunters were required to submit a harvest report upon harvesting a muskox or at the end of the season if unsuccessful, and although age of the animal was not consistently recorded, most hunts were limited to bulls only. Because immature bulls and cows can be difficult for inexperienced hunters to distinguish, mature bulls were usually selected to avoid accidentally harvesting a cow. Large bulls were also preferred for their trophy value even though hunters from outside the local area were required to submit the skulls to the Alaska Department of Fish and Game [ADFG] for trophy destruction (i.e., the distal end of each horn was removed and retained) in most hunts. Based on these combined circumstances, we assumed that most bulls harvested from the SPP were mature animals. We assessed the validity of this assumption by calculating the proportion of males ≥4 yrs vs. <4 yrs from a sample (n = 42) of horns submitted to ADFG for trophy destruction in 2010.

Mature Bull and Short-Yearling Abundance and Realized Harvest Rates. We applied the mature bull and short-yearling ratio estimates to the abundance estimate for each year in each GMSU to estimate the abundance of mature bulls and short-yearlings in each hunt unit. Because we were confident that harvest consisted almost entirely of mature males, directly estimating the number of individuals in this subgroup allowed us to calculate the maximum realized harvest rate on this segment of the population. We calculated harvest rate within WinBUGS allowing us to directly provide estimates of precision on the number of mature bulls removed as well as the realized harvest rates. We also estimated the number of short-yearlings in each GMSU in each survey year in the same manner, providing an estimate of recruitment into the population for each survey year. These estimates were only calculated for years in which composition surveys were conducted. Estimates are presented as means with 95% Bayesian credible intervals (CI). Trends in bull and short-yearling abundance were estimated using the approach described above.

Comparisons Among Populations

We used published minimum count and harvest data from the SPP [31], NEP [33,35,46] and CTP [32,47] to estimate exponential rates of population change during time periods with differing levels of harvest. We grouped years into time periods corresponding to changes in harvest regulations and reported harvest. We then calculated average harvest as a percent of the total population and the average number of bulls harvested during each period. We then compared harvest rates to population growth rates among the three populations to identify similarities. We also compared changes in calf production [33,35] to harvest over these same time periods for the NEP.

Results

Seward Peninsula Population

The numbers of muskoxen observed in the SPP study area increased through 2007, but the final two surveys suggested overall population growth had stopped by 2010 and then declined at a rate of -14%/year through 2012 (Table 1). Between 2010 and 2012, the estimated number of animals in 22C, 22D, and 22E (together containing approximately 70–80% of the total population) declined by 28%, 28%, and 51%, respectively, although numbers remained relatively unchanged in the remaining units (Table 1). We found that mature bull:mature cow ratios declined substantially in GMSUs 22B, 22C, and 23SW during the course of the study, while remaining relatively stable in 22D and 22E until after 2010 when ratios in these areas also appeared to decline (Table 2, Fig. 2). Short-yearling:mature cow ratios were more variable through time but declined in all GMSUs except 22E during the study period (Table 2, Fig. 3). Declines in mature bull:mature cow ratios were most severe in the most road accessible GMSU, 22C, where ratios changed at a rate of −12% (95%CI: −14% to −10%) annually. During this period, the proportion of bachelor groups also tended to decline, while the number of observed groups lacking mature bulls increased (Fig. 4). The average size of bachelor groups did not increase, rather the number of these groups generally declined through time accounting for the changes in proportions.

Temporal patterns in the estimated total number of short-yearlings and mature bulls in each GMSU differed from patterns in composition. In 22C where total harvest exceeded 6% of the estimated population in consecutive years, the number of mature bulls declined throughout the study period (Table 2). In the remaining areas, mature bull numbers were relatively steady until after 2010 (Fig. 3). Short-yearling abundance declined in 22D, 22E, and 23SW throughout the study, and declined in most of the remaining GMSUs between 2010 and 2012 (Table 2, Fig. 3). The total number of bulls harvested generally increased in all GMSUs throughout the study (except for 2011), particularly between 2007 and 2010 (Table 3). However, the realized harvest rate of bulls increased dramatically, approaching half of the estimated number of bulls in some GMSUs (Table 3). The range of realized harvest rates on this segment of the population was lower in 22D and 22E and did not exceed 25% (Table 3), at least in years with corresponding composition data. In 2010, a sample of horns (n = 42) from harvested animals inspected by the ADFG indicated that 88% of the bulls harvested were mature animals in that year, despite the observed reductions in mature bull:mature cow ratios. In addition, we found that <12% of groups were likely missed during a given survey under the restricted conditions of the distance sampling protocol.

Population Growth Relative to Harvest

Annual rates of population growth for the SPP decreased disproportionately as harvest rates increased (Fig. 5A). After the onset of a small harvest averaging <2% of the population,

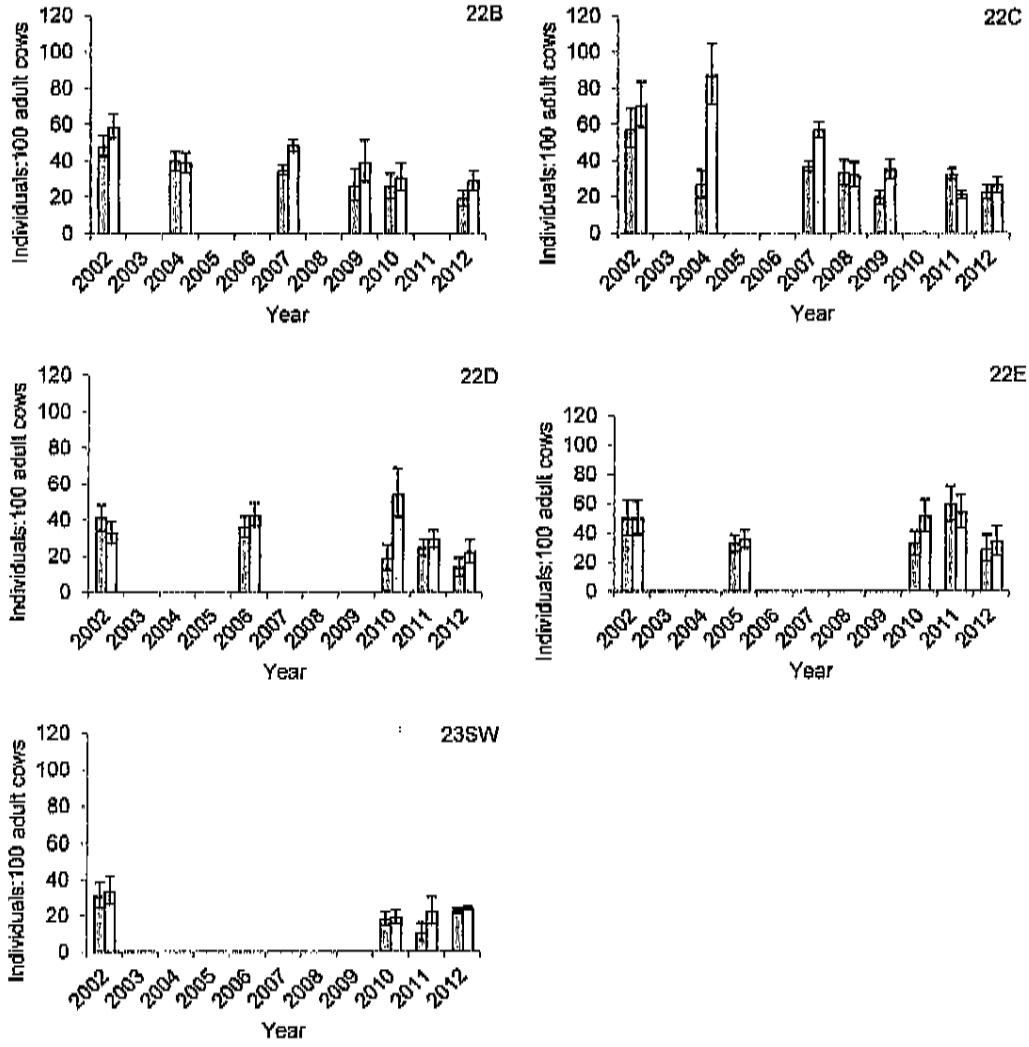


Figure 2. Composition estimates for muskoxen on the Seward Peninsula, Alaska from 2002–2012. Estimates of muskoxen composition for 5 Game Management Subunits (GMSUs) on the Seward Peninsula, Alaska, USA from 2002 to 2012. Gray bars and stippled bars represent short-yearlings:100 adult cows and mature bulls:100 adult cows, respectively. Missing bars indicate years when composition surveys were not completed in a given GMSU. Error bars represent 95% Bayesian credible intervals.
doi:10.1371/journal.pone.0067493.g002

population growth appeared to slow. Overall, annual harvest increased to an average of approximately 3% between 2000 and 2007, and the rate of population growth decreased by about 50% over the same period. At harvest rates of approximately 5% starting in 2007, growth was negligible through 2010 and then declined precipitously (14%/year) through 2012. Changes in harvest regimes appeared to be associated with decreases in population growth rate in the NEP as well, although harvest rates were lower and changes in growth occurred over a longer time frame (Fig. 5B). The average population growth rate was approximately 60–70% lower in the period after the onset of a 1.5–1.7% average harvest rate in the early 1980s, and the population declined dramatically after 1995 under an annual harvest of approximately 2% of the population. The population stabilized after harvest ended in 2006 and has remained stable (Fig. 5B). We identified a similar association between harvest rates and population growth in the CTP (Fig. 5C). Prior to the first harvest in 2000, the population grew at an annual rate of approximately 10%. Between 2000 and 2005 the average harvest rate was <1%, and population growth slowed to an average exponential rate of 2.5% annually. Between 2005 and 2010 the average annual harvest increased to 1–2% and the population declined at a rate of 4.5% annually. Although the rates of both population growth and harvest differed among the populations, the basic pattern of disproportionate decreases in growth after the implementation of increased harvest levels was consistent.

Discussion

Our estimates of changes in abundance, sex and age ratios, and population growth rates through time coincided with increases in harvest rates, in agreement with our hypothesis that harvest of mature bulls may have secondary population-level effects in this species. While we were unable to rule out other potential causes such as changes in predator densities or density dependent effects, the observed relationship between high rates of harvest and

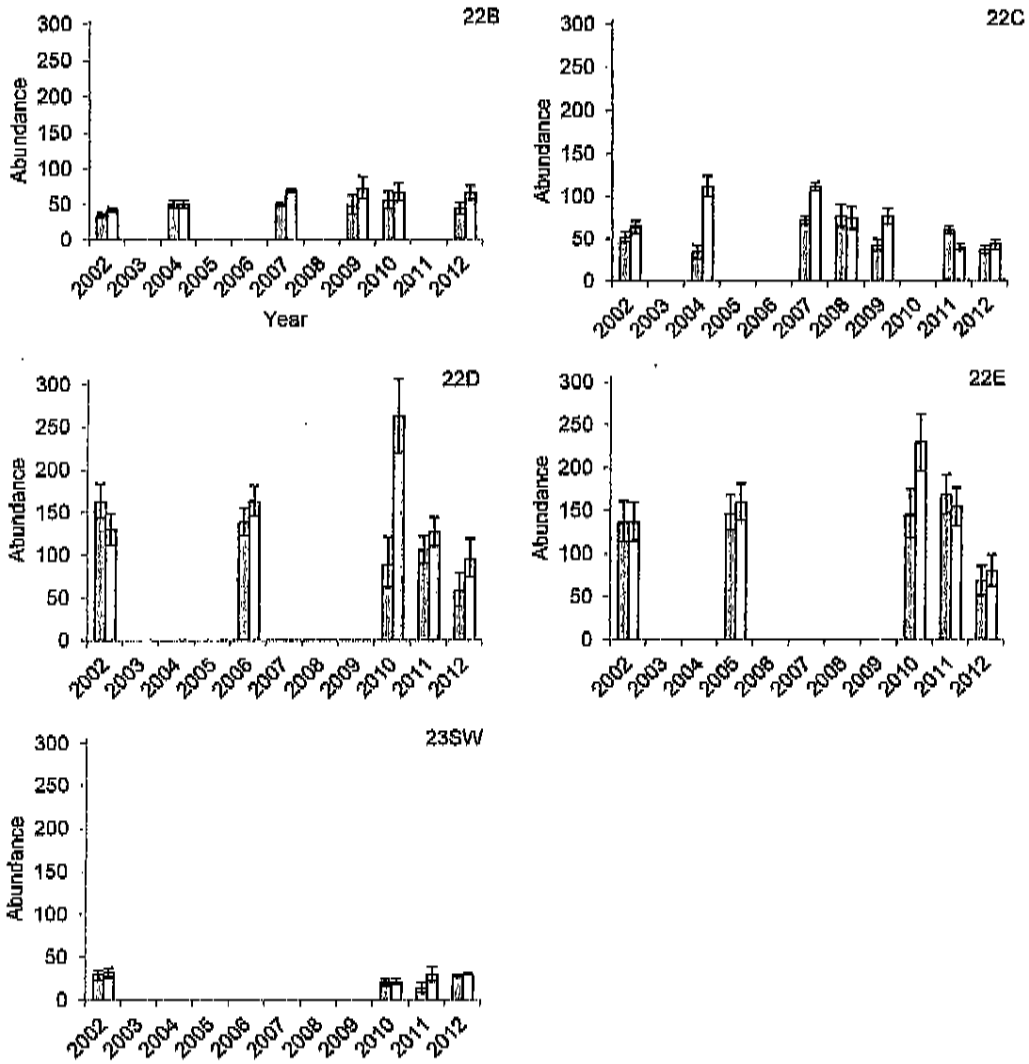


Figure 3. Estimated number of short-yearling and mature bull muskoxen on the Seward Peninsula, Alaska from 2002–2012. Estimated number of short-yearlings (gray bars) and mature bulls (stippled bars) present in 5 Game Management Subunits (GMSUs) on the Seward Peninsula, Alaska, USA from 2002 to 2012. Missing bars indicate years when composition surveys were not completed in a given GMSU. Error bars represent 95% Bayesian credible intervals.
doi:10.1371/journal.pone.0067493.g003

changes in populations suggests that male-biased harvest regimes deserve careful consideration as potential driver of muskox populations. In the SPP, we found that population growth slowed, mature bull:mature cow and short-yearling:mature cow ratios declined, the number of bachelor groups declined, and the presence of mature bulls in mixed-sex groups declined in most GMSUs under increased harvest pressure. These population-level changes corresponded with increases in realized harvest rate estimates which suggested that in some years >40% of mature bulls may have been harvested in some GMSUs. Similar declines were also observed in the CTP and NEP under increasing harvest rates. Although our data could not be used to determine causation, when viewed in the context of the life-history characteristics of muskoxen, these patterns suggest that the harvest of mature bulls should be reduced until further research can identify the ultimate cause of observed declines in these populations.

Selective harvest regimes are expected to result in reduced mature bull:mature cow ratios [2], but the strong declines we observed in portions of the SPP (i.e., up to 70% over 10 years) likely indicated harvest levels were unsustainable. Past work on muskoxen has also suggested that high removal rates of mature bulls can lead to reductions in recruitment, possibly compounding the effect of harvest longer term. For example, Smith [48] observed declines in reproductive output concurrent with a selective males-only harvest regime in a predator-free system (i.e., Nunivak Island). In a portion of the NEP, Reynolds [33] documented declines in average calf production from 87 calves:100 cows prior to the implementation of harvest, to 61:100 between 1982 and 1986, and 38:100 between 1991 and 1996. Calf recruitment appeared to be lower in the CTP in later years as well, coincident with increases in harvest [32,37,47]. We found comparable declines in yearling:mature cow ratios in the SPP during the decade of this study. While the available data from

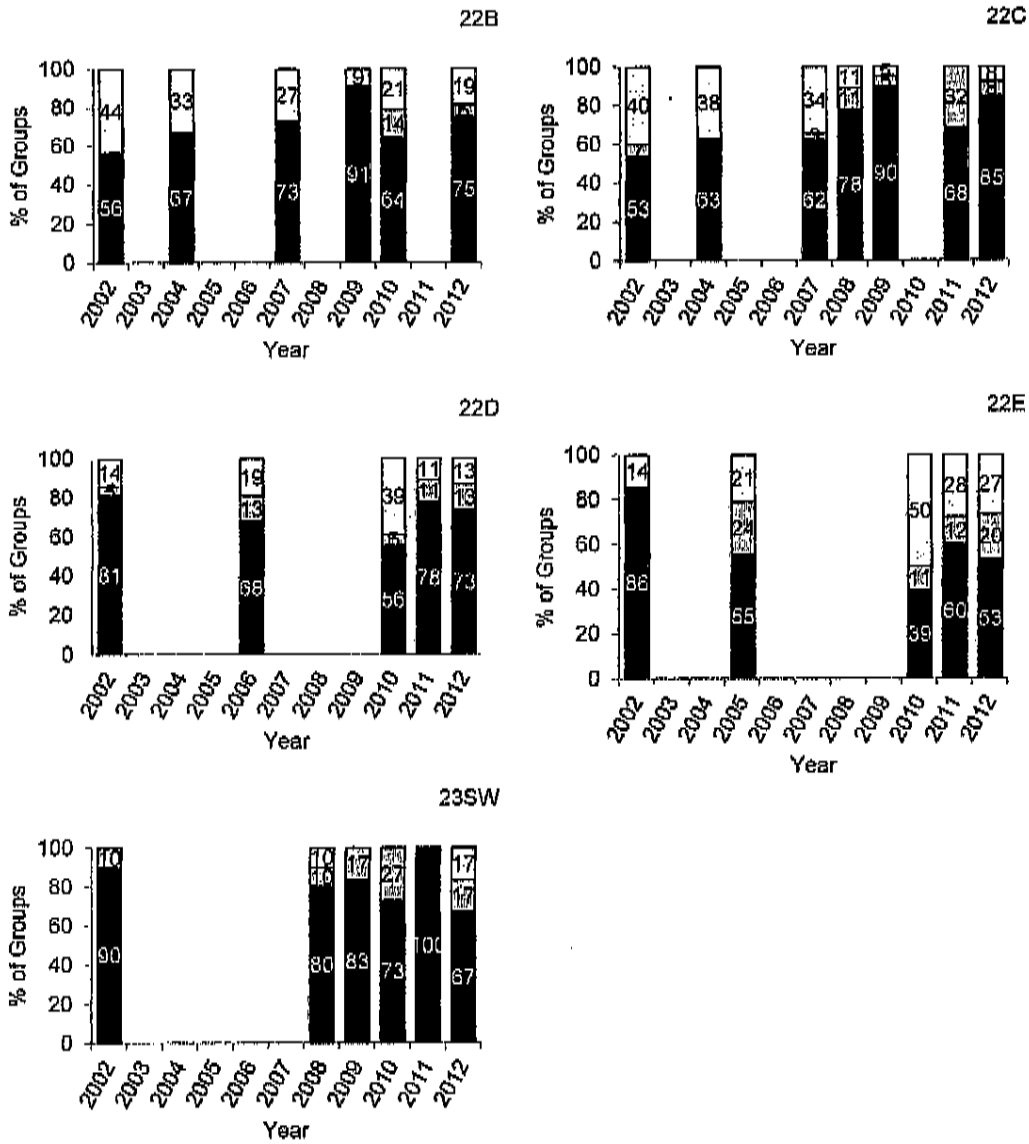


Figure 4. Proportion of muskox groups containing mature bulls on the Seward Peninsula, Alaska. Proportion of groups observed in 5 Game Management Subunits during the composition surveys containing mature bulls with other sex and age classes (black), no mature bulls (gray), and bulls only (stippled) on the Seward Peninsula, Alaska, USA from 2002 to 2012.
doi:10.1371/journal.pone.0067493.g004

these areas could not be used to establish harvest as the cause for observed declines, a consistent pattern of declining recruitment after the implementation of harvest does suggest that the selective harvest of mature males may be related to reductions in recruitment in this species.

Potential mechanistic explanations for decreased recruitment include: delayed birth dates, reduced birth synchrony, lowered calf body mass, and reduced pregnancy rates [2,7,8,10,14]. Pregnancy rates for mature cows in the SPP appeared to be quite high in recent years (>90% T. Gorn, unpublished data), suggesting that decreased calf survival may have been the ultimate cause of declining recruitment. Young male muskoxen may be less effective at maintaining a harem [48], and the presence of prime-aged bulls can synchronize estrus in females [49,50]. Therefore, although the typical muskoxen calving season extends over several weeks, a reduction in the number of prime-aged bulls in the population could delay or prolong the calving period. In Alaskan ungulate populations, other studies have found decreased survival rates for calves born later in the season [51,52] or outside of the peak calving period [53], suggesting that such delays could decrease calf survival in muskoxen as well. While these mechanisms have the potential to negatively affect recruitment, numbers of prime-aged bulls may expose all group members, and calves in particular, to higher levels of predation by decreasing the effectiveness of the group predator defense mechanism.

Wolves (*Canis lupus*) were traditionally considered to be the principal predator of muskoxen, and predation by grizzly bears (*Ursus arctos horribilis*) was considered rare [26,54,55]. The details of the defensive behavior of muskoxen are not fully understood, but it appears clear that prime-aged bulls in mixed-sex groups play a

Table 1. Muskoxen counts by Game Management Sub-Unit.

	Game Management Unit					
Year	22B	22C	22D	22E	23SW	Total
2000	159	148	774	461	255	1797
2002	189	257	771	632	201	2050
2005	326	220	796	863	182	2387
2007	329	445	746	949	219	2688
2010[a]	420	402	878	879	175	2754
	(362–520)	(357–463)	(800–993)	(802–996)	(137–244)	(2561–3105)
2012[a]	460	289	629	431	222	2031
	(392–577)	(246–355)	(551–761)	(363–551)	(171–320)	(1806–2422)

[a]Values for 2010 and 2012 are the point estimates generated using distance sampling methods with 95% credible intervals shown in parentheses.
Muskoxen counts by Game Management Sub-Unit for the 6 years during which all sub-units were surveyed between 2000 and 2012 on the Seward Peninsula, Alaska, USA.
doi:10.1371/journal.pone.0067493.t001

Table 2. Estimated annual rates of change in sex and age ratios, mature bull abundance, and short-yearling abundance.

GMSU	$\lambda^{B:C}$	$\lambda^{Y:C}$	λ^{B}	λ^{Y}
22B	**−0.06**	**−0.08**	0.05	0.02
	(−0.8, −0.04)	(−0.10, −0.06)	(0.03, 0.06)	(0.00, 0.04)
22C	**−0.12**	**−0.07**	**−0.06**	0.00
	(−0.14, −0.10)	(−0.9, −0.05)	(−0.07, −0.05)	(−0.01, 0.01)
22D	−0.01	**−0.09**	0.00	**−0.08**
	(−0.03, 0.01)	(−0.11, −0.07)	(−0.01, 0.02)	(−0.09, −0.06)
22E	0.00	**−0.01**	**−0.01**	**−0.02**
	(−0.03, 0.03)	(−0.04, 0.02)	(−0.02, 0.01)	(−0.04, 0.00)
23SW	**−0.04**	**−0.06**	**−0.01**	**−0.03**
	(−0.07, −0.02)	(−0.09, −0.03)	(−0.04, 0.01)	(−0.06, −0.01)

Estimates of annual rates of change (λ) in mature bull:mature cow (B:C) and short-yearling:mature cow (Y:C) ratios and mature bull (B) and short-yearling (Y) abundance between 2002 and 2012 for 5 Game Management Subunits (GMSU) on the Seward Peninsula, Alaska, USA. Numbers in parentheses represent 95% confidence intervals. Bold numbers indicate estimated declines that do not include 0 in the 95% confidence interval.
doi:10.1371/journal.pone.0067493.t002

primary role in group defense [15,17,24,25,26] and they will aggressively defend themselves against grizzly bears [56]. A reduction in the effectiveness of group defense as numbers of prime-aged bulls are reduced through harvest offers one possible explanation for the increased instances of grizzly bear predation [56] and declines in calf production [33] observed in the NEP. Upon the elimination of harvest, the precipitous decline in the NEP ceased almost immediately, further supporting a possible link between the two. Grizzly bears are generally emerging from their dens during the calving season when other food sources are limited, and other work has found groups lacking mature bulls to be more nervous and flighty [21,57]. Because muskoxen cannot easily outrun predators, individual animals and calves in particular are much more vulnerable to predation if the defensive approach is abandoned. Prior to the onset of harvest, bear predation was considered to be a rare occurrence on the Seward Peninsula, despite bears being common [56]. However, recent observations have indicated that bear predation has increased in the area, possibly explaining an adult cow mortality rate approaching 20% annually in some areas [31]. A lack of predator density estimates prevented us from evaluating the influence of the number and distribution of predators on muskox population trajectories, although we suspected that increases in successful predation attempts due to reduced numbers of prime-aged bulls could explain the disproportionate reductions in population growth and recruitment we and others have observed.

Other potential factors that could contribute to large-scale population declines include severe winter weather, large scale emigration from the study areas, or density dependent population limitation. Harsh winters with deep snow and icing events can reduce survival and recruitment and may be the primary factor limiting muskox populations in some areas [33,59,60]. However, in a separate study on the SPP, all observed non-human caused mortalities of radio-collared individuals occurred during spring and summer [31], supporting our assertion that severe winter weather conditions were likely not the immediate cause of death. This time period also corresponds to the interval when bears are not hibernating. Emigration has been observed in all 3 mainland populations [31,32,35], but the survey areas were very large, and in the case of the SPP is surrounded by the ocean on 3 sides, limiting the potential for extensive undocumented emigration. Recent surveys adjacent to our SPP study area to the east indicated a small, slowly growing population [31], confirming that emigration to adjacent areas was not driving large changes in population growth in the SPP. In muskoxen, reproductive rates are largely attributed to nutritional condition [61,62,63], females can give birth at age 2, and will calve in successive years under very favorable nutritional conditions [26,63]. Preliminary data suggested that annual pregnancy rates were high in the SPP (>90% T. Gorn, unpublished data) and CTP, and a proportion of 2 yr old females were pregnant each year in both areas (L. Adams, unpublished data, J. Berger et al. unpublished data). If density-dependent limitations were influencing these populations, lower pregnancy rates, longer reproductive intervals, and later age of first reproduction would be expected. While we were unable to rule out density dependent effects, the available information provided little evidence that changes at the population level were due to population densities in any of the populations we considered.

Although our results indicate that declines in population size and mature bull:mature cow and short-yearling:mature cow ratios coincided with higher harvest, the nature of the available data complicated interpretation. Harvest regimes were established and composition surveys were conducted at the level of the subunit, potentially obscuring changes in subunits with lower numbers of animals (e.g., 22B or 23SW) through small-scale movements of a few groups from larger adjacent units (e.g., 22E). It is possible that changes in these subunits were buffered by small-scale immigration from the larger adjacent units, however, the overall pattern of population decline and declines in ratios was clear. In addition, the realized harvest rate differed through time in each subunit with some areas like 22C reaching higher levels of harvest prior to other areas (e.g., 22D, 22E). We expect that lower realized harvest rates in the early years of our project explain the later timing of declines in abundance and sex/age ratios in subunits 22D and 22E. The lack of parallel declines in abundance and composition throughout the study for all subunits may reflect these differences in timing rather than indicating differing responses among subunits. If our interpretation is correct, these differences suggest that there may

Table 3. Reported harvest and realized harvest rates of mature bull muskoxen.

	Game Management Subunit											
Year	22B		22C		22D		22E		23SW		Total	
	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate
2000–2001	0		0		22		16		5		43	2.4%
2001–2002	6		2		23		9		5		45	
2002–2003	6	14%	5	8%	24	18%	18	13%	6	19%	59	2.9%
2003–2004	9		5		24		17		3		52	
2004–2005	7	14%	4	4%	17		34		5		67	
2005–2006	10		5		7		30	19%	0		52	2.2%
2006–2007	17		19		30	18%	19		3		87	
2007–2008	22	32%	25	23%	33		39		10		129	4.8%
2008–2009	9		30	41%	31		35		15		120	
2009–2010	14	19%	31	41%	34		42		13		134	
2010–2011	28	43%	24		49	19%	22	10%	4	19%	127	4.6%
2011–2012	17		1	3%	30	24%	28	18%	6	20%	82	
Total	139		150		324		309		75		997	

Reported number of bull muskoxen harvested (#) and estimated realized harvest rates (Rate = [number harvested/estimated number available] X 100) in each Game Management Subunit on the Seward Peninsula, Alaska, USA between regulatory years (i.e., July1 of the current year-June 30 of the following year) 2000 and 2011. Missing harvest rate values indicate years without appropriate composition or abundance data.

doi:10.1371/journal.pone.0067493.t003

be a lag between the timing of the implementation of increased harvest and observed changes in abundance and composition.

We acknowledge that our data do not provide a definitive explanation for the observed population declines and multiple factors may play important roles. However, the available evidence does suggest that the selective harvest of mature bull muskoxen should be considered as a potential cause of observed declines in recruitment and population growth. While we were unable to exclude influences of density dependence or changes in predator densities as primary drivers of population change, our results suggest harvest could be an important driver. We suspect that the overall reduction in the number and average age of bulls in each population may have increased the opportunity for predation on cows and calves (particularly by bears), although this hypothesis will require further testing. Predation pressure may be particularly high in the spring when grizzly bears first emerge from dens and muskox groups that have experienced harvest are least likely to contain mature bulls. A concurrent decline in recruitment and possibly cow survival, if related to mature bull abundance, could explain the dramatic and sustained decline (approximately 60% between the mid-1990s and mid-2000s) in the NEP, the recent 28% decrease in the SPP between 2010 and 2012, and the approximately 20% decrease in the CTP between 2005 and 2010. If our suspicions are correct, the low numbers of large bulls and associated bachelor groups due to years of poor recruitment may help explain the failure of the NEP to recover after the cessation of harvest [35], and the consistent declines in the SPP and CTP. Until appropriate data are available to establish the cause of population declines in harvested muskox populations, our results suggest that managers should consider the potential importance of prime-aged bulls to overall population productivity and growth, and future conservation and harvest programs should be structured accordingly.

Conclusions

After examining the available data, we propose that male-biased harvest rates based on total population size may be inappropriate for muskoxen. With observed concurrent declines in short-yearling:mature cow and mature bull:mature cow ratios, as well as the overall population in the SPP, we recommend that annual harvest be restricted to $<10\%$ of the estimated number of mature bulls in the interest of conservation. Reasonable rates might be lower, particularly following years with poor recruitment or in declining populations, and the elimination of harvest should be considered if mature bull:mature cow ratios fall below approximately 20:100. If our hypothesis is correct, we suspect that higher harvests and positive population growth rates may be sustainable in the future if sex ratios were returned to near pre-hunt levels (>50–70 mature bulls:100 mature cows). A formal adaptive management framework could provide a mechanism for assessing the relationship between harvest and population trajectories and may reduce the risk of unsustainable harvest rates in the future [64,65,66]. For the SPP, we suggest range-wide abundance and composition surveys be conducted sequentially (within a year) every other year to best monitor the continuing effects of harvest on population structure and trajectory. Current effort for the composition surveys (i.e., $\geq$15 groups or 200 individuals per GMU) appears to be adequate, but if more detailed information is needed for specific areas, larger samples may be necessary. Further research focused on pregnancy rates, body condition, timing and causes of mortality, predation rates and predator densities, and comparisons of survival and recruitment rates of harvested vs. unharvested sub-populations will be necessary to establish the causal mechanism for population declines in harvested populations.

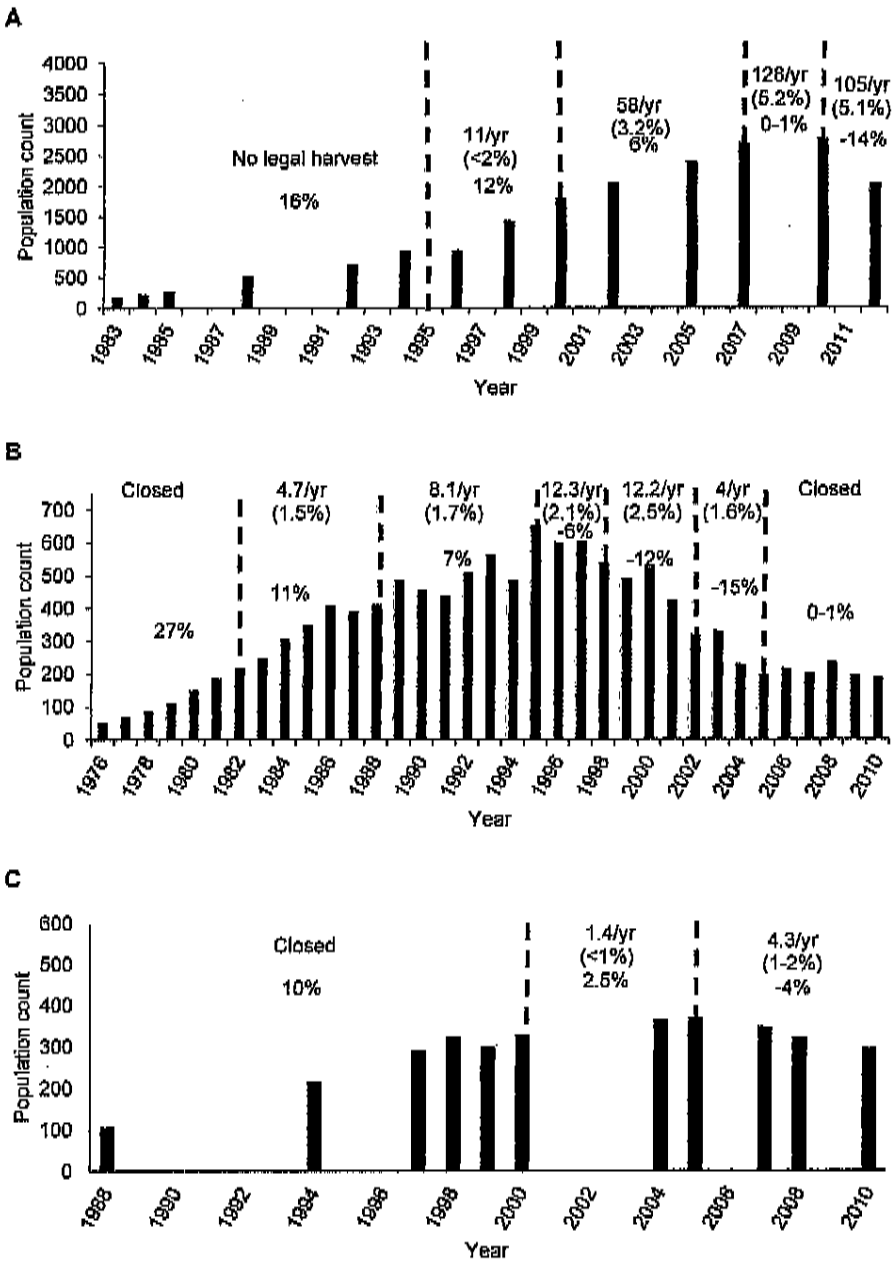


Figure 5. Population counts and harvest levels for the 3 mainland populations of muskoxen in Alaska. Population counts for the Seward Peninsula (A), Northeastern (B), and Cape Thomson (C) muskox populations in Alaska, USA. Dashed lines delineate periods with substantial changes in harvest. Values indicate the average number of bulls harvested annually during each period, the average annual overall harvest rate as a proportion of the total population (in parentheses), and the exponential rate of growth during each period. Data sources: Seward Peninsula [this study,31], Northeastern [33,35], Cape Thompson [32,47].
doi:10.1371/journal.pone.0067493.g005

Acknowledgments

Numerous pilots and observers helped to complete these surveys safely over the years. K. Persons carefully classified thousands of muskoxen in the SPP since 2002. L. Adams, J. Dau, J. Lawler, L. Parrett, P. Reynolds, B. Shults, C. Tambling, K. Titus, C. Westing and several anonymous reviewers provided helpful discussions and comments on a previous draft of this manuscript. B. Dunker provided much needed assistance with the entry of historic data used for analysis.

Author Contributions

Conceived and designed the experiments: JHS TSG. Performed the experiments: TSG. Analyzed the data: JHS. Contributed reagents/materials/analysis tools: JHS TSG. Wrote the paper: JHS TSG.

References

1. Saether B-E, Engen S, Solberg EJ (2001) Optimal harvest of age-structured populations of moose *Alces alces* in a fluctuating environment. Wildlife Biol 7:171–179.
2. Ginsberg JR, Milner-Gulland EJ (1994) Sex-biased harvesting and population dynamics in ungulates: implications for conservation and sustainable use. Conserv Biol 8:157–166.
3. Laurian C, Ouellet J-P, Courtois R, Breton L, St-Onge S (2000) Effects of intensive harvesting on moose reproduction. J Appl Ecol 37:515–531.
4. Boertje RD, Keech MA, Young DD, Kellie KA, Seaton CT (2009) Managing for elevated yield of moose in Interior Alaska. J Wildl Manage 73:314–327.
5. White GC, Freddy DJ, Gill RB, Ellenberger JH (2001) Effect of adult sex ratio on mule deer and elk productivity in Colorado. J Wildl Manage 65:549–551.
6. Bishop CJ, White GC, Freddy DJ, Watkins BE (2005) Effects of limited antlered harvest on mule deer sex and age ratios. Wildlife Soc B 33:662–668.
7. Milner JM, Nilsen EB, Andreassen HP (2007) Demographic side effects of selective hunting in ungulates and carnivores. Conserv Biol 21:36–47.
8. Saether B-E, Solberg EJ, Heim M (2009) Effects of altering sex ratio structure on the demography of an isolated moose population. J Wildl Manage 67:455–466.
9. Saether B-E, Engen S, Solberg EJ (2009) Effective size of harvested populations. Anim Conserv 12:488–495.
10. Lee AM, Saether B-E, Engen S (2011) Demographic stochasticity, Allee effects, and extinction: the influence of mating system and sex ratio. Am Nat 177:301–313.
11. Mysterud A (2011) Selective harvesting of large mammals: how often does it result in directional selection? J Appl Ecol 48:827–834.
12. Dobson A, Poole J (1998) Conspecific aggregation and conservation biology. In: Caro T, editor. Behavioural ecology and conservation biology. Oxford University Press, Oxford, United Kingdom. pp. 193–208.
13. Solberg EJ, Loison A, Ringsby TH, Saether B-E, Heim M (2002) Biased adult sex ratio can affect fecundity in primiparous moose *Alces alces*. Wildlife Biol 8:117–128.
14. Mysterud A, Coulson T, Stenseth NC (2002) The role of males in the dynamics of ungulate populations. J Anim Ecol 71:907–915.
15. Gunn A (1982) Muskox (*Ovibos moschatus*). In: Chapman JA, Feldhamer GA, editors. Wild mammals of North America: biology, management, and economics. First edition. Johns Hopkins University Press, Baltimore, Maryland, USA. pp. 1021–1035.
16. Reynolds PE (1991) Dynamics of muskox groups in northeastern Alaska. Rangifer 13:83–89.
17. Smith TE (1976) Reproductive behavior and related social organization of the muskox on Nunivak Island. M.S. Thesis. University of Alaska Fairbanks, Fairbanks, Alaska, USA.
18. Smith TE (1989) The role of bulls in pioneering new habitats in an expanding muskox population on the Seward Peninsula, Alaska. Can J Zool 67:1096–1101.
19. Ihl C, Bowyer T (2011) Leadership in mixed-sex groups of muskoxen during the snow-free season. J Mammal 92:819–827.
20. Lent PC (1999) Muskoxen and their hunters. University of Oklahoma Press, Norman, USA.
21. Gray DR (1987) The muskoxen of Polar Bear Pass. National Museum of Natural Sciences. Fitzhenry and Whiteside, Markham, Ontario, Canada.
22. Carbyn LN, Trottier T (1988) Descriptions of wolf attacks on bison calves in Wood Buffalo National Park. Arctic 41:297–302.
23. Hone E (1934) The present status of the muskox in arctic North America and Greenland. Special Publication of the American Committee for International Wildlife Protection 5, 1–87.
24. Gray DR (1973) Social organization and behaviour of muskoxen (*Ovibos moschatus*) on Bathurst Island, N.W.T. Ph.D. Thesis. University of Alberta, Edmonton, Canada.
25. Gray DR (1974) The defense formation of the muskox. Muskox 14:25–29.
26. Lent PC (1988) Ovibos moschatus. Mamm Species 302:1–9.
27. Prins HHT (1989) Condition changes and choice of social environment in African buffalo bulls. Behaviour 108:297–324.
28. Komers PE, Messier F, Gates CC (1992) Search or relax: the case of bachelor wood bison. Behav Ecol Sociobiol 31:195–203.
29. Allen JA (1912) The probable recent extinction of the muskox in Alaska. Science 36:720–722.
30. Alaska Department of Fish and Game (2009) Muskox management report of survey-inventory activities 1 July 2006-30 June 2008. Harper P, editor. Juneau, Alaska, USA.
31. Gorn T (2011) Unit 22 muskox. In: Harper P, editor. Muskox management report of survey and inventory activities 1 July 2008-30 June 2010. Alaska Department of Fish and Game. Project 16.0. Juneau, Alaska, USA. pp.16–17.
32. Westing C (2011) Unit 23 muskox. In: Harper P, editor. Muskox management report of survey and inventory activities 1 July 2008-30 June 2010. Alaska Department of Fish and Game. Project 16.0. Juneau, Alaska, USA. pp. 48–62.
33. Reynolds PE (1998) Dynamics and range expansion of a reestablished muskox population. J Wildl Manage 62:734–744.
34. Barboza PS, Reynolds PE (2004) Monitoring nutrition of a large grazer muskoxen on the Arctic Refuge. Int Congr Ser 1275:327–333.
35. Lenart EA (2011) Units 26B and 26C muskox. In: Harper P, editor. Muskox management report of survey and inventory activities 1 July 2008-30 June 2010. Alaska Department of Fish and Game. Project 16.0. Juneau, Alaska, USA. pp. 63–84.
36. Western Regional Climate Center (2011) http://www.wrcc.dri.edu/index.html Accessed October 19, 2011.
37. Dau J (2007) Unit 23 muskox. In: Harper P, editor. Muskox management report of survey and inventory activities 1 July 2004-30 June 2006. Alaska Department of Fish and Game. Project 16.0. Juneau, Alaska, USA. pp. 35–48.
38. Persons K (2001) Unit 22 muskox. In: Hicks MV, editor. Muskox management report of survey and inventory activities 1 July 1998-30 June 2000. Alaska Department of Fish and Game. Project 16.0. Juneau, Alaska, USA. pp. 13–24.
39. Buckland ST, Anderson DR, Burnham KP, Laake JL, Borchers DL, Thomas L (2001) Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, New York, New York, USA.
40. Czaplewski RL, Crowe DM, McDonald LL (1983) Sample sizes and confidence intervals for wildlife population ratios. Wildlife Soc B 11:121–128.
41. Olesen CR, Thing H (1989) Guide to field classification by sex and age of the muskox. Can J Zool 67:1116–1119.
42. Skalski JR, Ryding KE, Millspaugh JJ (2005) Wildlife Demography: Analysis of sex, age, and count data. Elsevier Academic Press, Burlington, Massachusetts, USA.
43. Royle JA, Dorazio RM (2008) Hierarchical modeling and inference in ecology. Academic Press, Burlington, Massachusetts, USA.
44. R Development Core Team (2011) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna Austria.
45. Spiegelhalter DJ, Thomas A, Best NG, Lunn D (2004) WinBUGS, version 1.4.1. User manual. MRC [Medical Research Council] Biostatistics Unit, Cambridge, United Kingdom.
46. Lenart EA (2001) Units 26B and 26C muskox. In: Hicks MV, editor. Muskox management report of survey-inventory activities 1 July 1998-30 June 2000. Alaska Department of Fish and Game. Project 16.0. Juneau, Alaska, , USA. pp. 39–54.
47. Dau J (2001) Unit 23 muskox. In: Hicks MV, editor. Muskox management report of survey-inventory activities 1 July 1998-30 June 2000. Alaska Department of Fish and Game. Project 16.0. Juneau, Alaska, , USA. pp. 31–38.
48. Smith TE (1984) Population status and management of muskoxen on Nunivak Island, Alaska. Biological Papers of the University of Alaska, Special Report No. 4:52–56.
49. Rowell JE, Sousa MC, Shipka MP (2003) The male effect, mounting behavior, and the onset of estrus in farmed muskoxen. J Anim Sci 81:2669–2674.
50. Rowell JE, Sousa MC, Shipka MP (2007) Estrous synchronization and the male effect in captive muskoxen. Can J Anim Sci 87:535–538.
51. Keech MA, Bowyer RT, VerHoef JM, Boertje RD, Dale BW, Stephenson TR (2000) Life-history consequences of maternal condition in Alaskan moose. J Wildl Manage 64:450–462.
52. Testa JW, Becker EF, Lee GR (2000) Temporal patterns in the survival of twin and single moose (*Alces alces*) calves in southcentral Alaska. J Mammal 81:162–168.
53. Adams LG, Singer FJ, Dale BW (1995) Caribou calf mortality in Denali National Park, Alaska. J Wildl Manage 59:584–594.
54. Tener JS (1965) Muskox in Canada: a biological and taxonomic review. Canadian Wildlife Service Monograph No. 2.
55. Gunn A, Miller FL (1982) Muskox bull killed by a barren-ground grizzly bear, Thelon Game Sanctuary, N.W.T. Arctic 35:545–546.
56. Reynolds PE, Reynolds HV, Shideler RT (2002) Predation and multiple kills of muskoxen by grizzly bears. Ursus 13:79–84.
57. Miller FL, Gunn A (1980) Behavioural responses of muskox herds to simulation of slinging by helicopter, Northwest Territories. Can Field-Nat 94:52–60.
58. Smith TE, (1987) Status and dispersal of an introduced muskox population on the Seward Peninsula, Alaska Department of Fish and Game, Federal Aid in Wildlife Restoration, Final Report 16.1R, 61pp.
59. Gunn A, Shank C, McLean B (1991) The history, status, and management of muskoxen on Banks Island. Arctic 44:188–195.
60. Jenkins DA, Campbell M, Hope G, Goorts J, McLoughlin P (2011) Recent trends in abundance of Peary Caribou (*Rangifer tarandus pearyi*) and muskoxen (*Ovibos moschatus*) in the Canadian Arctic Archipelago, Nunavut. Department of the Environment, Government of Nunavut, Wildlife Report No. 1, Pond Inlet, Nunavut. 184pp.
61. White RG, Holleman DF, Tiplady BA (1989) Seasonal body weight, body condition and lactational trend in muskoxen. Can J Zool 67:1125–1133.
62. White RG, Rowell JE, Hauer WE (1997). The role of nutrition, body condition and lactation on calving success in muskoxen. J Zool (Lond) 243:13–20.
63. Gunn A, Adamczewski J (2003) Muskox (*Ovibos moschatus*) In: Feldhamer GA, Thompson BC, Chapman JA, editors. Wild mammals of North America: biology, management, and conservation. Second edition. Johns Hopkins University Press, Baltimore, Maryland, USA. pp. 1076–1094.
64. Williams BK, Nichols JD, Conroy MJ (2002) Analysis and management of animal populations. Academic Press, San Diego, California, USA.
65. Hunter CM, Runge MC (2004) The importance of environmental variability and management control error to optimal harvest policies. J Wildl Manage 68:585–594.
66. Conroy MJ, Carroll JP (2009) Quantitative conservation of vertebrates. Wiley-Blackwell, West Sussex, UK.

KAWERAK, INC.
P.O. BOX 948
NOME, AK 99762
TEL: (907)443-5231
FAX: (907)443-4452

December 26, 2013

ATTN: BOG Comments
Alaska Department of Fish and Game
Boards Support Section
P.O Box 115526
Juneau, AK. 99811-5526

RE: BOG Proposals up for Review in the Arctic/Western Region (Region V) Game Management Unit: 22

Dear Board of Game,

Thank you for the opportunity to comment on proposals you will consider at the next Board of Game meeting. Kawerak, Inc. is the regional tribal consortium in the Bering Strait Region. Our Board of Directors is comprised of the President of the 20 federally recognized tribes in our region, two elder representatives and the Chairman of the Norton Sound Health Corporation. The Kawerak, Inc. Board of Directors met this month and reviewed the proposals and offer the following comments for your consideration.

Kawerak **supports** Proposal 13 - 5 AAC 85.045. Hunting Seasons and Bag Limits for moose in GMU 22E, to change the winter hunt from January 1-31 to March 1-31. The dates in the current regulations for this particular hunt occur typically during the time of year when weather conditions are extremely bad, making it almost impossible to participate in a hunt and the conditions pose an immediate danger to life and safety. By simply moving the dates of this hunt, the weather conditions have drastically improved, making it safer for the people depending on this valuable resource. Additionally, snow coverage is limited, making for unsafe travel conditions, and the lack of snow causes wear and tear on machines - in turn causing a higher risk of breakdown resulting in unnecessary repair costs and the potential of people being stranded. Ground storms where one can barely see 10 feet in front of them and extremely cold weather conditions below -50 degrees F are prevalent in January and start to diminish by the end of February. The increasing daylight and the increase of snow coverage improve travel, giving the hunters a safer and more opportunistic time to harvest moose, especially when food reserves stored from the previous season have started to diminish.

Kawerak **supports** Proposal 14 - 5 AAC 85.045 (a)(20). Hunting seasons and bag limits for moose to establish an Antlered Bull season in Unit 22A Unalakleet River Drainage (Unit 22A Central) to be announced by emergency order during the period of December 1-31. Unit 22A Central has shown that the moose population is on the rise. The past two hunting seasons the quota has not been met. During the current hunting season for bull moose the fall weather plays an important role in determining whether one gets to harvest a moose or not. When too much rain and foul weather are factors when taking care of meat the chances of meat spoilage increases. Extending the moose season to December

1-31 by Emergency Order if the quota is not met will allow residents of Unit 22A an opportunity to harvest a valuable resource when weather is more favorable and meat spoilage is not as prevalent. Stress on moose would be less at the later date in December as opposed to extending the September season when the moose are starting the rut.

Kawerak **supports** Proposal 15 - 5 AAC 85.045 (a)(20). Hunting seasons and bag limits for moose. Reauthorize the antlerless moose seasons in Unit 22C and 22D Remainder. Retaining the antlerless moose hunt will help in the future, when/if the opportunity presents itself and the populations allows for harvest of a bull or a cow.

Kawerak **supports** Proposal 16 - 5 AAC 85.020. Hunting seasons and bag limits for brown bear. Modify the season and bag limit for brown bear in Unit 22C. The bear population for all of Unit 22 continues to grow and is getting out of control. Correspondence with the local Fish & Game Department shows the last completed bear survey for the Seward Peninsula was in 1991. Although this information is helpful, it is outdated by more than 20 years and the Seward Peninsula is past due for another bear survey. By the reports received during various public meetings in town there is no shortage of bears, bears are even showing up miles from shore on the sea ice in the spring time. A subsistence bear hunt for 22C was authorized in 2002 for 1 bear every regulatory year. Correspondence with local Fish & Game Department however shows that when averaged out from when first authorized in 2002, less than 1 bear a year has been harvested from the Subsistence Hunt in Unit 22C. Local Fish & Game Department staff also report, during the years 1990-2012 (22 years) the average number of bears taken annually in Unit 22C, in Defense of Life and Property, is 1 bear/year. Every year, sows with 4 cubs are reported throughout Unit 22C and in a few cases some with as many as 5 cubs. It has been reported that these cubs are surviving year after year and remain in the same area until the sow shoos them away and is ready to have more cubs. The local moose population is declining as reported by the local Fish & Game Department, evident by the low harvest quota of 9 moose for Unit 22C. Again correspondence with local Fish & Game Department shows our moose population is not getting the recruitment (moose calves) that it needs. Bears are notorious for being extremely hard on moose calves. And finally Nome Beltz High School had to cancel a Cross Country event because of bears in the area where the runners were competing; school officials were afraid the runners would entice a bear to attack. Unit 22C is the only Sub-Unit north of Anchorage besides 14A that has a 1 bear every 4 years regulatory restriction. A more aggressive solution to the Unit 22C bear problem is required to help control the over population of bears.

Kawerak **supports** Proposal 17 - 5 AAC 85.020. Hunting seasons and bag limits for brown bear. Extend the brown bear season in Unit 22A. Extending the spring brown bear season from May 31 to June 15 will give the residents a more opportunistic chance at harvesting a bear due to spring warm up. Rivers are still iced over in May and the preferred method of transportation is by boat. The moose population in Unit 22A has been hurting for some time and by lengthening the spring brown bear season this would help the moose population by means of some predator control.

Kawerak **supports** Proposal 18 - 5 AAC 85.060. Hunting seasons and bag limits for fur animals. Extend the wolf hunting season for Unit 22. Extending the wolf season from April 30 to May 31 does two

things. 1) It would give hunters a "one last chance" to harvest the hide from wolves if the spring were to last longer than expected. Spring on the Seward Peninsula does not happen on an exact calendar date every year. 2) By extending the season it would give the moose population a break as well, wolves are notorious for preying on moose and their calves. In Unit 22 the moose population has declined for due to the lack of an effective predator control program.

Kawerak **supports** Proposal 19 - 5 AAC 85.060. Hunting seasons and bag limits for fur animals. Extend the wolverine season in Unit 22. Extending the wolverine season from March 31 to April 30 would allow hunters "one last chance" to harvest the hide from a wolverine if the spring were to last longer than expected, spring on the Seward Peninsula does not happen on an exact calendar date every year. There is no shortage of wolverines in this unit.

We look forward to being involved at the upcoming meeting. Thank you for considering these comments as you make decisions about resources in the Bering Strait Region.

Sincerely,
KAWERAK, INC.

M Bahnke

Melanie Bahnke, President

CC: Kawerak Board of Directors

NATIVE VILLAGE OF MEKORYUK
P.O. Box 66
Mekoryuk, Alaska 99630
(P) 907-827-8828 (F) 907-827-8133

November 13, 2013

Board of Game
Alaska Department of Fish and Game Boards Support Section
P.O. Box 115526
Juneau, AK 99811-5526
Attn: Kristy Tibbles

Re: Nunivak Island Musk-ox

Board of Game,

In 1936, musk-ox were introduced to Nunivak Island. Since then, tribal members have been stewards abiding by laws set forth by the U.S. Government and State of Alaska in regards to musk-ox. Native Village of Mekoryuk appreciates State biologist's work in determining the musk-ox populations each year. The community also appreciates management efforts. On March 19-20, 2013, six volunteers conducted a ground survey and counted 555 musk-ox. According to a 1992 musk-ox management plan, 500 musk-ox is the threshold for Nunivak Island. Native Village of Mekoryuk is requesting a percentage of musk-ox bull permits be given to Mekoryuk tribal members for the 2014 musk-ox hunting season, as an emergency order, for subsistence purposes.

Historically, tribal members had benefits of hunting musk-ox cows every spring for subsistence consumption. We are grateful for that opportunity. Considering a decline in cow permits being issued to tribal members with in the past two years, our tribe specifically requests a taking of percentage of bulls for the 2014 season. In our view, this may allow additional tribal members subsistence hunting opportunities. One of our responsibilities as a tribal council is to promote the general welfare for all tribal members of Native Village of Mekoryuk. We humbly ask the Board of Game to consider our request.

Sincerely,

Albert R. Williams
IRA Council President
Native Village of Mekoryuk

Cc: Patrick Snow, YK-Delta Acting Refuge Manager
Patrick Jones, ADF&G Assistant Area Wildlife Biologist
Assistant Regional Director – Subsistence Management

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Togiak National Wildlife Refuge
P.O. Box 270
Dillingham, Alaska 99576
Phone 907-842-1063
Fax 907-842-5402

December 26, 2013

Chairman Ted Spraker
Alaska Board of Game
Boards Support Section
P.O. Box 115526
Juneau, Alaska 99811

Dear Chairman Spraker:

The Togiak National Wildlife Refuge (Togiak Refuge) appreciates the opportunity to comment on proposals to be considered by the Alaska Board of Game during its upcoming meeting. Our recommendations on Proposals 7 and 132, which could affect the management of wildlife populations on Togiak Refuge and adjacent lands in Units 17 and 18, are below.

Proposal 7 would shift the hunting season two weeks later for wolverines in Unit 18. Togiak Refuge is opposed to this proposed change as female wolverines with dependent young would likely be more vulnerable to harvest in April. This would also create an inconsistent end date with the federal wolverine hunting season, which should be avoided.

Proposal 132 would reauthorize the existing winter hunt for antlerless moose in Unit 17A. Togiak Refuge supports this proposal. It is consistent with the Unit 17A Moose Management Plan which allows for antlerless moose harvest when the population trend is stable or increasing and above 600 moose. The most recent survey in March 2011 found a minimum of 1,166 moose. Calf recruitment to radio-collared cows and adult female survival since the March 2011 survey suggest this population is still increasing.

Thank you for the opportunity to comment on these proposals and for taking the time to consider our comments.

Sincerely,

Susanna J. Henry

Susanna Henry
Refuge Manager

Coastal Villages Region Fund

711 H Street, Suite 200

Anchorage, Alaska 99501

Phone: (907)278-5151 Fax: (907)278-5150

To: Board Support Section

AK Department of Fish and Game

PO Box 115526

Juneau, AK 99881-5526

(907)4656094

From: Coastal Villages Region Fund

P.O. Box 77

Mekoryuk, Alaska 99630

Phone: (907)827-8138 Fax: (907) 827-8139

RE: Proposal

Total Number of forms including cover sheet: 3

December 25, 2013

Board Support Section
Alaska Department of Fish and Game
PO Box 115526
Juneau, Alaska 99881-5526

Dear Alaska Board of Game:

It is my pleasure write a letter in support for Proposal 5 -5 AAC 85.050; Hunting Season and Bag Limits for Musk ox in Unit 18 Nunivak Island and Nelson Island.

I am sure you are all aware in Alaska subsistence refers to the practice of taking fish, wildlife or other wild resources for one's sustenance for food, shelter or other personal or family need. What is subsistence priority? Our Federal Governments says that subsistence uses by rural residents are accorded priority over non-subsistence uses. During times of shortage of game on federal lands the Federal Government can restrict non-subsistence users from harvesting its resources. During these times rural residents are assured subsistence harvests. The state of Alaska says similar words regarding subsistence. Like the Federal Government, the State of Alaska gives top priority in allocation decisions to subsistence users. The State also says a portion of a fish stock or game population can be harvested for subsistence consistent with sustained yield. The board also determines what amount of harvestable portion of the population is reasonably necessary for subsistence uses.

Subsistence uses, by definition, are ones that are customary and traditional. The state issues different criteria to be determined customary and traditional. These criteria include length and consistency and use; seasonality; methods and means of harvest; geographic areas; means of handling, preparing, preserving and storage; intergeneration transmission of knowledge, skills values, and lore; distribution and exchange; and diversity of resources in an area economic, culture, social and nutritional elements.

Since the introduction of musk oxen on Nunivak nearly 80 years ago, and hunting of the animals nearly 40 years ago, hunting of musk ox has been passed generation to generation. Hunting is commonly done my snow machine, which is economical to local hunters and no commercial services are used. Subsistence hunting, fishing and gathering has and always be an important role to the residents of Nunivak. Hunting knowledge is passed on from parent to child. It is not uncommon for older brothers or even uncles to teach these skills to younger hunters. I am currently a second generation hunter of musk ox. Other families within the community have 3 even 4 year generation hunters. Economic opportunities of cash are few and household income is low for many families, therefore subsistence resources are vital for every resident. Freezing of all subsistence game is considered normal and drying is also not common with its residents. Traditionally a hunter's first catch is given away, ether in whole to an elderly family or

distributed entirely among its residents. This practice currently still exists for our first time musk ox hunters.

Alaska state law directs you, the Alaska Board of Game and Board of Fisheries to provide a reasonable opportunity for subsistence use first. Alaska Statutes 16.05.258 (c) states. "The boards may not permit subsistence hunting or fishing in a nonsubsistence area. The boards, acting jointly, shall identify by regulation the boundaries of nonsubsistence areas. A nonsubsistence area is an area or community where dependence upon subsistence is not a principal characteristic of the economy, culture, and way of life of the area or community. In determining whether dependence upon subsistence is a principal characteristic of the economy, culture, and way of life of an area or community under this subsection, the boards shall jointly consider the relative importance of subsistence in the context of the totality of the following socio-economic characteristics of the area or community:" We are currently in a sense being treated as a nonsubsistence area and the board is currently not given reasonable opportunity for subsistence musk ox hunting in unit 18. As stated before cash flow is low. Alaska's unemployment rate from the state's website show 6.3% and in unit 18 it is listed as 14.1% (Bethel Census Area). Bull to cow hunt ratio has steadily declined since 2008, bulls hunts being greater than cows. In 2011and 2012 only 5 cow permits have been issued on Nunivak Island. The projection for 2013 is 5 cows as well. The current regulation for a bull hunt costs $500.00. I have not known residents of Nunivak to hunt Bull musk ox because of the hunt fee. It is just not affordable to the residents.

In 2011the Alaska Department of Fish and Game issued a musk ox management report in unit 18. The introduction report states. " Muskoxen were once widely distributed in northern and western Alaska but were extirpated by the middle or late 1800s." In 1997 the Alaska Board of Game met in Nome and made a determination that there is a customary and traditional use of musk ox in Northwestern unit 23. Although the board could not make a positive finding on criteria 2 regarding pattern and taking of use, this proposal passed. With ADF&G's 2011 management report stating musk ox once roamed western Alaska, how is it possible today that we do not have a subsistence musk ox hunt on Nunivak Island and in the rest of unit 18.

In conclusion, I fully support proposal 5 and I appreciate the opportunity given to me by the board as you seek customary and traditional use of musk ox on Nunivak Island and unit 18. The evidence is clear that C&T exists and state statutes like AS 16.05.58 (b).

Sincerely,

Samuel Davis
PO Box 83
Mekoryuk, Alaska 99630

SITNASUAK
NATIVE CORPORATION

P.O. Box 905 • Nome, Alaska 99762
(907) 387-1200, Fax (907) 443-3063

December 27, 2013

Alaska Board of Game
Boards Support Section
P.O. Box 115526
Juneau, AK 99811-5526

FAX 907-465-6094

RE: Board of Game Proposal, Brown Bear, Winter 2014

Dear Alaska Board of Game Members,

Sitnasuak Native Corporation is the Alaska Native Claims Settlement Act of 1972 (ANCSA) village corporation for the Native village of Nome, AK. Sitnasuak is pleased to provide comment to the Alaska Board of Game regarding wildlife proposals for consideration at its winter 2014 meeting scheduled to take place in Kotzebue, AK.

Proposal 16
Sitnasuak supports its joint brown bear proposal to amend the hunting season and bag limit for brown bear in GMU 22C. Sitnasuak supports both a one bear per year and an alignment of the seasons of adjoining units. It seems quite apparent brown bear populations have been increasing in all of GMU 22. Sitnasuak manages an extensive campsite program and routinely receives complaints of bear problems with a highest incidence of occurrence at Cape Nome and Hastings Creek east of Nome. Sitnasuak understands that the BOG must consider numerous issues when considering any change to the GMU 22C bear regulations. Sitnasuak urges the BOG to consider the most critical biological factor of increasing brown bear populations and allow Nome residents to take advantage of an increasing bear population. Sitnasuak believes that increasing the brown bear bag and season limit may only cause a small increase in harvest but will afford the necessary opportunity to hunt bear which are now more numerous.

The Sitnasuak Elder's Committee and Joint Elder's and Subsistence Committee met twice with local ADF&G personnel to express their concern of too many bears. ADF&G staff and Sitnasuak Committee members discussed concerns and methods to reduce the brown bear population in 22C, which resulted in the development of Proposal 16 a joint proposal sponsored by local tribes and Native Corporations. Sitnasuak respectfully urges the Alaska Board of Game to adopt Proposal 16.

Please also find enclosed written comments from Sitnasuak shareholders and members of the public regarding Sitnasuak's brown bear proposal.

Thank you for your time and consideration.

Sincerely,

Charles Fagerstrom, President
Sitnasuak Native Corporation

BOG Proposal 16

Summer 2012
LAST Summer we HAD Bears
Go Through our Kitchen Tent at
3 1/2 mi Council ROAD Twice in one
Week. We - my wife + I HAD to fix
The WALLS Twice. NOW This
Summer WELL Have to rebuild
The Sides + Replace The blue tarp + Tent

Ed Bahnke Sr
FEB 21 2013

We Need to CULL Some of them
But you CAN not do much after they
are killed when They get into
OLD WALRUS

RBS

BOG, PROPOSAL 16.

State Board of Game
RE: Cape Nome Bears

December 20th, 2013

Dear Sirs and Madams:

I am testifying as a Sitnasuak Native Corporation Shareholder and subsistence user. My family and I have a salmon fish camp west of Cape Nome, about 1 mile on the beach since the 1980s. Along with our extended family (about 4 or 5 families), we set subsistence salmon nets into the Bering Sea waters so that we can harvest various salmons for drying, smoking or freezing to be used during the up-coming winter, pending upon weather and ocean conditions.

During the salmon drying process, the families and young children helping enjoy this cultural learning experience at this fish camp, they also notice increasing bear activities raiding the fish racks. We had to buy and install a electric fence around the racks ($750 expense), hoping that the fence will save our drying salmon.

This does not decrease the bear population to the fish camps around our traditional Cape Nome sites. Bear dens now have increased from one den to at least three (3) dens since the 1980s. Our families have also increased to where we have young grand children enjoying the fish camp by harvesting and processing.

In the interest of our cultural economic salmon practice, Eskimos around Cape Nome area need your board's attention to decreasing the bear population as was the cultural practice years ago in protecting life and property. This was through hunting bears. Today we need hunting policies which would address the increasing bear population near and around subsistence salmon users.

We thank your board's attention in addressing the increasing Cape Nome bear population problem our subsistence users face during salmon season.

Sincerely,

Perry T. Mendenhall
Box 1141
Nome, Ak 99762
443-2455

BOG PROPOSAL 16

Charles Fagerstrom

From: Barb (QasuGlana) Amarok [redacted]
Sent: Wednesday, December 18, 2013 11:36 AM
To: Charles Fagerstrom
Subject: My Message for ADF&G Meeting

Dear Mr. Fagerstrom:

This email serves as my comments on bear in the Nome area to the January 2014 ADF&G meeting. If you need me to print out a letter and sign it, please let me know.

I am a member of the Sitnasuak Native Corporation (SNC) Board of Directors and as a long-time and permanent resident of Nome, I support the SNC recommendations to ADF&G on bear in the Nome area.

Going out on the tundra to pick blueberries, cranberries and salmonberries is something I have done for decades. It is something I have to do; I need to be on the tundra, smell the growing plants and gather berries to store at home. I use them to make breads, jams, jellies and desserts; I share when my family and friends gather to eat Native foods.

It has only been in the past few years that I have not gone out by myself on the tundra or beach because I've been afraid to. I now only go if members of my family or my friends can go with me. I have one friend, a female, who carries a pistol when we go out to pick berries and greens and dig roots. I have another friend who invites me to go berry picking; her husband accompanies us and stands by with a rifle on his back.

Recently this past fall, I went with a friend to pick cranberries off the Old Osborne Road behind Icy View. It was a Tuesday and I had to be back in town by 5:30 because I am on the Nome Publics Schools Board of Education and we had a meeting. I was dismayed to hear several people talking at the meeting about the fact that one of the teachers, Brian Marvin, had been chased for a while as he rode his bicycle on the Old Osborne Road the previous day. I wonder what would have happened if my friend and I had been picking berries, far from the car, on Monday.

Bear have affected our activities and gotten into our camps. I know of two families who have put up electric fences to keep bear from taking dry fish.

Please take seriously the concerns and requests of the people who live in the Nome area. We worry for our safety when it comes to bear.

SNC has my permission to use this correspondence in its presentation to ADF&G.

BAmarok 12.26.13

Board of Game Proposal 16 **Dece**

State of Alaska Department of Fish and Game
Board of Game
Proposal 16

Dear Board of Game members,

I, *Lincoln Trigg, Sr.*, am testifying as a subsistence user and shareholder of Sitnasuak Native Corporation. I have been camping at Cape Nome for 74 years, which is my primary use for subsisting off of the land and sea, as my elders before taught me. These activities include seal and walrus hunting, beluga netting, sea net setting for salmon, pick both berries and greens, and gather driftwood from the beach for the stove.

In the recent years, there have been more bears breaking into my storage shed where I store my black meat and dry fish. They have also been getting into my fish drying rack, which is enclosed with screens to keep bugs out. In the last two years, I bought an electric fence to keep the bears out. Even though it has proven effective, some bears have bent the fence to get at the fish. Others have also bought fences to keep the bears out, but there is no control measure for the population of bears in and around the area at Cape Nome.

Please consider a plan of action to control the population of bears. They pose a serious threat to the families that visit Cape Nome for recreational and more importantly subsistence use. Any course of action to lower/control the bear population will be supported by not only me, but other members of the general public that visit Cape Nome, or any area with a higher than usual bear population.

Thank you for your time,
Sincerely,

Lincoln Trigg Sr.
Lincoln Trigg, Sr.

P.O. Box 1081
Nome, AK 99762

I give Sitnasuak Native Corporation my permission to mail this testimony. L. J.

December 27, 2013

Board of Game
State of Alaska Department of Fish and Game

Dear Board of Game,

My name is Vince Pikoganna, I am originally from King Island and now reside in Nome. This is my testimony for Proposal 16. I have a camp at Cape Woolley, 40 Miles on the Nome-Teller Highway. Several bears have broken into our cabins at Cape Woolley, including mine. It broke in through one window, made a quite a mess, and left out another window. In another cabin, it came in through a wall and left out another wall. In these instances, we took care of the bear problems ourselves, because they were damaging our cabins and the fish racks. It was also endangering our young people and elders. We want to take care of the bears in our traditional way because it was becoming a real problem for us and starting to endanger people's lives.

We need something done for bear population control. I support any action taken to help lower the population of bears so that we may continue to live our traditional way of life at camp. If no action is taken, people will return to hunting bears traditionally and just going out and killing them off, seen on the spot and in their dens. It should not have to come to that, for our state not to take care of its residents, and take action so that our camps are safe, our elders and young people are safe.

Solve this issue before it becomes a real problem for all of the communities.

Sincerely,

Vince Pikoganna

Vince Pikoganna

I give Sitnasuak Native Corporation permission to send my testimony. V.P.

Board of Game

State of Alaska Department of Fish and Game

Dear Board of Game,

Due to increasing bear numbers in GMU 22C, I feel that there needs to be a change to the bag limit from 1 bear every 4 years to 1 bear every year. I have lived in this region for over 25 years and in the past 5 to 10 years bears have become a problem. Mostly with bears searching for food, breaking into camps and robbing fish racks. I spend a lot of time out in the country (22C) and now it is the norm to see a bear, not the exception. During berry picking season (August-September) my wife refuses to go out in the country to pick berries without my protection or being on the lookout for bears. During the last two years, we have had close encounters and were able to avoid confrontation because I was in bear alert. I think the new regulations would reduce the bear population over time and make the area residents more comfortable out in the country.

Sincerely,

John K. Baker

I give Sitnasuak Native Corporation permission to send my testimony.

Board of Game Proposal 16 Decembe

Board of Game
State of Alaska Department of Fish and Game

Dear Board of Game,

In the last decade, not only we, but the residents of Nome have noticed the increase in the bear population around the Nome area, GMU 22C.They similarly are out longer, and not going into hibernation when they used to previously. With their increased population and longer awake times, they are wondering closer to town, and closer to the high school, Nome Beltz.

4 years ago, Jack Johnson's cabin was broken into. This was also after the usual time the bears go into their state of hibernation. We believe this is due to the lack of natural food sources, such as fish. Without a stock of fish, the bears turn to alternative food sources for fattening up for winter. These alternatives, such as moose, caribou/reindeer, and other game are not as dangerous as the alternative of breaking into subsistence users' food caches, storages, and camps. The damage is not only to the building, but the winter supply of food, hunted and gathered from the spring. Many people have told me of bears wandering into their camps and stealing hard earned fish. This can devastate some peoples supplies, especially with poor fish runs as of late.

One example of the bears also impacting their alternative food supply is when I, Jack Johnson, had tried to take my family moose hunting up the Kuzitrin River. Before, even if I had just gone up the river to go boating, I would see moose along the river. But when I decided to take my family hunting on the river, I had to travel as far as I could up the river and camp for two days even before we spotted one moose. Over the duration of the hunt, we spotted 6 bears. 6 bears to 1 moose is a very uneven predator ratio.

Another reason we should have Proposal 16 pass, is that they are affecting our elders' and youths' way of subsistence life. Many elders do not want to go out into the country side and go berry picking, green picking or fishing, for the fear that a bear may be around. It also threatens the youth that join the elders on these trips into the country. I do not want the next generation to grow up in fear of being able to do what we have done for thousands of years.

For the amount of bears we have in our GMU, 22C, we need Proposal 16 to pass so that no more damage to not only our campsites, winter caches of food, and the safety of our elders, but so that the ecosystem and food chain of animals can regulate itself back into a normal cycle for a more even predator to prey ratio.

Sincerely,

Jack Johnson,

Jake Sherman

I hereby give Sitnasuak Native Corporation our permission to mail this testimony.

Proposal 16 December 27

Board of Game

State of Alaska Department of Fish and Game

Dear Board of Game,

Ever Since my family and I have had our campsite on Sitnasuak Native Corporation land at Cunningham Creek, we would catch fish in the creek and hang them to dry. But in the last few years, a bear would come and destroy the fish, by eating them or tearing them up. The past two years, we had encountered a mom and cub coming back to the camp. We believe they have been the culprits that have been ruining our winter supply of salmon. To try and keep our salmon safe, I put up a galvanized wire fence to try and deter the mom and cub, but they were able to find ways of getting in and destroying this winters supply of fish.

Growing up at between Nuuk (West of Safety) and at Fort Davis, I've always had bears break in to caches and camps, where they would take and ruin spring catches of cut up seal meat to dry. But now that there is more of a human population and campers on Sitnasuak land, the increase of bears poses a threat to everyone. We now fear for our grandchildren, that they grow up in fear of the bears and how they can cause issues and problems with teaching them a subsistence lifestyle.

I believe that there should be some manner of bear control, whether it is by Proposal 16 or a cooperative between the Department of Fish and Game and Sitnasuak Native Corporation to help manage the bear population affecting the subsistence and recreational campers on Sitnasuak Lands.

Sincerely,

Alton A. Walluk

Alton A. Walluk

I give Sitnasuak Native Corporation permission to send my testimony. AAW

BOG PROPOSAL 16

SITNASUAK
NATIVE CORPORATION

P.O. Box 905 • Nome, Alaska 99762
(907) 387-1200 • Fax (907) 443-3063

EMAILED TO TG 11/7/2012

November 9, 2012

Ref: Concerns of Bear Abundance and Nuisance of Bear and Mush Oxen.

Tony Gorn
Area Biologist
Box 1148
Alaska Department of Fish and Game
Nome, Alaska 99762-1148

Dear Tony:

Sitnasuak Native Corporation has made a portion our lands available to shareholders and non-shareholders as 100 x100 foot campsites, stretching from Fort Davis to just west of the Safety Sound Bridge. At present there are 158 active campsites and amongst these are numerous native allotments.

We estimate that there are 300 plus individuals, moms, dads, grandparents, children, grand children that utilize these campsites for a variety of purposes at different times during the year.

During two of Sitnasuak's committee meetings concerns of committee members were expressed, about the numerous number of bears roaming the beach, posing a threat to life and taking subsistence gathered food from drying racks and or storage sheds.

Sitnasuak feels that now is the time to express our concerns of possible harm or death by bears, to individuals using our land as campsites. We don't want to see happy camping turn into a tragedy.

We have concerns of the over population of Mush oxen. While grazing , they do lasting damage to the fragile tundra tearing up the roots of the berries and " greens"-toguyuks. With their bravery and presence close to and in populated area, they are a nuisance destroying home gardens, and a threat to our dog population, on a occasion causing injury or death to dogs.

In closing Sitnasuak Native Corporation believes there is a over population of bear in our region, and request your department take immediate and extreme measures to reduce the number of bear prior to Summer 2013. Although the Mush-oxen are a possible threat to us and our dogs, and are also a nuisance, we have no suggestions on controlling these animals.

BOG PROPOSAL 16

Respectfully yours,

Charles W. Fagerstrom
President, SNC

Cc: Peter Bente, via Email

Submitted By Thor Stacey
Affiliation Alaska Professional Hunters Association
Phone 9077231494
Email thorstacey@gmail.com
Address PO Box 240971
Anchorage, Alaska 99524

December 26, 2013

Alaska Department of Fish and Game

Boards Support Section

PO Box 115526

Juneau, Alaska 99811-5526

ALASKA PROFESSIONAL HUNTERS ASSOCIATION Inc.

January 2014, Region v Board of Game Comments

Dear Alaska Board of Game Members,

Please find the following comments regarding proposals you will be considering during the January board meeting in Kotzebue. The Alaska Professional Hunters Association Inc. (APHA) is opposed to attempts to change non-resident allocation formulas established in Board Policy (2007-173-BOG). APHA members rely on fair and predictable allocation to non-resident hunters based on defensible biological parameters that are inline with the principles of sustained yield and result in a maximum benefit of ALL users. The APHA maintains it support of the Board's current allocative policies and believes that the well defined, species specific, resident preferences are in the best interests all Alaskans.

The APHA is in strong support of the Board and Department's efforts to form a sheep-working group. We feel strongly that this group should incorporate voices from stakeholders across the state. To this effect, we request that hunting guides are considered "stakeholders" and that persons responsible for the formation and implementation of this group are provided information to this effect. We maintain our participation in this group is historically justified and that our knowledgeable perspective will be essential to its ultimate success. We see the goal of the working group as:

to have a robust discussion, in a think-tank format, that presents current understandings of sheep biology and sheep harvest information (Alaska) to a group of diverse, knowledgeable Alaskan stakeholders who incorporate their perspectives in the drafting of a statewide sheep management plan that relies on a set of pre-determined, agreed upon, management tools the Board of Game shall adopt to achieve the goals and objectives the group sets' for a sustainable future for Alaska sheep hunting.

We strongly suggest that the *management tools* include not only "stop-gap" measures to conserve the resource but, given abundance, opportunity liberalizations as well. Alaska's final sheep management plan should be made easily available to the public and then allowed to run its course for 10 years before it is revisited. Our 10-year recommendation is based on recognition of the need for biological and social compromise. First, we considered the cyclical nature of Alaska's game populations and our northern latitude that can retard the effects of management changes (up to 20+ years). It is quite probable that ten years will be an insufficient timeline to measure the full biological effects, on a statewide basis, of a new management strategy. Second, we believe that given Alaska's current rate of population growth and the short average length of residency, 10-years will be about as long as the public will understand and accept the working group's results. We feel that the 10-year goal is a good compromise that allows for public re-appraisal while giving new management practices some time to run their course. The recent reappraisal and subsequent validation of the Unit 4 Brown Bear Management Plan

(January 2013, Sitka BOG meeting) is an excellent example of the net positive effects this type of working group can have for the resource and the surrounding social climate. The Sheep working group is a timely project and has our strong support.

As you consider our positions we urge you to keep in mind that Alaska's professional guide industry represents a significant and important economy in rural Alaska. In addition to the "new dollars" the guide industry brings to rural Alaska and the private sector at large, our client's tag and license purchases directly and indirectly, through matching Federal funds, provide the "lion's share" of ADF&G's funding. The health of our industry is dependent upon prudent stewardship and conservation of Alaska's wildlife as well as fair allocation. It is precisely because or our stewardship principles and respect for all users and a fair allocation process that our members maintain deep community ties across our vast State. Alaska's professional hunters ask that when you consider the below comments you remain mindful that its in our best interest to have abundant game as well as a healthy, inclusive social situation that is in the best interests of ALL Alaskan's.

Individual Proposal Comment

Below you will find our comments on individual proposals under your consideration for Region V. Leading up to the drafting of these comments the APHA held a tele-conference and invited all of its members to participate in the drafting of these comments. This tele-conference was well attended with good representation from guides who conduct hunts in Region V. You will find that there are some proposals that we don't have comments listed for. These were proposals that we felt did not directly impact guides or that are outside of the groups purview. We also chose, in a couple of instances, to group similar proposals together and combine our recommendations (example, wolverine hunting season proposals). While these comments represent the voice of our group, you will undoubtedly get comments from APHA members who want their individual positions considered as well. Because the APHA takes a statewide perspective when approaching Board proposals, we urge you to consider regional expertise from our members even when their position is different from that of the APHA. Finally, we thank you for you consideration and urge you to reach out to our membership for clarity and details on proposals before you, either on a unit-by-unit or regional basis. Given the opportunity, Alaska's hunting guides will continue to bring a wealth of wildlife and hunting knowledge and experience to table.

Proposal #5 OPPOSE

We oppose Prop. 5 because there has already been a negative C&T finding for both Nunivak and Nelson Islands. Because mainland musk-ox populations in unit 18 originate from the same introduced animals that established the populations on Nunivak and Nelson Islands we see no need to re-visit subsistence findings for an introduced, non-native, population of animals. As and alternative, we support **Proposal #6** because it allows for more musk-ox harvest given abundance and/or habitat stress. Because local residents will also be able to take advantage of these increased opportunities, given abundance, we see this as the preferred alternative that meets local and statewide needs.

Proposal #6 SUPPORT

We support Prop. 6 as a preferred alternative to Prop. 5 and for the same reasons outlined by the Department.

Proposals #7, 19- CONDITIONAL SUPPORT

Both proposals 7 and 19 propose to provide more wolverine hunting opportunity in April. However neither of them seeks to align the trapping and hunting season ending dates. We **DO NOT** support either of the proposals as written. We instead support a preferred alternative of aligning the trapping and hunting season ending dates throughout Region V. We recognize the potential conservation issues with April wolverine hunts, we only support more opportunity because additional wolverine harvest would be purely incidental to bear hunting and since trapping is open at the same time, the opportunity already exists under a different license. We see this change as purely a regulatory clarification because hunters can ALREADY harvest wolverines while bear hunting with a trapping license. Since there is no conservation issue associated with this current opportunity, we don't anticipate any with the proposed changes. By changing the hunting season to end at the same time as the trapping, the Board will simply be requiring that a hunter only buy a hunting license instead of having to buy both hunting and trapping licenses in case he happens to encounter a wolverine on his bear hunt.

Recommendation for proposals #7&19:

Region V wide- Maintain a September 1st hunting start date

Align the spring hunting closure with trapping season closure (April 15th in Units 22, 23, 26A, March 31st in Unit 22)

Proposal 11- OPPOSE

While we agree with the "spirit" of the stated concerns relating to wound loss and would encourage a statewide discussion on acceptable calibers for hunting in Alaska, the effect of the proposal would be to create a caliber restriction specific to Unit 18. Because *methods and means* should be approached on a statewide basis, we are opposed to this proposal and feel that it would result in confusion and inadvertent violations.

Proposal 13- SUPPORT

The APHA supports this proposal based on population and harvest information presented in the Departments comments. We feel that a March season would accomplish the goal of safer travel while limiting harvest to younger bulls that drop their antlers later. This would not have an effect on the adult bull component of the population thus minimizing the impacts of potential increases of harvest on herd fecundity. Local residents have proven willing to support conservation measures when the moose population was less abundant, so we anticipate little or no conflicts if this population becomes stressed like it was in 2001.

The APHA would make one recommendation based on local, anecdotal evidence. Local observations indicate an increasing wolf population; therefore we would like the department to do, at a minimum, biannual track surveys of the Seward Peninsula. If these track surveys are not feasible then would welcome other suggestions on methodology to develop a model that shows relative wolf abundance on the Seward Peninsula. Generally, geographic features such as islands and peninsulas are very susceptible to the effects of predation.

Proposal 16- SUPPORT

We support this proposal and agree with the Departments comments. We also agree that it is best to change either the bag limit or the season individually to ascertain the effects of the change and that making both changes at once could be detrimental in this road accessible Sub-Unit.

Proposal 17- SUPPORT

We support this proposal because bears are generally very abundant in Unit 22A and there are legitimate access problems, identified in the proposal, to the southern portion of 22A during spring time. While this proposal is likely to result in an increase in bear harvest in southern 22A, this appears to be a desired outcome as all moose populations in 22A are generally healthy or increasing except for the areas south of St. Michael. Therefore, an increase in bear harvest will, in the short term, benefit bear huntes and moose reliant locals alike.

While we strongly support this proposal we would like to respond to the Departments concerns and opposition to this proposal. First and foremost, the Department should develop an abundance model, perhaps using seasonally critical habit concentrations or aerial surveys to

monitor relative bear abundance and thus extrapolate some coefficient for area density. Secondly, a harvest model integrating historic data (sealing records, hunt success, days in the field for success, etc.) should be developed. This harvest model will give managers, guides and the Board of Game a sense of population health and hunt quality. For instance, high rates of female harvest or declining age class in the harvest sample are indicative of population stress and/or over harvest. Third, there are anecdotal reports of “drive by shootings” on bears. We would like to develop a better method of tracking human caused bear mortality in the area. The Department’s opposition to this proposal and it concerns should be addressed with data gathering strategies and educational outreach, especially when other bear season liberalizations are supported based on the positive effects of reduced bear numbers on resident moose populations a situation that exists in southern 22A.

We strongly support this proposal while advocating for resource safeguards and better population and harvest monitoring.

Proposal 18- SUPPORT

We support this proposal based on its given merits and on the fact that similar wolf season extensions, notably in Unit 9, have not resulted in an over harvest of wolves in the Unit. Anecdotal resident observations indicate an expanding wolf population while mainland musk-ox populations appear to be stressed. Furthermore, the APHA is not aware of any wolf populations in the state that are stressed or depleted due to land based hunting effort. Quite simply; traditional hunting and trapping methods, no matter how long the season, are not efficient enough to extirpate, deplete or permantly diminish a wolf population. We anticipate a slightly higher reported harvest, incidental to other the other hunting activities outlined in the proposal (bear and seal hunting).

We also feel our suggestions about wolf population and abundance gathering on the Seward Peninsula in our comments on proposal 13 are applicable to this proposal. Due to wolves large home ranges and dispersal behaviors, attempts at determining Unit-wide abundance will probably fail.

Passing proposal 18 will have a net positive effect in Unit 22.

Proposals 20, 21- SUPPORT

We support proposals 20 and 21 based on their given merits. We would like the Department to provide accurate bull:cow ratios during the meeting to either substantiate part of the rationalization for Proposal 21 or refute it. It is possible that more than two non-resident tags could be issued based on this information and other herd composition information.

Proposal 24- SUPPORT

Coyotes should be treated as an invasive species north of the Brooks Range and harvested at every opportunity to prevent proliferation.

Proposal 27- OPPOSE

We oppose this proposal based on the use of inaccurate, untrustworthy population density/data used in support of the proposal. We agree wholeheartedly with the Departments findings and opposition to the proposal.

Proposal 28- SUPPORT

We support this proposal for the same reasons we support proposal 24.

Proposal 29- SUPPORT

We support this proposal based on its given merits and a desire for statewide uniformity on the regulations on the sale of antlers. However, if there is strong opposition from the Western Arctic Caribou Working Group, we would defer to that process and remove our support.

Proposals 30, 31, 32, 33- OPPOSE

We oppose all of the region-wide efforts to restrict non-resident sheep hunters. These proposals lack a conservation perspective and are strictly allocative in nature.

The APHA is solution oriented regarding the recent slew of "sheep re-allocation/resident first proposals" but believes that the best solution will come from compromises that put all the users groups at the same table with the same objective information. We ask that the board to reject ALL SHEEP PROPOSALS PENDING THE RESULTS OF THE SHEEP WORKING GROUP. Furthermore, during the past 7 years the APHA has been actively fulfilling its commitment to the Board to advocate for a guide concession program on State Lands that will significantly reduce conflicts over game resources in Alaska. While the Guide Concession Program is in its final round of debate in the legislature before being implemented, it is more appropriate that the results of the sheep-working group be applied in conjunction with guide area implementation. Furthermore, because areas with and without guiding concessions have vastly different intensities of conflict over sheep, these substantive findings can and will be addressed in the working groups' recommendations' even if guide areas are not implemented. In a scenario where Guide Concessions are implemented behind schedule the recommendations of the working group can be seamlessly be applied in to management strategies in this "delayed" or "tiered" implementation scenario. We feel this is appropriate because sheep conservation is not an issue, trophy quality and other subjective hunt qualities and values are. We feel that the working group format is the best possible forum for airing, expressing and solving this list of grievances currently being alleged between user groups.

We urge you to move the working group ahead rapidly, in the interest of ALL Alaskan sheep hunters and, potentially, the resource itself!

Proposal 34- OPPOSE

We oppose this proposal because it has no conservation basis and is purely allocative in nature. Since sheep conflict or decline is used as an example by its author, please include our above comments in addressing and opposing this proposal.

Proposal 35- OPPOSE

We oppose this proposal based on the Department of Laws finding that there is currently no bear snaring permitted in Region V. The proposal is therefore groundless and should be mooted without discussion.

Proposal 36, 37- OPPOSE

Both of these proposals seek to restrict non-resident allocation and once again, similar to other proposals requesting the same result, are not conservation based but purely allocative in nature. These two proposals are particularly troubling because they use other Western States as positive examples. Certainly this is misleading because residents of other western states living under the 90/10 have only seen diminished hunting opportunity, while, at the same time, isolating themselves and their use. Alaska has some similarities to other Western States but it has a vastly different constitutional treatment of renewable resources. **Arguments that reference "other western states" should be rejected outright as they do not fairly address or represent Alaska's unique status; legally, culturally or geographically.**

Sincerely,

Thor Stacey

Submitted By John D Frost
Affiliation The Alaskan Bowhunters Association

Attn: Board of Game Comments

Alaska Department of Fish and Game

Board Support Section

PO Box 115526

Juneau AK 99811-5526

Fax 907-465-6094

The Alaskan Bowhunters Association comments for Board consideration Region V meeting in Kotzebue Jan. 2014

Proposal #32 New archery season for sheep Support

This proposal was submitted by the Alaskan Bowhunters Association. As the Board is aware there is considerable concern about the declining quality of sheep hunting in Alaska. Over crowding is reducing the quality of the sheep hunting experience. The vast areas of Federal Park sheep habitat that are off limits to hunting squeeze hunters into smaller areas. Declining sheep populations in some open areas and transition to drawing permits have limited access to sheep hunting. The Board probably should review all sheep hunting on a Statewide basis but at present the only opportunity for change is to make proposals on regional basis.

The concept of this proposal is to improve the quality of the sheep hunting experience by reducing some of the over crowding seen in the first week of sheep season. By allowing an archery hunt starting on August first, ten days prior to the start off the general sheep season, many bowhunters would opt for the early season and would be leaving the field when the general season opens. This might allow for increased business for air taxis and transporters. It would reduce the crunch just prior to August 10th and would allow some hunters to be taken out of the field as the next group is being brought into the field.

The success rate of bowhunters is far lower than firearms hunters. This has been shown over the last 30 years with experience with special bow hunts in Unit 14C. Those hunts had very low success rates in spite of allowing “any

sheep”. This proposal would be for full curl rams only. So the success rate would be even lower.

You also have several proposals to open resident seasons earlier than non-resident seasons. Those proposals are generally opposed by the guiding industry. This proposal should be supported by guides, because it would give them opportunity to guide a bowhunt before their regular season if they took nonresident bowhunters.

There is always the concern expressed by the Board that bowhunters are a special interest group. We want to reiterate that nearly anyone can learn to bowhunt. The analogy to fly fishing is appropriate. Fly fishing is a method which reduces the take by comparison with bait fishing. The same is true of bowhunting. Bowhunting requires more patience and persistence because the hunter must get much closer to the quarry. That is the reason that the actual success rate is so much lower than with firearm hunting.

There would appear to be no biologic problem with opening a sheep season earlier in August. Sheep seasons in NWT start July 15th and in BC the stone sheep seasons start August 1st.

We considered requesting a late archery sheep hunt similar to that, which has been successful for many decades in unit 14C. However in late September and early October the days are very short and the weather is getting colder and stormier. This is even more of a problem in the far northern Region V. Probably far fewer bowhunters would participate in a late season sheep hunt and it could be more dangerous.

Allowing a bowhunting season before the regular firearm sheep season would have minimal impact on the sheep population but would reduce some over crowding. That should enhance the quality of the hunt for everyone.

Thank you for your consideration of our comments.

Sincerely,

John Frost – Legislative VP of the Alaskan Bowhunters Association

Submitted By Joe Letarte
Affiliation Alaska Trappers Association
Phone 907 488 7517
Email letarte@alaska.net
Address Box 16075
Two Rivers, Alaska 99716

Proposal #35 - The ATA does not support this proposal. It is the responsibility of the state of Alaska and the board of game to manage the resources in the best manner, so they should have the final decision in these matters.

Submitted By Gary Eckenweiler
Affiliation
Phone 907 624-4249
Email geckenweiler@gmail.com
Address P.O. Box 231
Unalakleet, Alaska 99684

re: proposal 19-5 AAC 85.060 etention of wolverine season unit 22

I am not supporting this proposal.

The wolverine season as it stands give more than ample time for anyone interested in havesting wolverine to do so. Being a wolverine trapper I notice an increase in activity at the end of the current season and the few weeks following the season. This may be due to females hunting for their young; with a longer hunting season females nurturing their young may be harvested, not good. Also at that time of the year wolverine have a tendency to loose thier fur tip ends especially right on the parka ruff stripe which makes them undesirable. Also durring this time of year there are more people out and longer daylight which could relate to a harvest quite higher than any other portion of the open season.

GATES OF THE ARCTIC NATIONAL PARK
SUBSISTENCE RESOURCE COMMISSION
4175 Geist Road
Fairbanks, AK. 99709
(907) 455-0639 or FAX (907) 455-0601

November 19, 2013

Mr. Ted Spraker, Chairman
ATTN: Alaska Board of Game Comments
Alaska Department of Fish and Game
Board Support Section
P.O. Box 115526
Juneau, Alaska 99811-5526

Dear Chairman Spraker,

The Gates of the Arctic National Park Subsistence Resource Commission (SRC) met in Fairbanks on November 5 and 6, 2013. The SRC reviewed the Alaska Board of Game proposals pertaining to the Gates of the Arctic area for your January 2014 meeting in Kotzebue and would like to provide comments for the following proposals:

Proposal 20: Extend the bull moose hunting season in Unit 26A
The Gates of the Arctic National Park Subsistence Resource Commission unanimously supports the proposal. Bull moose are starting to move around later in the season, so an extended season would ensure that hunters are successful in getting a moose.

Proposal 21: Allow moose hunting in the Anaktuvuk Pass Controlled Use Area, modify the bag limit, and change the nonresident moose permit allocation for nonresidents
The Gates of the Arctic National Park Subsistence Resource Commission unanimously opposes the proposal because an increase in air traffic north of Anaktuvuk Pass has the potential to deflect the caribou herds. The SRC would like to minimize any aircraft activity or hunting north of the community.

Proposal 32: Open a bowhunting only season for Dall sheep in the Arctic/Western Region
The Gates of the Arctic National Park Subsistence Resource Commission unanimously opposes this proposal. The Dall sheep population in these regions cannot support additional hunting pressure. The Dall sheep population in 26B has declined dramatically because of the late spring and hard winter.

Proposal 33: Change nonresident sheep hunts to drawing hunts and limit the permit distribution to ten percent of the annual ten year average for the Arctic/Western Region
The Gates of the Arctic National Park Subsistence Resource Commission deferred this proposal. There is not enough information for the SRC to evaluate this proposal.

Proposal 34: Allocate a small percent of game harvest for nonresidents in Unit 26
The Gates of the Arctic National Park Subsistence Resource Commission deferred this proposal. This proposal does not give a defined percentage to allocate. There are no specifics addressed with this proposal.

Proposal 70: Retain the winter registration moose hunt in Unit 24B (RM833)
The Gates of the Arctic National Park Subsistence Resource Commission unanimously supports the proposal with modification to include portions of Unit 24C. This proposal will reauthorize the current winter hunt in Units 24B and 24C.

Proposal 136: Establish definitions for subsistence hunting and subsistence uses
The Gates of the Arctic National Park Subsistence Resource Commission deferred this proposal due to vagueness.

Proposal 137: Establish a definition for subsistence hunting
The Gates of the Arctic National Park Subsistence Resource Commission unanimously opposes this proposal because it would be detrimental to rural residents.

Proposal 139: Remove the harvest ticket requirement and require harvest reports for certain non-permit hunts
The Gates of the Arctic National Park Subsistence Resource Commission unanimously opposes this proposal. This proposal would be detrimental to elder households that do not understand how harvest reporting works.

Proposal 140: Require each harvest report or permit to specify whether the hunt was conducted to provide a wildfood harvest for subsistence uses or for recreational values
The Gates of the Arctic National Park Subsistence Resource Commission unanimously opposes this proposal. Residents from cities claim to be subsistence users when they are really trophy hunters. This proposal will bolster the amounts necessary for subsistence use by urban people.

Thank you for the opportunity to comment.
Sincerely,

Pollock Simon Sr., Chair

Jack Reakoff, Vice-Chair

Co: NPS Alaska Regional Director
Superintendent, Gates of the Arctic National Park and Preserve
North Slope, Northwest Arctic and Western Interior Regional Advisory Councils
Governor of Alaska

Submitted By Joe Letarte
Affiliation None
Phone 907 488 7517
Email letarte@alaska.net
Address Box 16075
Two Rivers, Alaska 99716

Proposals 36,37 and any other proposals that deal with restricting non resident hunting I do not support. There is no biological reason for these proposals and we would be excluding the people who are paying the way for the rest of us.

December 5, 2013

ATTN: Board of Game,

There are three proposals that wish to comment on and strongly oppose. Before I list them, I want to let you know who I am, and my involvement in the area. My name is Johnny Richardson and I've lived in St. Michael since 1995. I have trapped in unit 22A the same length of time. My main trap line is the Golsovia River and also everything else surrounding it. I have also held an assistant guides license for the last 14 years. I have guided in the same area I trap. I spend more time in that country more then anyone, and I have a very good understanding of the animal's behavior and populations. The three proposals I'm going to oppose are for that area.

PROPOSAL 17

I strongly oppose extending the bear season until June 15th to compensate for the ice. What if the ice starts hanging in there until July. Will we extend it longer? How far do we go then? At some point and time the animals we hunt and Mother Nature has to win. If we keep compensating for these factors then pretty soon there's nothing left to hunt. We have always hunted bears with the use of snowmobiles out of St. Michael in the spring. We conduct our hunt earlier in the season during April when the snow and ice conditions allow it. By the middle of May the ice is not stable enough to trust. Sometimes we lose our snow and ice sooner and sometimes we track bears back into heavy timber that's impossible to get to the bear, and when that happens the BEAR wins. So if Mother Nature hangs onto the ice a little longer in this area, then the bear should win. We should not lengthen the season just for hunter's sake. Ten years ago it was not uncommon on some days to see more then twenty bears a day on some days. But, those days are gone. I spent two months up in the hills of the Golsovia River this fall. The most bears I seen in a day was seven. Two of them which were cubs, and those were the only two cubs I seen all fall. We are not over populated with bears like we used to be, but we have a stable hunting population and our moose herd it is growing, so right now everything is in check. The only people who benefit from this change is the guide and the hunter. The bears killed in this area have no effect on the reindeer herd out of St. Michael. The ones that are affected by this change are the bear population and the potential bear hunters in the future. I personally think everything is in balance right now. So I hope you will consider this before accepting this proposal. Thank You.

PROPOSAL 18

I strongly oppose this as well. We are not over populated with wolves in our area like other part of the state. We have a stable population of wolves that provides fur and money for the local hunters and trappers. I don't believe the season should be extended to benefit an out of state hunter. If they want to hunt wolves, there are plenty of guides in this state that offer winter wolf hunts. By May the females are having their pups in the den, and any member of the wolf pack that is killed at that time impacts the survival of the pack. This is another proposal that if accepted that will only benefit the guide and hunter. The locals will not benefit from this at all.

This time of the year wolf fur is marginal at best. Being a trapper first, I think fur should be harvested in its prime. I don't believe we should extend a season just so a hunter can say he shot a wolf.

PROPOSAL 19

This is the one I would really want to oppose and I have good reason. We all know that the wolverine population is nothing like the wolf population. That's consistent through out the state. There are not as many wolverines and they don't have as many young pups as wolves do. So were already dealing with fewer numbers. My wife's uncle told me years ago when I first started trapping on the Golsovia. He said, "You will see lots of tracks in November and December. Then the wolverine will disappear until March and April. Then you will see a lot more wolverine tracks." He said, "its because the females are denning up and having their pups at that time." I was skeptical to believe that at first. Because it went against everything I had read about them. But as time went on I noticed it to be true. I've skinned a lot of wolverines that were shot by other hunters that time of year. Nine times out of ten it's a female and she's lactating. Not only have you killed that wolverine, so you've killed the young ones in the den also. That does affect the population. You have a greater chance of coming across a female in April because their hungry and in search of food. I purposely do not concentrate on wolverines during the later part of March and April for that reason. Being a trapper, feeding my family, and paying bills with that income I would not turn one down. But I also won't go out looking for them. So to change the season to benefit the guide and the hunter just doesn't seem right. Again it affects the population of the wolverine and also affects the local people who depend on them. Thank you.

I know it sounds like I'm against other people coming in and killing game in this area. That is not the case. I'm against extending the season to compensate for the guide proposing these changes and his hunters. They are the only ones who benefit from it. I've helped guide a lot of bear hunters over the years and we've also had guys catch wolves and wolverine in the winter as well. But we've always done it in the season that was set. That is what has kept our population of these animals secure. So I do not think it is fair for an out of area guide to come in and propose these changes that will only benefit him and his clients. You need to think of the local guides, hunters, and trappers first who are dependent on these animals for their living.

Thank you for taking the time to read this.

Sincerely,

Johnny D. Richardson
P.O. Box 59090
Saint Michael, Alaska 99659
(907) 923-2370

Submitted By Mike Wade
Affiliation
Phone 907-443-5470
Email betsmike@nome.net
Address P.O. Box 1623
Nome, Alaska 99762

PROPOSAL 19: 5 AAC 85.060. Hunting seasons and bag limits for fur animals.

I oppose this proposal:

This propsosal is to extend the wolverine hunting season from September 1 - April 30. Right now the season ends on March 31. That makes for a 6 month hunting season for wolverines. Very little is really known about the population of wolverines in GMU 22. What is known is that in late March and April wolverines breed. They travel around the counrty looking for mates, which make them very vulnerable to hunters and being run down by snowmachines.

I feel that with very little biological data on this animal and an already long hunting season, we should not lengthen it another month and into their prime breeding season.

The trapping season ends on April 15, why would we allow hunters to harvest them until April 30?

Mike Wade, Nome, Alaska

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. Tudor Road
Anchorage, Alaska 99503-6199

IN REPLY REFER TO:

FWS/OSM 13086.CA

DEC 04 2013

Mr. Ted Spraker, Chair
Alaska Board of Game
P.O. Box 115526
Juneau, Alaska 99811-5526

Dear Chairman Spraker:

The Alaska Board of Game is scheduled to meet January 10-13, 2014, to deliberate proposals concerning changes to regulations governing hunting and trapping of wildlife for the Arctic and Western Regions. We have reviewed the 38 proposals the Board will be considering at this meeting.

The U.S. Fish and Wildlife Service, Office of Subsistence Management (OSM), working with other Federal agencies, has developed preliminary recommendations on those proposals that have potential impacts on both Federal Subsistence users and wildlife resources. Our comments are enclosed.

We appreciate the opportunity to comment on these important regulatory matters and look forward to working with your Board and the Alaska Department of Fish and Game on these

issues. Please contact Chuck Ardizzone, Wildlife Liaison, (907) 786-3871, with any questions you may have concerning this material.

Sincerely,

Gene Peltola, Jr.
Assistant Regional Director, OSM

Enclosure

cc: Cora Campbell, Commissioner, Alaska Department of Fish and Game
Tim Towarak, Chair, Federal Subsistence Board
Kathleen M. O'Reilly-Doyle, Deputy Assistant Regional Director, OSM
Thomas Evans, Acting Policy Coordinator, OSM
Kristy Tibbles, Executive Director, Alaska Boards of Fish and Game
Jennifer Yuhas, Assistant Director, Alaska Department of Fish and Game
Interagency Staff Committee
Chuck Ardizzone, Wildlife Division Chief, OSM
Administrative Record

RECOMMENDATIONS

ALASKA BOARD OF GAME PROPOSALS

Arctic/Western Alaska Region

January 10-13, 2014

Kotzebue, Alaska

U.S. Fish and Wildlife Service Office of Subsistence Management (OSM)

Proposal 1 – 5 AAC 85.045. Hunting seasons and bag limits for moose. Modify the Lower Yukon Area for moose hunting in Unit 18.

Current Federal Regulations:

> ***§_.26 Subsistence taking of wildlife.***
>
> *(i) Unit regulations.*
>
> *(18) Unit 18 consists of that area draining into the Yukon and Kuskokwim Rivers downstream from a straight line drawn between Lower Kalskag and Paimiut and the drainages flowing into the Bering Sea from Cape Newenham on the south to and including the Pastolik River drainage on the north; Nunivak, St. Matthew, and adjacent islands between Cape Newenham and the Pastolik River.*

Is a similar issue being addressed by the Federal Subsistence Board? Yes, two similar proposals, WP14-24 and -25, were submitted to revise the boundaries in the lower Yukon hunt area of Unit 18 and liberalize moose harvest for a small area upriver of Mountain Village. The Federal Subsistence Board will address the proposals at its April 2014 public meeting.

Impact to Federal subsistence users/wildlife: If this proposal is adopted, it would ease confusion for Federally qualified subsistence users with respect to the hunt area boundary location. However, if the Federal Subsistence Board does not adopt similar boundary changes, State and Federal areas would be out of alignment, which would add regulatory complexity for users. The impact to wildlife should be minimal as moose populations are healthy and growing in the unit.

Federal Position/Recommended Action: The OSM recommendation is **neutral** on this proposal.

Rationale: If this proposal is adopted, the geographic descriptions for Unit 18 would differ between State and Federal regulations. The Federal Subsistence Board would need to take parallel action in order for boundary descriptions to match. The Federal Subsistence Board could make a similar change if they adopt Proposals WP14-24 and -25 with modification.

Proposal 2 – 5 AAC 85.045. Hunting seasons and bag limits for moose. Modify the Lower Yukon Area for moose hunting in Unit 18, extend the resident season, and liberalize the bag limit.

Current Federal Regulations:

Unit 18—That portion north and west of the Kashunuk River including the north bank from the mouth of the river upstream to the old village of Chakaktolik, west of a line from Chakaktolik to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village—2 moose, only one of which may be antlered. Antlered bulls may only be harvested from Aug. 1 through Sept. 30.	*Aug. 1 – the last day of February*

Is a similar issue being addressed by the Federal Subsistence Board? Yes, two similar proposals, WP14-24 and -25, were submitted to revise the boundaries in the lower Yukon hunt area of Unit 18 and liberalize moose harvest for a small area upriver of Mountain Village. The Federal Subsistence Board will address the proposals at its April 2014 public meeting.

Impact to Federal subsistence users/wildlife: Federally qualified subsistence users would be afforded more hunting opportunities under State resident hunting regulations due to the expanded hunt area, extended season, and liberalized harvest limit. The impact to wildlife should be minimal as moose populations are healthy and growing in the unit.

Federal Position/Recommended Action: The OSM recommendation is **neutral** on this proposal.

Rationale If this proposal is adopted, the geographic descriptions for Unit 18 would differ between State and Federal regulations. The Federal Subsistence Board would need to take parallel action in order for boundary descriptions to match. The Federal Subsistence Board could make a similar change if they adopt Proposals WP14-24 and -25 with modification.

Proposal 3 – 5 AAC 85.045. Hunting seasons and bag limits for moose. Modify the season and bag limit for moose in Unit 18 Remainder and Lower Yukon.

Current Federal Regulation:

Unit 18 – That portion north and west of the Kashunuk River including the north bank from the mouth of the river upstream	*Aug. 1–the last day of February.*

to the old village of Chakaktolik, west of a line from Chakaktolik to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village—2 moose, only one of which may be antlered. Antlered bulls may only be harvested from Aug. 1 through Sept. 30.

Unit 18, remainder – 1 moose	*Aug. 10 – Sept. 30* *Dec. 20 – the last day of February*

Is a similar issue being addressed by the Federal Subsistence Board? Yes, two similar proposals have been submitted. Proposal WP14-23 requests an extension of the moose season in a portion of Unit 18 and removal of the bull-only restriction. Proposal WP14-28 requests a 9 day extension of the fall moose season in Unit 18 Remainder. Both proposals will be addressed by the Federal Subsistence Board at its April 2014 public meeting.

Impact to Federal subsistence users/wildlife: This proposal would create a longer season than the Federal season. Federally qualified subsistence users would have more hunting opportunities under State regulations, but State and Federal seasons would become misaligned, leading to regulatory complexity for subsistence users. The moose population is healthy and growing in the unit and a longer hunting season could help to reduce the population, reducing the chance of over-browsing that could lead to a population crash if left unchecked.

Federal Position/Recommended Action: The OSM recommendation is to **oppose** this proposal.

Rationale: If the Board adopts this proposal, it should help reduce moose densities in the area. However, the resulting State season would be longer than the season under Federal regulations, which could lead to increased regulatory complexity for subsistence users. In addition, creation of one large hunt area would limit the ability of managers to respond to localized changes in moose populations and habitat conditions over time, making management more difficult.

Proposal 5 – 5 ACC 85.050. Hunting seasons and bag limits for musk oxen. Open a subsistence musk ox hunt in Unit 18 and 19 as follows: allow for a subsistence musk ox hunt to occur in the various populations of the Unit 18 and 19 mainland by close proximity communities.

Current Federal Regulation:

Unit 18 – No Federal season
Unit 19 – No Federal season

Is a similar issue being addressed by the Federal Subsistence Board? No. The Board will be accepting proposals to change Federal subsistence hunting and trapping regulations from January to March 29, 2015

Impact to Federal subsistence users/wildlife: There would be no impact to Federally qualified subsistence users as there is no Federal subsistence priority for muskox in either Unit 18 or Unit 19. However, a proposal could be submitted to the Federal Subsistence Board to create a Federal hunt in these units. The impact to the muskox population is uncertain as there are no current estimates of numbers for the species in the units in question outside of Nunivak and Nelson Islands.

Federal Position/Recommended Action: The OSM recommendation is **neutral** on this proposal.

Rationale: There are currently no Federal seasons for musk ox in Units 18 and 19. However, most of the area in question is on Federal public land. If this hunt is established and the Federal Subsistence Board receives an equivalent proposal, a closure of Federal lands to all non-Federally qualified users is possible to provide a subsistence priority.

Proposal 7 – 5 AAC 85.057. Hunting seasons and bag limits for wolverine. Shift the wolverine hunting season dates in Unit 18.

Current Federal Regulation:

Unit 18 – 2 wolverine	*Sept. 1 – Mar. 31*

Is a similar issue being addressed by the Federal Subsistence Board? No. The Board will be accepting proposals to change Federal subsistence hunting and trapping regulations from January to March 29, 2015

Impact to Federal subsistence users/wildlife: A longer season would provide more harvest opportunities for Federally qualified subsistence users. Although most wolverines are taken opportunistically under hunting regulations, there could be impacts to the wolverine population

as females with dependent young would likely be more vulnerable to harvest if the end of the season is shifted to April 15.

Federal Position/Recommended Action: The OSM recommendation is **oppose** on this proposal.

Rationale: Wolverines are polygamous and exhibit delayed implantation, which means they mate in summer, but fertilized eggs remain in the blastocyst stage until early to mid-winter. The timing of birth varies between January and April (Banci and Harestad 1988), with most kits being born in Alaska from mid-February to March (Rausch and Pearson 1972). The reproductive capacity of wolverines appears to be limited by the availability of food (Banci 1994).

Human harvest was an important source of adult wolverine mortality in many North American studies (Hornocker and Hash 1981, Whitman and Ballard 1983, Magoun 1985, Banci 1987). Survival rates were higher in populations that were not exposed to trapping pressure, suggesting that harvest mortality is additive (Krebs et al. 2004). However, harvest may not affect all age-sex classes equally. Harvests may have a greater effect on subadult male survival due to their greater dispersal rates (Krebs et al. 2004). Thus, subadult male harvest may be partially compensatory, due to higher natural mortality of that sex-age class (Banci 1994). Most natural mortality is associated with starvation and predation (Banci 1994).

If the proposal is adopted, it could impact the wolverine population by allowing harvest of females with young. Additionally extending the season would cause misalignment with State and Federal regulations.

Literature Cited

Banci, V. 1987. Ecology and behavior of wolverine in Yukon. M.S. Thesis, Simon Fraser University, Burnaby, British Columbia. 178 pages.

Banci, V. 1994. Wolverine. Pages 99–127 *in* Ruggiero et al., editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. U. S. Forest Service, Rocky Mountain Forest and Range Experiment Station. General Technical Report RM-254. Fort Collins, CO. 184 pages.

Banci, V., and A. S. Harestad. 1988. Reproduction and natality of wolverine (*Gulo gulo*) in Yukon, Canada. Holarctic Ecology 13:195-200.

Hornocker, M. G., and H. S. Hash. 1981. Ecology of wolverine in northwestern Montana. Canadian Journal of Zoology 59:1286-1301

Krebs, J., et al. 2004. Synthesis of survival rates and causes of mortality in North American wolverines. Journal of Wildlife Management 68:493-502.

Magoun, A. J. 1985. Population characteristics, ecology, and management of wolverine in northwestern AK. Ph.D. Diss. University of Alaska, Fairbanks, AK. 197 pages.

Proposal 10 – 5 AAC 92.450. Description of game management units. Modify the boundaries for Units 18, 19, and 21.

Current Federal Regulations:

§_.26 Subsistence taking of wildlife.

(i) Unit regulations.

(18) Unit 18 consists of that area draining into the Yukon and Kuskokwim Rivers downstream from a straight line drawn between Lower Kalskag and Paimiut and the drainages flowing into the Bering Sea from Cape Newenham on the south to and including the Pastolik River drainage on the north; Nunivak, St. Matthew, and adjacent islands between Cape Newenham and the Pastolik River.

(19) Unit 19 consists of the Kuskokwim River drainage upstream from a straight line drawn between Lower Kalskag and Piamiut

(21) Unit 21 consists of drainages into the Yukon River upstream from Paimiut to, but not including, the Tozitna River drainage on the north bank, and to, but not including, the Tanana River drainage on the south bank; and excluding the Koyukuk River drainage upstream from the Dulbi River drainage.

Is a similar issue being addressed by the Federal Subsistence Board? No. The Board will be accepting proposals to change Federal subsistence hunting and trapping regulations from January to March 29, 2015.

Impact to Federal subsistence users/wildlife: Changes to unit boundary descriptions could result in confusion for Federally qualified subsistence users, since the proposed changes would

differ from Federal boundary descriptions. Changes in boundaries would have no effect on wildlife populations.

Federal Position/Recommended Action: The OSM recommendation is **neutral** on this proposal.

Rationale: If these changes are adopted by the Board, the Federal Subsistence Board would need to make changes to Federal regulations to match them. At this time, there are no proposals before the Federal Subsistence Board to make similar boundary changes. Differences between State and Federal boundaries for these units could lead to regulatory complexity for Federally qualified subsistence users, who can hunt under either State or Federal regulations.

Proposal 14 - 5 AAC 85.045(a)(20). Hunting seasons and bag limits for moose. Establish an antlered bull season in Unit 22A Unalakleet River drainage (Unit 22A Central) to be announced by emergency order during the period December 1–December 31.

Current Federal Regulation:

Unit 22A Unalakleet River drainage—Moose

Unit 22A—that portion in the Unalakleet drainage and all drainages flowing into Norton Sound north of the Golsovia River drainage and south of the Tagoomenik and Shaktoolik River drainages—Federal public lands are closed to the taking of moose, except that residents of Unalakleet, hunting under these regulations, may take 1 bull by Federal registration permit, administered by the BLM Anchorage Field Office with the authority to close the season in consultation with ADF&G.	*Aug. 15–Sept. 14*

Is a similar issue being addressed by the Federal Subsistence Board? No. The Board will be accepting proposals to change Federal subsistence hunting and trapping regulations from January to March 29, 2015.

Impact to Federal subsistence users/wildlife: The proposed December season could provide additional harvest opportunity for Federally qualified subsistence users to harvest moose when announced by an emergency order. Harvest is currently restricted by a harvest quota, and Federal public lands in the affected area are closed to the harvest of moose except by residents of Unalakleet.

Following conservative management actions, the moose population in the Unalakleet River drainage (Central Unit 22A) has been increasing since 2003. As hunting is limited by harvest quotas and the proposed hunt would have to be opened by emergency order, the potential for overharvest is limited. In addition, restricting the harvest to antlered bulls in December would limit the number of harvestable moose and protect cows.

OSM Recommendation: The OSM recommendation is **neutral** on this proposal.

Rationale: If adopted, the Federal Subsistence Board could take similar action in the future. Conservative management actions, including the elimination of winter hunts, moose hunting closures under State (2005–2007) and Federal (2005–2008) regulations, and restricting the Federal harvest to residents of Unalakleet, have been implemented to help the moose population in Central Unit 22A recover from lower numbers in 2003. The moose population has been increasing since 2003, but still remains at a low density. Conservative management strategies are still warranted to continue the recovery of the moose population in Central Unit 22A and to continue subsistence uses of the population.

Proposal 20 – 5 AAC 85.045.(4) Hunting seasons and bag limits for moose. Extend the bull moose hunting season in Unit 26A until September 30.

Current Federal Regulation:

Unit 26A–Moose

Unit 26A—that portion of the Colville River drainage upstream from and (including) the Anaktuvuk River drainage —1 bull	*Aug 1–Sept. 14*
Unit 26A, remainder—1 bull	*Aug. 1–Sept 14*

Is a similar issue being addressed by the Federal Subsistence Board? No. The Board will be accepting proposals to change Federal subsistence hunting and trapping regulations from January to March 29, 2015.

Impact to Federal subsistence users/wildlife: Extending the State season by two weeks, until September 30, would result in misalignment between State and Federal regulations. Federally qualified subsistence users would be provided with more opportunity to harvest moose under State regulations during the extended State season in Units 26A. However, extending the harvest season while the population is in decline may reduce further reduce the local moose population and future hunting opportunities for Federally qualified subsistence users.

Federal Position/Recommended Action: The OSM recommendation is to **oppose** this proposal.

Rationale: The moose population in Unit 26A is currently in decline due to high adult mortality and poor calf survival (Carroll 2010, Carroll pers. comm. 2013). Extending the fall moose season until September 30 is likely to increase the moose harvest, which could have a significant adverse impact on the local moose population.

Literature Cited

Carroll, G. 2010. Unit 26A moose management report. Pages 643-665 *in* P. Harper, editor. Moose management report of survey and inventory activities 1 July 2007 –30 June 2009. ADF&G. Juneau, Alaska.

Carroll, G. 2013. Wildlife Biologist. Personal communication: email. ADF&G. Anchorage, AK.

WESTERN ARCTIC CARIBOU HERD WORKING GROUP

GOAL: TO WORK TOGETHER TO ENSURE THE LONG-TERM CONSERVATION OF THE WESTERN ARCTIC CARIBOU HERD AND THE ECOSYSTEM ON WHICH IT DEPENDS, TO MAINTAIN TRADITIONAL AND OTHER USES FOR THE BENEFIT OF ALL PEOPLE NOW AND IN THE FUTURE.

CHAIR: VERN CLEVELAND, SR. **VICE-CHAIR: CYRUS HARRIS**
P.O. BOX 175, NOME, AK 99762

December 27, 2013

ATTN: Board of Game Comments
Alaska Department of Fish and Game
Boards Support Section
P.O. Box 115526
Juneau, AK 99811-5526

SUBJECT: Board of Game Proposal 29

To the Alaska Board of Game:

At its regular meeting on December 4, 2013, the Western Arctic Caribou Herd Working Group (Working Group) voted unanimously to oppose adoption of Board of Game Proposal 29, "Allow the sale of caribou antlers harvested in Unit 23". The Working Group is concerned that allowing sale of antlers would encourage people to harvest caribou for the purpose of getting antlers for sale and that it would lead to meat waste.

On behalf of the Working Group, I hope that you will consider this comment in your deliberations regarding this proposal.

On behalf of the Working Group,

Jan Caulfield
WACH WG Facilitator

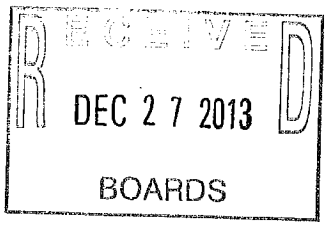
For Vern Cleveland, Sr., Chair

WESTERN ARCTIC CARIBOU HERD WORKING GROUP

GOAL: TO WORK TOGETHER TO ENSURE THE LONG-TERM CONSERVATION OF THE WESTERN ARCTIC CARIBOU HERD AND THE ECOSYSTEM ON WHICH IT DEPENDS, TO MAINTAIN TRADITIONAL AND OTHER USES FOR THE BENEFIT OF ALL PEOPLE NOW AND IN THE FUTURE.

CHAIR: VERN CLEVELAND, SR. **VICE-CHAIR: CYRUS HARRIS**
P.O. BOX 175, NOME, AK 99762

December 27, 2013



ATTN: Board of Game Comments
Alaska Department of Fish and Game
Boards Support Section
P.O. Box 115526
Juneau, AK 99811-5526

SUBJECT: Board of Game Proposal 23

To the Alaska Board of Game:

At its regular meeting on December 4, 2013, the Western Arctic Caribou Herd Working Group (Working Group) discussed Board of Game Proposal 23, "Review the customary and traditional use worksheet for the Teshekpuk Lake caribou herd; establish amounts reasonably necessary for subsistence".

The Teshekpuk caribou herd (TCH) overlaps the Western Arctic Herd (WAH) during its annual cycle of distribution and movements. Because the herds can overlap, actions or decisions regarding the TCH may affect WAH hunting opportunity. Management actions taken for one herd may impact harvest opportunities on the other, particularly as it may be impossible for hunters to tell caribou from the two herds apart.

The Working Group's primary concern is that the Board of Game's action regarding the Teshekpuk caribou herd not negatively affect WAH management or harvests, including the Amount Necessary for Subsistence established for the WAH.

Thank you for this opportunity to comment.

On behalf of the Working Group,

Jan Caulfield
WACHWG Facilitator

for Vern Cleveland, Sr., Chair

Alaska Board of Game
Arctic/Western Region V Meeting
January 2014 Kotzebue
Public on time written comment from AOC

ATTN: Board of Game Comments
ADF&G
Board Support Section
PO Box 115526
Juneau, AK 99811-5526

December 26, 2013

RE: Alaska Outdoor Council (AOC) written comment on Proposal #6 – Nelson Island musk ox permits.

Dear Members of the AK Board of Game,

AOC members and the AOC Board of Directors would like to thank board members for their willingness to serve on the state's game regulatory board and for providing the opportunity for public participation in the regulatory process. AOC's Purpose, as stated in the AOC bylaws, is first to perpetuate game resources that their membership activities depend on. Simply put that means to advocate for management that provides a harvestable surplus of wildfood and furbearer resources in Alaska annually.

AOC's secondary stated purpose, second only to conservation, is to "insure equality in access and use of these natural resources". An **amended Proposal #6**, once adopted by the board, could further implement the "common-use of fish and game" enshrined in the Alaska State Constitution (Article 8, Section 3) which would be beneficial to AOC members who gather publicly owned natural resources for their use.

Alaska Department of Fish & Game (ADF&G), who submitted Proposal #6, state that the current musk ox population on Nelson Island if not checked could over graze their habitat. The department goes on to state under ISSUE - "To reduce the population, we need to increase hunting opportunity". Yet the department asks for no change in the constitutionally unenforceable restrictive **first-come, first-served** basis requirement to obtain a registration permit to harvest a musk ox on Nelson Island only in local communities. There is no statutory authority that would allow ADF&G to issue musk ox registration permits only to residents of Nelson Island and Newtok.

The Alaska Supreme Court has ruled against the BOG's efforts to adopt rural priority requirements to harvest publicly owned natural resources since McDowell v. State, 785 P.2d 1 (Alaska 1989). There is no other justification for making non-local residents and nonresident hunters pay the expense of traveling to Nelson Island or Newtok a week prior to the hunt to try and obtain a musk ox hunt permit other than to provide a priority of all the musk ox permits to local residents.

5 AAC 99.025(a)(9) states that musk ox has a negative finding for Customary & Traditional uses in GMU 18. This is not a subsistence hunt conducted under AS 16.05.258 requiring the BOG to consider an amount of the harvestable portion that is reasonably necessary for subsistence use.

AOC recommends that the BOG - **Amends and adopts Proposal #6** to allow for a portion of the Nelson Island musk ox General hunt permits, 5 AAC 85.050(a)(1) available for a drawing hunt annually. Permit holders should be provided a map of Nelson Island showing the landownership and how to contact the principle land owner, the Calista Corporation.

Thank you for your consideration of AOC's comments on Proposal #6.

Rod Arno,
Executive Director, Alaska Outdoor Council