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Department of Environment
Avatiliqiyikkut
Ministère de l'Environnement

GRIZZLY BEAR (*Ursus arctos*) HARVEST MONITORING IN NUNAVUT

Summary report

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Summary

The purpose is to monitor the geographic distribution, sex, and age composition of grizzly bear harvest in Nunavut. Hunters were asked to return the lower jaw or whole skull, a piece of muscle, a small piece of the skin with hair (2x5cm), and to provide kill information (date, location, etc.) to their local Conservation Officer on a voluntary basis. Tooth samples were processed to determine age of the individuals. A total of 232 grizzly bears were reported harvested from 2013 to 2019, 93 from the Kitikmeot and 139 from the Kivalliq region. Grizzly bear harvest was concentrated in the western Kitikmeot, in the vicinity of Kugluktuk, Cambridge Bay and along the traditional travel route from the Cambridge Bay to the Bathurst Inlet area. Arviat and Baker Lake were the next highest contributors to the total harvest in the Kivalliq region.

The harvest was dominated by a younger age class (subadults) in the Kivalliq region and the proportion of adults in the harvest was 34%, while proportion of adults in Kitikmeot harvest was 60%. The average harvest in the Kitikmeot from 2013 to 2019 appears to be relatively stable (average of 13 bears harvested/year) with a slight increase in the last three hunting seasons. The grizzly bear harvest in Kivalliq region continued to be relatively high (average 20 bears/year) for the same period. The number of grizzly bears currently being harvested within the Kivalliq region may not be sustainable over the long term and may cause a population decline, highlighting the need to better understand the status of the population and determine viable harvest levels.

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ᐱᔾᔪᑕᐅᔪᖅ ᓇᐅᑎᖅᓱᐃᓂᕐᒧᑦ ᓄᓇᒥᑦ ᓇᑭᖕᒐᕐᒪᖕᒐᑕ, ᐊᕐᓇᓪᓗᖕᒪᖕᒐᑕ ᐊᖑᓴᓪᓗᖕᒪᖕᒐᑕ ᖃᔅᓯᓂ ᐅᑭᐅᖃᓕᕐᒪᖕᒐᑕ ᐊᖑᔭᐅᑎᓪᓗᒋᑦ ᓄᓇᕗᒻᒥᑦ. ᐊᖑᓇᓱᒃᑎᑦ ᑐᓂᓯᖃᑦᑕᕐᑯᔭᐅᔪᑦ ᐊᓪᓕᕈᓂᑦ ᓂᐊᕐᑯᐃᓐᓇᖕᒐᓂᓪᓘᓐᓃᑦ, ᓄᑭᒥᑦ, ᐊᒥᐊᕐᔪᑯᓗᒃ ᒥᖅᑯᖃᕐᓗᓂ (2x5cm), ᑐᓴᖅᑎᑦᑎᓗᑎᒃᓗ ᖃᖕᒐ ᓇᓐᓄᓚᐅᕐᒪᖕᒑᖕᒋᓐᓂᑦ (ᐅᓪᓗᖕᒐᓂ, ᓇᒥᑦ, ᑕᒪᒃᑯᐊ) ᐆᒪᔪᕐᓂᐊᖅᑎᕐᑯᑎᔅᓯᓐᓄᑦ ᐃᓱᒪᕐᓱᕐᓗᓯ. ᑭᒍᑎᑦ ᖃᐅᔨᓴᕐᑕᐅᓚᐅᕐᑐᑦ ᖃᐅᔨᔭᐅᓇᓱᒃᔓᑎᒃ ᖃᓄᑎᒋ ᐅᑭᐅᖃᓕᒫᖕᒑᖕᒋᑦ. ᑲᑎᕐᔓᒋᑦ 232 ᐊᒃᓚᒃᑕᐅᓯᒪᓂᕋᖅᑕᐅᓚᐅᕐᑐᑦ 2013−ᒥᑦ 2019−ᓄᑦ, 93−ᓂᑦ ᕿᑎᖕᒥᐅᓂᑦ 139−ᓗ ᑭᕙᓪᓕᖕᒥᑦ. ᐊᒃᔕᒃᑕᐅᔪᑦ ᕿᑎᕐᒥᐅᑦ ᐱᖕᒐᖕᓇᖕᒐᓂᓪᓗᐊᑕᐅᓚᐅᕐᑐᑦ, ᖁᓪᓗᖅᑐᑉ ᐊᕙᑖᓂ, ᐃᖃᓗᑑᒃᑎᐊᒥ ᐊᖅᑯᑎᒋᔭᐅᕙᒃᑐᒥᓪᓗ ᐃᖃᓗᒃᑑᑦᑎᐊᒥᑦ ᕿᖕᒐᐅᒻᒧᑦ. ᐊᕐᕕᐊᑦ ᐊᒻᒪ ᖃᒪᓂ'ᑐᐊᖅ ᐊᖑᔭᖕᒋᑦ ᐅᓄᕉᖕᖑᖃᑕᐅᓚᐅᖅᑐᑦ ᓇᐃᓴᖅᑕᐅᔪᓂ ᑭᕙᓪᓕᖕᒥᑦ.

ᐊᖑᓇᓱᒃᑕᐅᓪᓗᐊᑕᓚᐅᕐᑐᑦ ᒪᒃᑯᒃᓂᕐᓴᐃᑦ (ᓄᑲᐅᑦ) ᑭᕙᓪᓕᖕᒥᑦ ᐃᓐᓇᐅᓂᕐᓴᐃᓪᓗ ᐱᔭᑦ 34 ᐳᓴᓐᑎᐅᓪᓚᐅᕐᔓᑎᒃ, ᐃᓐᓇᐅᓂᖕᒋᓪᓕ ᕿᑎᖕᒥᐅᓂᑦ 60 ᐳᓴᓐᑎᐅᓚᐅᕐᔓᑎᒃ. ᐊᖑᓇᓱᒃᑕᐅᓪᓗᐊᑕᓚᐅᕐᑐᑦ ᕿᑎᕐᒥᐅᓂᑦ 2013−ᒥᑦ 2019−ᒧᑦ ᐊᓯᔾᔨᕐᓯᒪᓗᐊᖅᑰᔨᙱᑦᑐᖅ (ᒫᓃᖕᒋᓐᓇᐸᓗᒃᑐᑦ 13 ᐊᒃᔕᒃᑕᑦ/ᐊᕐᕘᒍᒧᑦ) ᐊᒥᓱᕈᕆᐊᕘᕐᔪᑯᓗᒃᔓᑎᒃ ᑭᖑᓪᓕᐅᔪᓂᑦ ᐱᖕᒐᓯᓂ ᐊᒃᔕᒐᓱᖕᓇᓂᑦ. ᐊᒃᔕᒃᑕᐅᕙᒃᑐᑦ ᑭᕙᓪᓕᖕᒥᑦ ᐅᓄᐃᓐᓇᕐᐸᒃᔓᑎᒃ (ᒫᓃᖕᒋᓐᓇᐸᓗᒃᑐᑦ 20 ᐊᒃᔕᑦ/ᐊᕐᕘᒍᒥᑦ) ᑕᒪᑐᒪᓂᔅᓴᐃᓐᓇᖅ. ᐊᒥᓲᓂᖕᒋᑦ ᐊᒃᔕᒃᑕᐅᕙᒃᑐᑦ ᑭᕙᓪᓕᖕᒥᑦ ᐱᐅᕐᓯᐊᒐᒃᓴᐅᔪᓐᓃᑐᐃᓐᓇᕆᐊᓕᒃ ᐊᑯᓂᐅᔪᒥ ᐅᓄᕈᓐᓃᕐᐹᓪᓕᕈᑕᐅᓇᔭᕐᓗᓂᓗ, ᑐᑭᓯᕚᓪᓕᓇᐊᖃᒻᒪᓇᓕᕐᓗᑕ ᖃᓄᐃᓕᖕᒐᓕᕐᓂᖕᒋᓐᓂᑦ ᐊᒥᓲᓂᖕᒋᑦ ᖃᐅᔨᓇᓱᒻᒪᑕᓗ ᐊᖑᓇᓱᒃᑕᐅᔭᒃᓴᓂᑦ.

Akharnik (*Ursus arctos*) **anguyauhimayunik munagiyukhat Nunavunmi**

Naittumik Titiraqhimayuq

Pidjutikhaq munagiyaangat humiliqaak nunami nayugangit, qanuritmangaat, ukiungitlu akhat anguyauvakhimayut Nunavunmi. Anguniaqtiit apiyauvakhimayut utiqtitiqulutik aglirungmik niaquanikluuniit tamaat, niqainarmik, mikiyumik amingmik mitquqaqtumik (2X5cm), tunilugitlu anguhiqiyiit anguyainik naunaitkutingnik (ublua, nayugaani, hunavalungniklu) nunalaanun Angihiqiyiqi Havaktinun ihumagigiaqagumik taimailiugiaqaqtun. Kigutingnik uuktuutikharnik hanaqiyauvaktun naunaiyaiyaangat ukiungit akhat. Atautimi 232nik akharnik ilitugipkaktauvakhimayut anguyauvakhutik talvuuna 2013mi 2019mun, 93nik Kitikmeotmi 139nik Kivallirmi. Akhat anguyauvakhimayut uataani Kitikmeotmi, nayugaani Kugluktuk, Iqaluktuutiami, pitquhirnirmilu aulaviingit aulaayuktunun talvanga Iqaluktuutiami Kingaotmi nayugaini. Arviat hamanilu Qamanittuaq tugliuyut amigainirit ikayuutait atautimun anguniaqtamingnun Kivallirmi.

Anguyauvakhimayut akhaanuat (akhaanuat) Kivallirmi ilagiyaingitlu akhat anguyauvakhimayut 34pusamik, taima ilangani akhat Kitikmeotmi anguyauvaktun 60 pusanmik. Naunairutiqaqtun anguyauvakhimayut Kitikmeotmi 2013mi 2019mun aulaluangituq (13nik akharnik anguyauvakhimayut ukiurmi) amigairyumiqhimayut talvuuna kinguligiikhimayunik pingahunik anguniarnirmi. Akhat anguyauvakhimayut Kivallirmi aulahimaaqhimayut amigaitunik (naunairutiqaqtunik 20nik akharnik ukiumi) talvuuna mikhaatigun atuqtaini. Nampangit akhat anguyauhimaaqtun Kivallirmi atuguminairniaqtuq hivunirmi ikikliyumirniaqtun, naunaiyainiq pidjutikharnik ihuaqtumik ilituqhaiyaangat kihititirutikhangit amigaitilaangit naunaiyaiyaangat anguniaqtauhimayut qullirutikhangit.

Surveillance des prises de grizzlis (*Ursus arctos*) **au Nunavut**

Sommaire

Le but de cette initiative est de surveiller la distribution géographique des récoltes de grizzlis au Nunavut ainsi que leur répartition en ce qui concerne le genre et l'âge. Les chasseuses et chasseurs de grizzlis ont été invités à donner à leur agente ou agent de conservation soit la mâchoire inférieure ou le crâne entier ainsi qu'un morceau de muscle et un petit morceau de fourrure (2 cm x 5 cm) prélevés de leur prise, de même qu'à fournir, sur une base facultative, des renseignements sur leur prise (date, emplacement, etc.). Les échantillons dentaires ont été analysés pour déterminer l'âge des sujets. Pour les récoltes faites de 2013 à 2019, le nombre de prises rapportées s'élève à 232 grizzlis, dont 93 récoltés dans la région du Kitikmeot et 139 dans la région du Kivalliq. Les prises ont majoritairement été récoltées dans l'ouest du Kitikmeot, aux alentours de Kugluktuk et de Cambridge Bay, de même que le long du parcours traditionnellement emprunté pour se déplacer entre la région de Cambridge Bay et celle de Bathurst Inlet. Quant à Arviat et à Baker Lake, dans la région du Kivalliq, elles figuraient au deuxième rang parmi les grands contributeurs à la récolte totale.

Par ailleurs, dans le Kivalliq, la majorité des grizzlis récoltés faisaient partie de la catégorie des jeunes (dits immatures) alors que les adultes comptaient pour 34 % des prises; dans la région du Kitikmeot, les sujets adultes représentaient 60 % des prises. Pour la période de 2013 à 2019, la récolte moyenne au Kitikmeot semble avoir été relativement stable, avec 13 grizzlis par an, mais être en légère augmentation depuis les trois dernières saisons de chasse. La récolte dans la région du Kivalliq pour cette même période est demeurée assez élevée, la moyenne étant de 20 grizzlis par an. La pratique actuelle en ce qui concerne la récolte de grizzlis dans la région du Kivalliq pourrait ne pas être durable à long terme et entrainer un déclin de la population, d'où la nécessité de bien en comprendre la situation et de déterminer des quotas de récolte viables.

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1.0 Introduction

Nunavut represents the northeastern edge of grizzly bear (*Ursus arctos*) distribution in Canada. Inuit observations and research indicate that grizzly bear numbers in Nunavut are either stable or slightly increasing, and the species may be expanding its range eastward and northward (Clark, 2007, Nirlungayuk 2011, Dumond et al. 2015). Grizzly bears are listed as a species of Special Concern under the federal *Species at Risk Act* (*SARA*) and are an important part of subsistence hunting by Inuit for both food and cultural purposes. There are limited baseline data on grizzly bear distribution and density within Nunavut, in part because of the cost and challenge of surveying bears at low densities in remote areas.

Currently, Inuit are able to harvest grizzly bears for subsistence use and in defense of life and property with no restrictions. For several years, hunters in the Kitikmeot have reported an increase in bear sightings and the occurrences of bears in new areas (e.g. Victoria Island) and Inuit hunters suggested predation as a potential contributing factor in current caribou declines. Increasing grizzly bear populations was identified as a threat to caribou recovery. Similarly, hunters from Arviat, Baker Lake and Rankin Inlet have observed increasing grizzly bear numbers and voiced their concerns over problem bears around communities, at cabins, meat caches and regard grizzly bears as a problem animal. Consequently, organizations from both regions have requested increases to their grizzly bear sport hunting limits. The Nunavut Wildlife Management Board (NWMB) regulated the non-resident/non-resident foreigner sport hunt of grizzly bears by an annual quota of 10 for the Kitikmeot region and 10 for Kivalliq region in 2018. In June 2019, the NWMB increased the annual sport hunt quota for the Kitikmeot region from 10 to 15 tags. Existing quotas for sport hunting were set based on historical sport hunt limits that were in place before Nunavut became a separate territory. Grizzly bears on the tundra exist at low densities, breed late in their life, have small litter sizes, long birth intervals, and therefore as a result of their conservative reproductive strategies, are not likely to support high subsistence and sport hunting at the same time.

Although territory-wide surveys have not been conducted, in 2008-2009, the Department of Environment (DOE) estimated a density of 5.6 bears/1,000 km^2 in the vicinity of Kugluktuk and the Bluenose East caribou herd calving grounds using a systematic DNA sampling grid. This estimate is higher than the previous estimated density of 3.5 bears/1,000 km^2 at the North Slave/Kitikmeot boundary (McLoughlin and Messier 2001). Density of bears at the regional level is unknown. No reliable current or historic estimates of population size exist for grizzly bears in the Kivalliq. Ongoing studies to determine population status and trend will provide local estimates to extrapolate to territorial estimates. Monitoring of grizzly bear harvest numbers, sex and age composition of the harvested bears is fundamental to the conservation of the species and its sustainable use.

2.0 Methods

Subsistence harvesting reports are voluntary and, with few exceptions, hunters have been reporting the harvest with good return rates to-date. Hunters in the Kivalliq and Kitikmeot regions were asked to return the lower jaw or whole skull, a piece of muscle, a small piece of the skin with hair (2x5cm), and to provide kill information (date, location, etc) to their local Conservation Officer for each harvested grizzly bear. To determine the age of the harvested individuals, we sent the first premolar (lower PM1) to Matson's Laboratory LLC (Milltown, MT,USA) for cementum analysis. This technique is based on the cyclic nature of cementum growth in teeth forming annular patterns of different darkness depending on the season (Matson 1981). Age results from the 2018-2019 season have not been received yet and this season is therefore excluded from all analysis presented in this report which take in consideration the age of the individuals.

3.0 Results and Discussion

A total of 232 grizzly bears were reported harvested from 2013 to 2019 harvest seasons, 93 (males = 80, females = 12 and unknown sex = 1) from the Kitikmeot and 139 (males = 103, females = 31 and unknown sex = 5) from the Kivalliq region (Fig. 1).

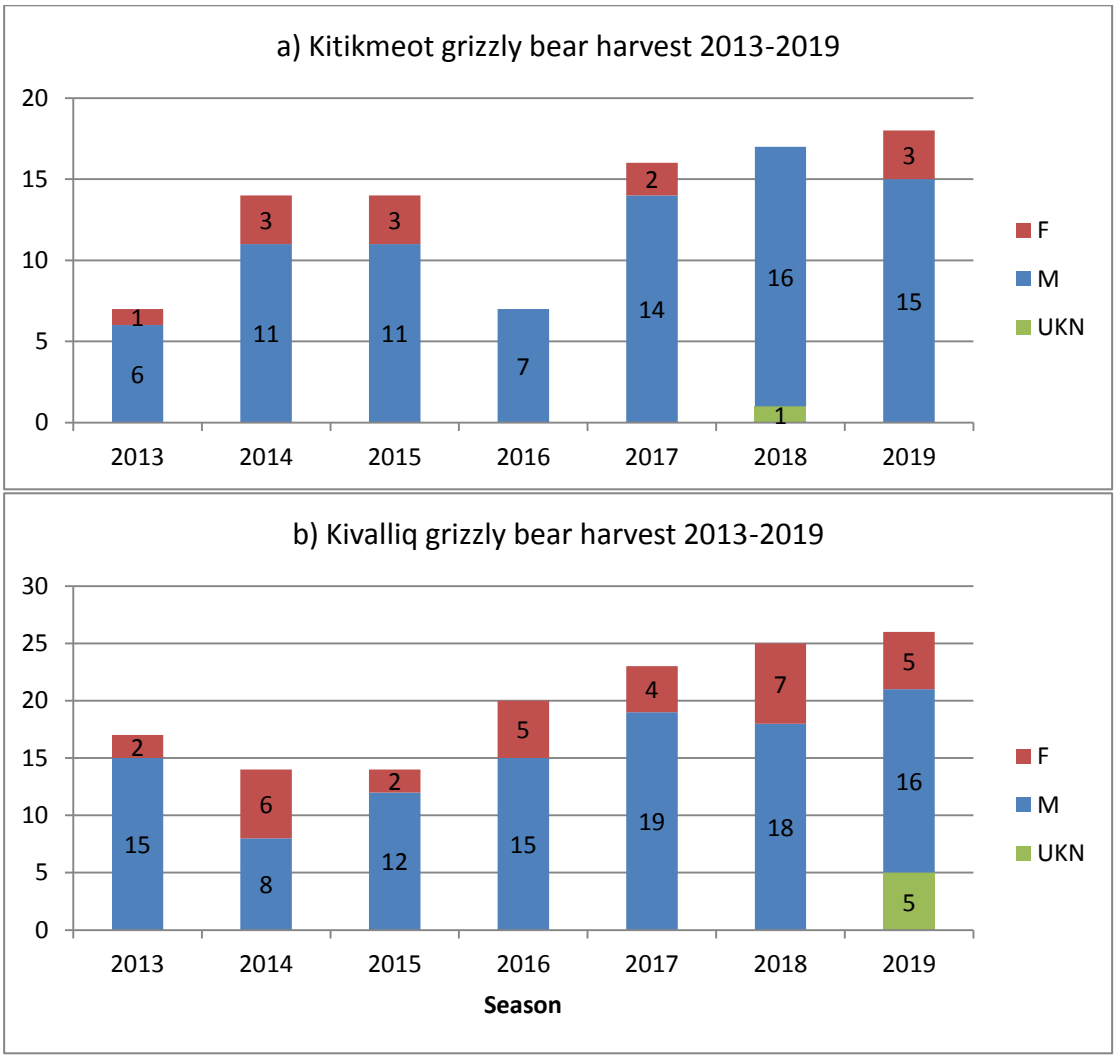

Figure 1: Proportion of males and females in reported harvest in Kitikmeot (a) and Kivalliq (b), from 2013 to 2019.

The known harvest, by region and community is summarized in Table 1. Most grizzly bears were harvested in the western Kitikmeot, in the vicinity of Kugluktuk, Cambridge Bay and along the traditional travel route from the Cambridge Bay to the Bathurst Inlet area, and few in the eastern communities. Arviat and Baker Lake were the highest contributors to the total harvest in the Kivalliq region (Fig. 2).

Table 1: Reported grizzly bear harvest in Kitikmeot and Kivalliq regions between 2013 and 2019. RH = Regular Hunt, SH = Sport Hunt.

Community	2013		2014		2015		2016		2017		2018		2019	
	RH	SH	RH	SH	RH	SH	RH	SH	RH	SH	RH	SH	RH	SH
Cambridge Bay	2	3	4	5	3	5		2	8	3	4	2	6	4
Kugluktuk	1	1	5	-	4	2	5	-	5	-	7	3	7	1
Taloyoak	-	-	-	-	-	-	-	-	-	-	1	-	-	-
TOTAL KITIKMEOT	3	4	9	5	7	7	5	2	13	3	12	5	13	5
Arviat	11	-	11		6		10		14		10	-	10	2
Baker Lake	3	-	3		8		7		7		10	-	11	-
Chesterfield Inlet	1	-	-	-	-	-	-	-	2	-	1	-	-	-
Naujaat	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Rankin Inlet	2	-	-	-	-	-	3	-	-	-	1	-	1	1
Whale Cove	-	-	-	-	-	-	-	-	-	-	2	-	1	-
TOTAL KIVALLIQ	17	-	14	-	14	-	20	-	23	-	25	-	23	3

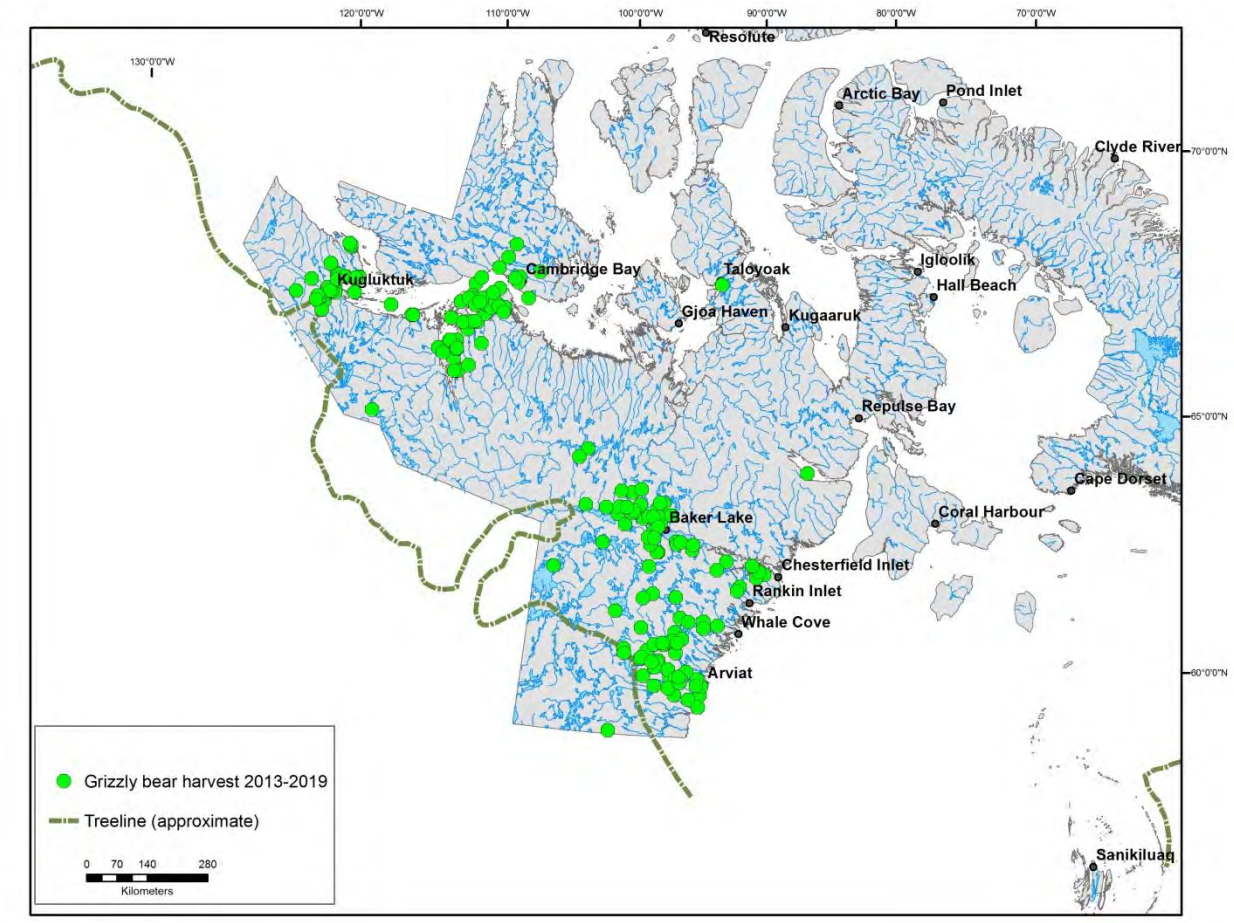

Figure 2. Distribution of reported grizzly bear harvest in Nunavut, from 2013 to 2019.

Long-term reported harvest trend of 15 years (2005-2019) shows that in the Kitikmeot region, the number of grizzly bears harvested has been relatively stable (13 bears/year) with a slight increase in the last three seasons where 16, 17, and 18 bears were harvested in 2017, 2018, and 2019 seasons respectively. Grizzly bear harvests in the Kivalliq have increased substantially since 2008. From 2000 to 2008, the harvest averaged 6 bears annually. Over the last 10 years, harvest then increased considerably to an average of 20 bears harvested annually between 2010 and 2019 (Fig. 3)

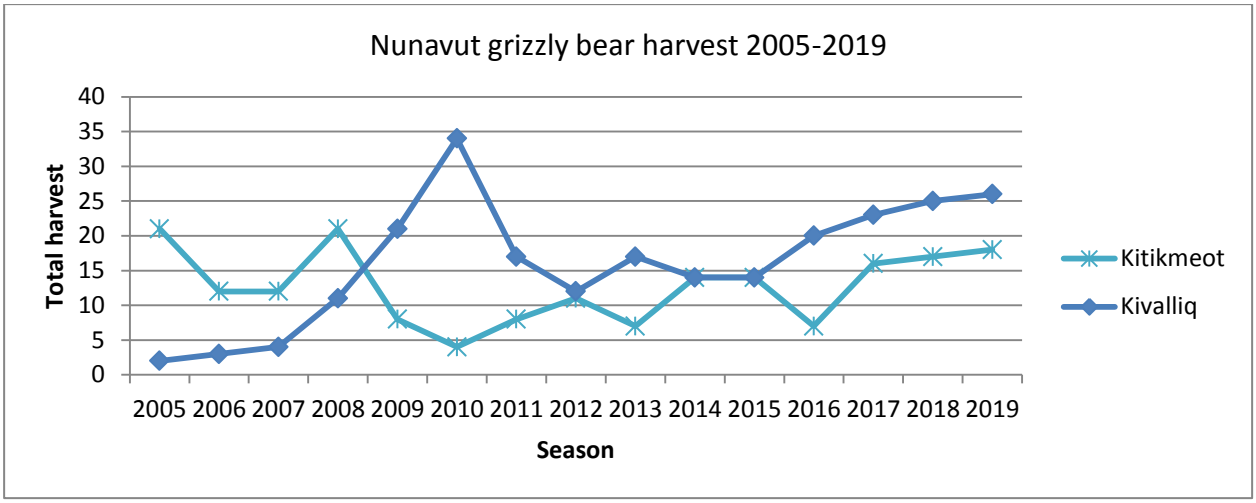

Figure 3: Reported grizzly bear harvest in Kivalliq and Kitikmeot regions between 2005 and 2019.

The male to female ratio in the harvest has been relatively stable for the last 15 years in the Kitikmeot region with males and females representing an average of 89% and 11% of the total harvest respectively (Fig.4). Males composed >80% of the harvest for the last 15 years, indicating a stable and healthy population.

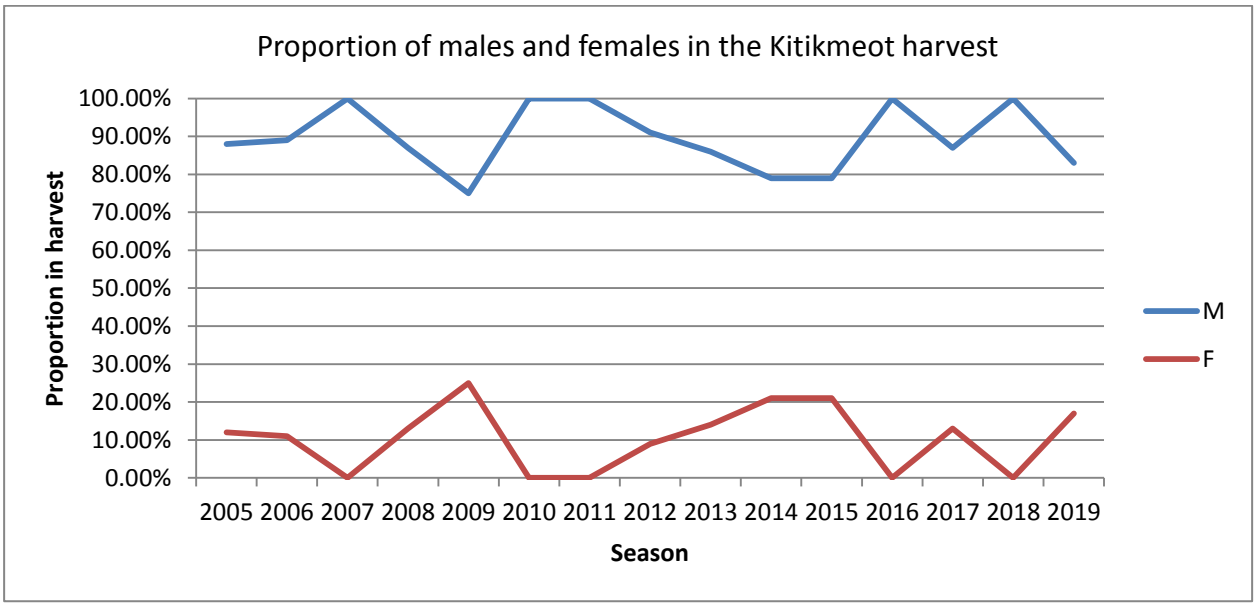

Figure 4: Proportion of males and females in reported harvest in the Kitikmeot region, from 2005 to 2019.

In the Kivalliq, a similar pattern can be observed up to 2009 with an average of 82% and 18% of males and females respectively in the harvest. Recently, the proportion of females in the Kivalliq harvest has increased to 32% and 71%, for the 2010 and 2011 seasons respectively, before dropping back to average 23% from 2012 to 2019 season. A decline in the percentage of males taken in the 2011 harvest suggests fewer males are present (Fig. 5).

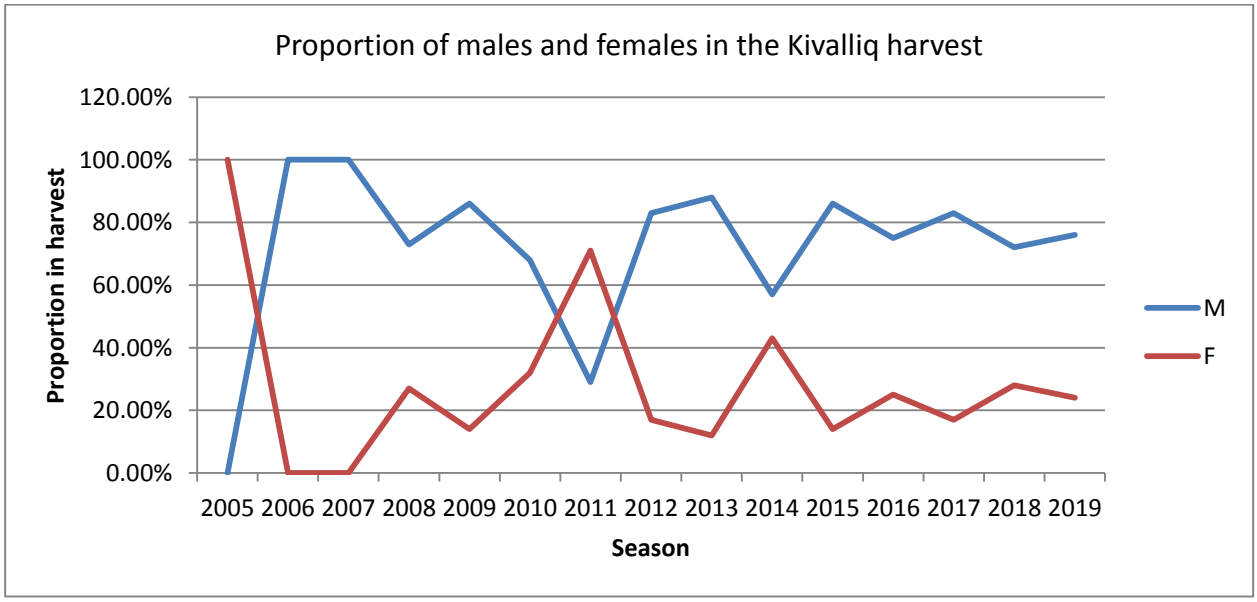

Figure 5: Proportion of males and females in reported harvest in the Kivalliq region, from 2005 to 2019. The reported harvest for 2005 is only one female.

The ages of harvested grizzly bears in Kitikmeot region ranged from 2 year to 19 years (Fig. 6). The oldest male (19 years) was killed by a sport hunter in 2013 in Bathurst Inlet area.

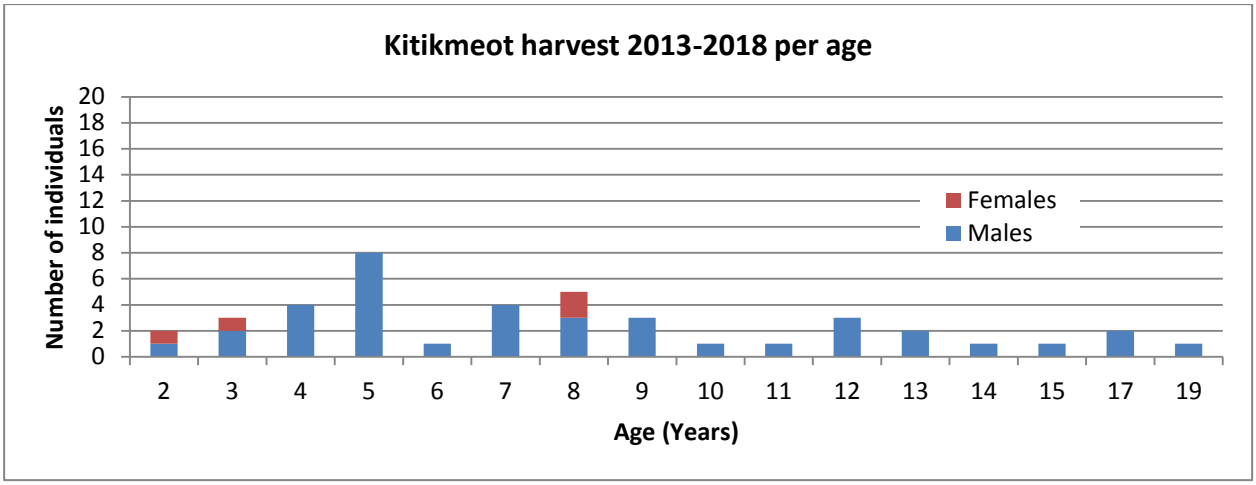

Figure 6. Age and sex structure of the reported Kitikmeot grizzly bear harvest, from 2013 to 2018.

The ages of harvested grizzly bears in Kivalliq region ranged from 1 year to 32 years (Fig. 7). The oldest female (32 years) was harvested in May 2013 about 140 km northwest of Arviat.

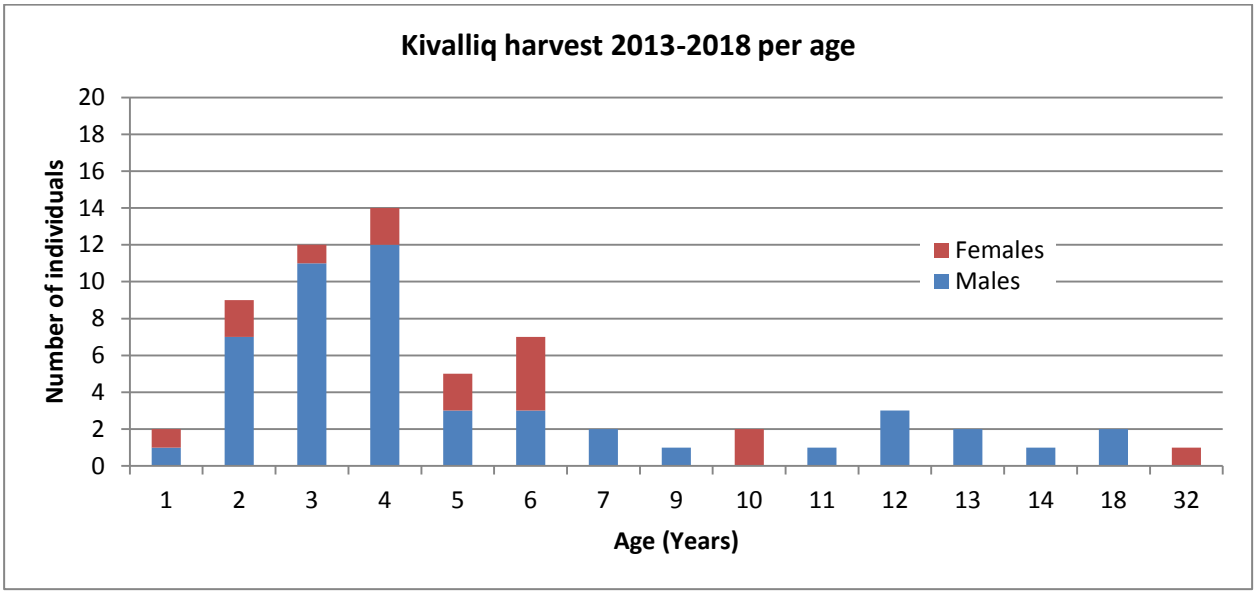

Figure 7. Age and sex structure of the reported Kivalliq grizzly bear harvest, from 2013 to 2018.

The average age of the grizzly bears harvested from 2013-2018 in the Kitikmeot was 7.97 (n = 42) years old, compared to 5.89 (n = 64) years old in the Kivalliq for the same period. The proportion of adults in the Kivalliq harvest was 34%, while proportion of adults in Kitikmeot harvest was 60% (Fig. 8).

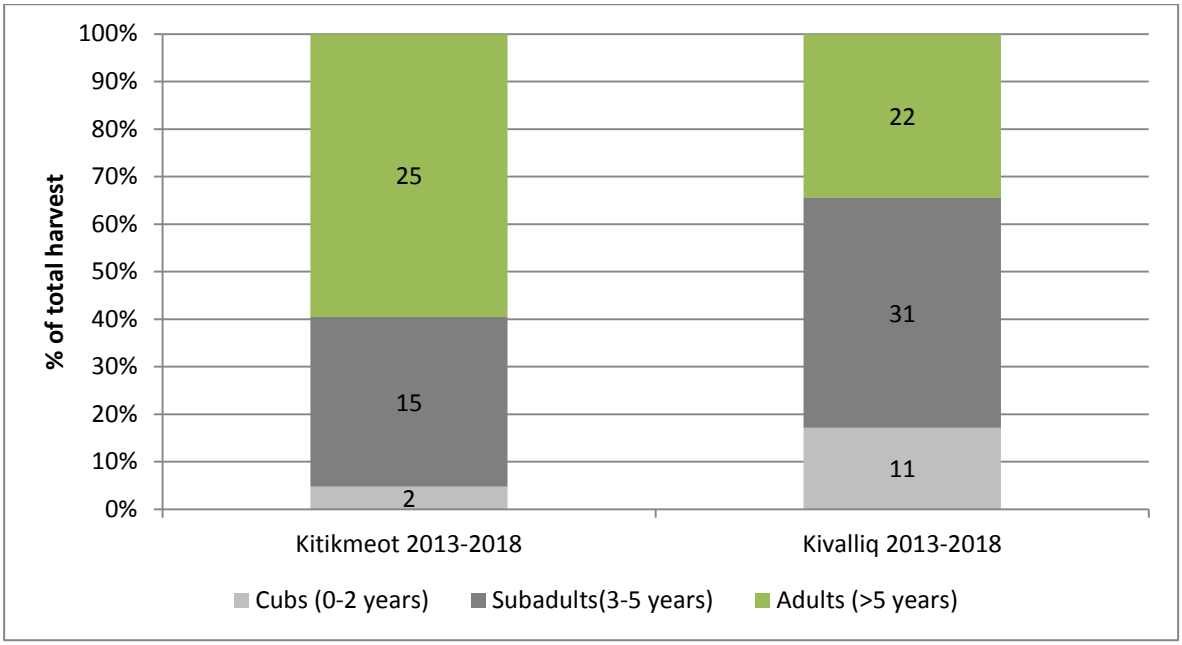

Figure 8: Proportion of age classes in the Kitikmeot and Kivalliq reported harvest, from 2013 to 2018.

Kitikmeot

The average harvest in the Kitikmeot from 2013 to 2019 appears to be relatively stable (average of 13.2 bears harvested/year) with a slight increase in the last three hunting seasons. In 2019 the reported harvest was 18 bears, continuing a trend of increasing harvest that began in 2017. It is usually agreed that an annual human-caused mortality of 2-3% is a safe management goal for most northern grizzly bear populations (Sidorowicz and Gilbert 1981, McLoughlin et al. 2003). Density of grizzly bears was estimated at approximately 5 bears/1,000 km^2 around Kugluktuk in the western Kitikmeot (Dumond et al., 2015), and 3.5/1,000km^2 around Lac des Gras, at the North Slave/Kitikmeot boundary (McLoughlin and Messier 2001). Based on those

densities and the demographic parameters of barren ground grizzly bears in the Kitikmeot region, McLoughlin and Messier (2001) suggest that a total removal of a maximum of 15 bears per year should be sustainable for that region. The current harvest thus appears to be within the recommended limits and should result in a stable population.

In the Kitikmeot region, grizzly bears are being harvested both as part of traditional/subsistence activities and as part of commercial activities (sport hunts). It is mainly males that are currently being harvested, constituting on average 89% of the harvest (2005-2019). The large home range of males compared to females, and the fact that their highest movement rates happen during spring probably increase their vulnerability to harvest which happens mostly in this same time of year (den emergence to end of June) (McLoughlin et al. 1999). The continuous high proportion of males in the Kitikmeot harvest indicates that the population seems to support relatively well the current harvest despite the continuous strong bias towards the removal of males.

The average age and age distribution of the 2013-18 harvest is comparable to the long-term average and appears to be relatively well distributed among the whole range of age. This also seems to point towards a stable population and a sustainable current harvest.

Kivalliq

Similarly to the Kitikmeot region, the sex ratio in the Kivalliq harvest has historically been biased towards males representing approximately >80% of the total harvested individuals up to 2009, however, the proportion of females increased to 32% in 2010 and 71% in 2011. The recent increase in the proportion of females in the Kivalliq harvest is concerning, but it seems that this occasional harvest is not a long term conservation concern. The grizzly bear harvest in the Kivalliq should however continue to be monitored closely to ensure the durability of this population for future generations.

Grizzly bears generally exist at low densities, breed late in their life, and have small litter sizes and long birth intervals. In addition, grizzly bears need large areas of undisturbed land. The barren ground grizzly bear has the largest home range size documented with an annual range for males of 7245 km^2 and for females 2100 km^2 (McLoughlin et al. 2003).There is concern that the cumulative effects of various human-caused mortalities and increasing development on the land may cause the grizzly bear population to decline in Nunavut.

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