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Building *Nunavut* Together
Nunavut liuqatigiingniq
Bâtir le *Nunavut* ensemble

WOLVERINE (*Gulo gulo*) HARVEST MONITORING IN NUNAVUT

Summary report

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Summary

Overall, Nunavut hunters submitted skulls and kill information from 691 harvested wolverines between 2019 and 2024 harvest years (1 July 2023 –30 June 2024 = 2024 harvest year). Most wolverines were harvested in the Kitikmeot region, in the vicinity of Kugluktuk, while relatively fewer were harvested in the eastern communities. Arviat and Baker Lake were the next highest contributors to the total harvest. Harvest data shows that 84% of wolverines were hunted with a rifle, while 16% were trapped. Sex ratio of the harvest was male biased with approximately two times as many males harvested than females. Juveniles and yearling predominated as 63% of the harvest while the other 37% were adults. The harvest was dominated by younger age classes during the early winter, while the harvest of adult individuals increased later in the winter. The spatial distribution, age, and sex structure of the harvest were typical of a healthy population. However, the relatively low number of mature females in the harvest is important to note and should be monitored closely.

Qalvik (*Gulo gulo*) anguniaqtunun munaridjutikhaq Nunavunmi

Naittuq Naunaijauti

Tamainun, Nunavunmi anguniaqtut tujuqtut niaqunik humilu tuquhimajatigut kangiqhidjutit hamanga 691 anguniaqtaujut qalviit qitqani 2019 unalu 2024 anguniarutini ukiuni (1 Taaqhivalirvia 2023 –30 Imaruqtirvia 2024 = 2024 anguniaqvingmi ukiungani). Tamavjaita qaviit angujaujut Kitikmeot aviktungnianin, qanilruani Kugluktup, ikitut angujaujut kivataanin nunallaanin. Arviat hamani lu Qamanittuaq tugliujut amigainirit ikajuutait atautimun anguniaqtamingnun. Angunianikkut naunaijautit takunaqtut tapkua 84 pusat qalviit hiqutikkut tuquhimajut, imaalu 16 pusat naniriaqhimajut. Qanuriniitigut amigainirit angujaujut angutiluat naamavjaktuq malruiqtughugu amigainiit angutit angujauluaqtut angnalurnin. Qalviat angujaujut imaa 63 pusat anguniaqtaujut aallat 37 pusat ininirit. Angujaujut amigaitqijaujut qalviat ukiungitigut naunaijaqhimajut ukiuq atulihaaqtilugu, angujaujut ininirnit atautit amigairjuumijun nungutinnagu ukiumi. Ilaujut tunijaujut, ukiungit, qanuriniit qanuqtut anguhimajut aanniaqtuqangitut. Kihimi, ikitpalaat qaffiuniit angnaluit angujaujuni aghuungnaqtut ilihimalugit munarijaujukhallu qanitukkut.

Contrôle de la récolte de carcajou (*Gulo gulo*) au Nunavut

Résumé

En tout, les adeptes de la chasse du Nunavut ont remis les crânes et les données provenant de 691 prises de carcajous lors des années de récolte de 2019 à 2024 (à titre indicatif, l'année de récolte de 2024 s'étend du 1^{er} juillet 2023 au 30 juin 2024). La majeure partie de la récolte a eu lieu dans la région du Kitikmeot, aux environs de Kugluktuk, alors que le nombre de carcajous récoltés dans les localités de l'est était relativement peu élevé. Arviat et Baker Lake figuraient au deuxième rang parmi les grands contributeurs à la récolte totale. Les données de récolte révèlent que 84 % des carcajous ont été chassés au fusil et 16 % ont été piégés. Le ratio mâle-femelle de la récolte était biaisé en faveur des mâles, qui en représentaient environ les deux tiers. Les jeunes carcajous et les petits d'un an constituaient la majeure partie de la récolte, représentant 63 % des prises alors que les prises adultes en représentaient 37 %. En préhiver, les carcajous récoltés provenaient surtout de la population de jeunes, et c'est aux mois de mars et d'avril qu'on a vu une croissance de la récolte d'adultes. La répartition spatiale, l'âge et la répartition par sexe de la récolte étaient caractéristiques d'une population en bonne santé. Cependant, on souligne que la récolte comportait un nombre relativement peu élevé de femelles adultes, et cette population devrait faire l'objet d'une surveillance étroite.

Table of Contents

1.0 INTRODUCTION.....1

2.0 METHODS3

3.0 RESULTS AND DISCUSSION.....4

4.0 ACKNOWLEDGMENTS.....12

5.0 LITERATURE CITED.....13

List of Figures

Figure 1. Reported wolverine harvest in Nunavut, from 2019 to 2024. 4

Figure 2. Distribution of reported wolverine harvest in Nunavut, from 2019 to 2024..... 5

Figure 3. Wolverine reported monthly harvest in Nunavut, from 2019 to 2024. Label indicates total number of wolverines harvested per month.. 6

Figure 4. Age and sex structure of the reported wolverine harvest in Nunavut, from 2019 to 2023..... 7

Figure 5. Monthly reported wolverine harvest per age class in Nunavut, from 2019 to 2023..... 10

List of Tables

Table 1. Male to female sex ratio by age in the reported wolverine harvest in Nunavut, from 2019 to 2023.....8

Table 2. Age and sex distribution of reported wolverine harvest in Nunavut, from 2019 to 2023.....9

1.0 Introduction

For thousands of years, Inuit have relied on the harvest of wildlife for food, clothing, and trade. In Nunavut, the furbearer harvest for clothing and for income is a seasonal and traditional activity, where opportunities for other employment are scarce. Under the Nunavut Agreement, furbearer harvest rights are held by Inuit beneficiaries, non-Inuit who harvested furbearers legally in Nunavut settlement area prior to 1981, and non-Inuit whose application has been approved and recommended by local Hunters and Trappers Organizations (HTOs).

In Nunavut, wolverines (*Gulo gulo*) occupy almost all areas of the territory and are classified as both a furbearer and a big game animal under the Nunavut Agreement. They are an important furbearer in Nunavut's culture and economy and have traditionally been considered a vital resource for hunters because of the beauty and frost resistant properties of the fur, which make it unique and quite valuable (Hash 1987). Wolverine fur is highly prized in local communities as ruffs or trims on parkas (Cardinal 2004). Unlike most provinces, hunters and trappers in Nunavut do not have registered or traditionally exclusive family trap lines or hunting areas, so wolverines are generally harvested opportunistically wherever people travel (Mulders 2000) or harvested while hunting other game. Wolverine hunting in Nunavut is mainly by firearms from snow machines while in other provinces trapping is the major method (Lee 2016).

Wolverine densities are believed to be moderate in the western mainland of Nunavut but low on the Arctic islands and in the eastern mainland (Slough 2007, Species at Risk Committee 2014). Using DNA-based mark-recapture, Awan and Boulanger (2016), Awan et al. (2018) estimated density from 1.6 to 4.4 wolverines/1,000 km² in the Kivalliq region and 4.14 wolverines/1,000 km² in the Napaktulik Lake area in the Kitikmeot region (Awan et al. 2020). Inuit observations and recent harvest reports suggest that wolverine numbers in Nunavut are either stable or slightly increasing, and the species may be expanding its range eastward and northward (Awan et al. 2012, COSEWIC 2014). The wolverine has been assessed as a species of Special Concern in Canada

and in 2018 was listed as the same under the *Species at Risk Act (SARA)*. The wolverine is generally described as a scavenger (Banci 1987) and an opportunistic predator throughout its range, occurs in low densities, have low birthing and recruitment rates, are sensitive to human disturbance, and require large secure areas to maintain viable populations (Magoun 1985, Mattisson et al. 2011). It is considered a wilderness species and potential indicator of ecosystem health (Carroll et al. 2001). Mulders (2000) suggests that the arctic tundra contains large undisturbed tracts of habitat that may act as reservoirs to maintain harvestable populations of wolverine in Nunavut.

Nunavut contributes substantial numbers to the national harvest even though ecological data for tundra wolverine are sparse, especially in the northeastern edge of the species distribution. Currently, there is no quantitative limit on their harvest by Inuit and there is no requirement for hunters to report their harvest. The only mechanism for tracking the harvest or pelts is the Government of Nunavut's Department of Environment (GN-ENV) fur-pricing program, which misses pelts, which are used locally or sold as raw frozen wolverine hides privately; the actual harvest is unknown. The current collection of wolverine skulls and kill information is an attempt to estimate the harvest, to monitor the age and sex of the harvest.

2.0 Methods

Each year we obtained the skull and a small piece of skin (~2.5 x 2.5 cm) with fur from hunters with the assistance of HTOs and Conservation Officers (COs). Hunters across Nunavut voluntarily reported and provided skull and skin samples from harvested wolverines via their local COs. A \$50 subsidy was provided to hunters for each skull brought back to the COs office to encourage the reporting and return of samples. Recently, increased activity in the online buying and selling of wolverine skulls has led to less reporting under this program. The online skull buyers offer higher prices for skulls than our subsidy amount of \$50. From January 2025 GN-ENV increased the subsidy amount to \$100 per wolverine.

For each wolverine sample collected during the course of this study, COs filled out sample collection forms with information from hunters about the harvest location, date, wolverine sex, and method of harvest, and their opinion of the current abundance trend of the local wolverine population (decreasing, stable or increasing). The skinned skulls were stored frozen, and were thawed at room temperature for examination in early May each year. We extracted a lower canine and sent to Matson's Laboratory LLC (Milltown, MT, USA) for age estimation using 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).

Following Banci and Harestad (1988) and Vangen et al. (2001), individuals were then grouped into three age classes: juvenile (0-1 year, date of birth is set to March 1st), yearling (1-2 years) and adult (≥ 2 years).

3.0 Results and Discussion

A total of 691 wolverines were reported as harvested from July 2018 to June 2024, 397 from the Kitikmeot, 290 from the Kivalliq and 4 from the Qikiqtaaluk region (Igloodik and Sanirajak) (Fig. 1). According to our sample collection program, reported wolverine harvest in Nunavut has been fluctuating and the harvest report rate for this period (2019-24) appears to be lower compared to early 2000s in the Kitikmeot region (Awan et al. 2012).

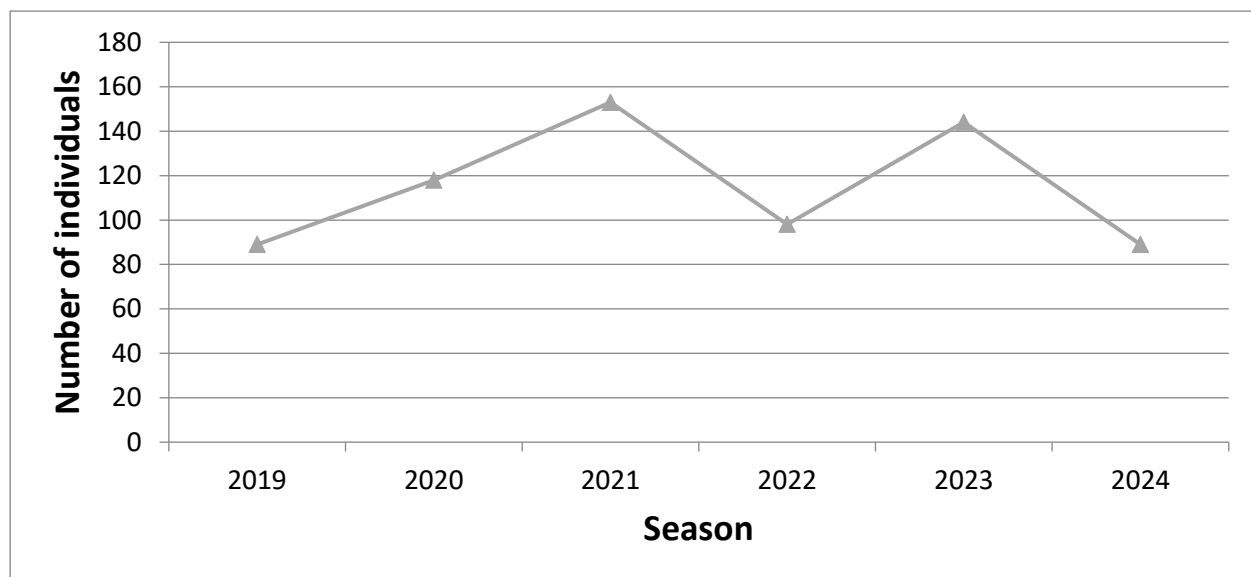


Figure 1. Reported wolverine harvest in Nunavut, from 2019 to 2024. Note that the harvest year is assigned as the year at the end of the regulations' harvesting season, for example, 1 July 2018–30 June 2019 = 2019 harvest year.

The harvest was unevenly distributed throughout the territory, with most wolverines having been harvested in the western Kitikmeot. Harvest in the vicinity of Kugluktuk was particularly intense, and along the traditional travel route from the Kugluktuk to the Contwoyto Lake. Relatively fewer wolverine were harvested in the eastern communities,

while Arviat and Baker Lake were the next major contributors to the total harvest (Fig. 2). Comparatively, high wolverine harvest happening out of Kugluktuk, when the caribou herds wintered nearby, was due to hunters spending more time on the land to hunt caribou. While hunting caribou, harvesters usually pursued wolverine when they saw wolverine or found fresh tracks.

Wolverine harvest distribution shows that harvest took place over a wider range on the Nunavut mainland, but it tended to be concentrated near communities. The surrounding areas without hunting may act as refugia or reservoirs that produce wolverines that move into the hunted areas and sustain the harvest (Mulders 2000, Lee 2016).

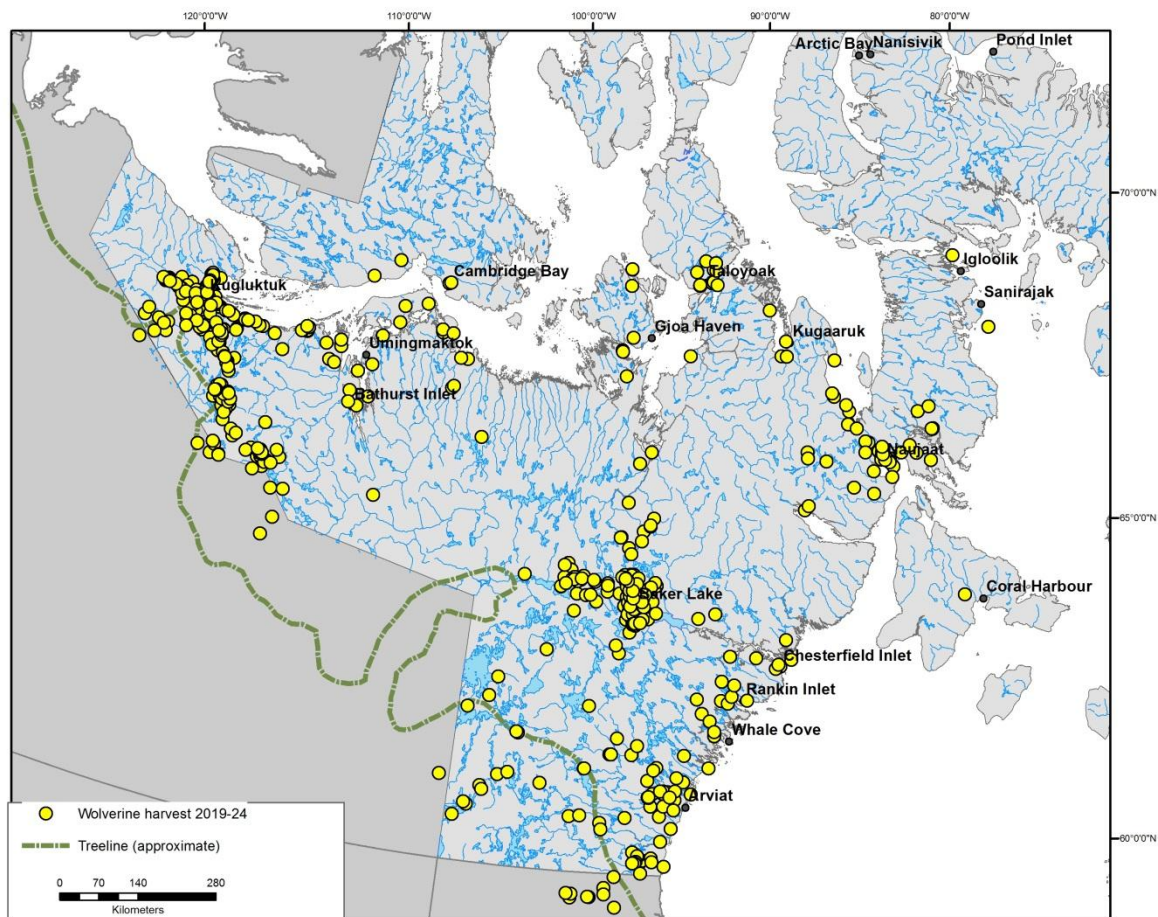


Figure 2. Distribution of reported wolverine harvest by Nunavut hunters from 2019 to 2024. Symbol may represent >1 wolverine harvested at that location.

Most wolverines were harvested between November and April each year (Fig. 3), when the fur is in prime condition. Harvest data shows that approximately 84% of wolverines were hunted with a rifle and 16% animals were trapped. Of the trapped animals ($n = 109$), 94% were killed in quick-kill traps and 6% in leg hold traps. In the Kivalliq region, only five hunters trapped 12 wolverines, while in the Kitikmeot region 97 wolverines were trapped by 15 hunters.

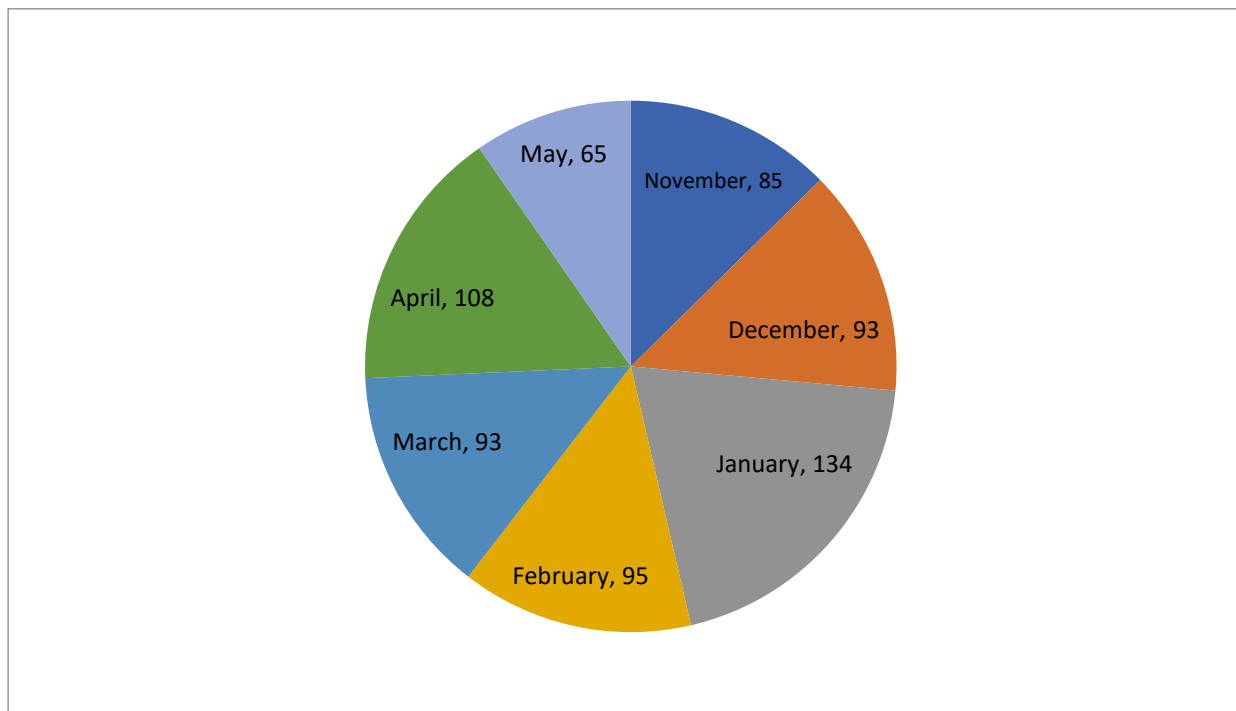


Figure 3. Wolverine reported monthly harvest in Nunavut, from 2019 to 2024. Label indicates total number of wolverines harvested per month.

The male:female ratio of the harvest was highly biased towards males (Fig. 4) with approximately twice as many males harvested than females (ratio = 1.7 and 2.1 in the Kitikmeot and the Kivalliq respectively), a typical figure for northern Canada (Mowat et al. 2020). We assumed sex ratio at birth in the population is 1:1, however, it is difficult to

distinguish if this reflects the actual sex ratio of the population or a difference in vulnerability by sex. Lee (1994) also observed a 2:1 male to female ratio in the western Kitikmeot harvest in the early 1990s. However, his observations showed a strong male bias in the younger age classes (< 2 yo) while the adult sex ratio was not different from a 1:1 ratio. Examining the sex ratio per age class since 2019 seems to show the opposite with a male to female ratio higher in the older individuals (Table 1), possibly pointing towards a diminution in mature females in the population, which will need to be monitored closely.

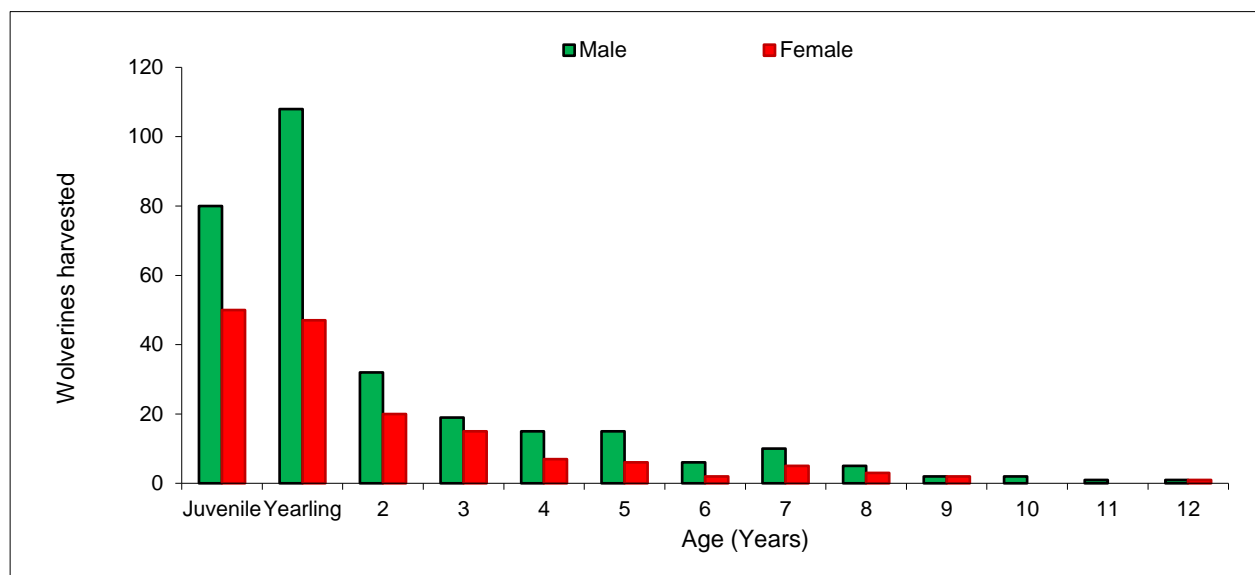


Figure 4. Age and sex structure of the reported wolverine harvest in Nunavut, from 2019 to 2023.

Table 1. Male to female sex ratio by age in the reported wolverine harvest in Nunavut, from 2019 to 2023.

Age	M:F total harvest	M:F sex ratio
Juveniles	80:50	1.6
Yearlings	108:47	2.3
2	32:20	1.6
3	19:15	1.3
4	15:7	2.1
5	15:6	2.5
6	6:2	3
7	10:5	2
8	5:3	1.7
9	2:2	1
10	2:0	-
11	1:0	-
12	1:1	1

The age distribution of the reported wolverine harvest from 2019 to 2023 is weighted more towards juvenile/yearling animals (Fig. 4). The ages of harvested wolverines ranged from <1 year to 12 years. The oldest female and male (12 years) were killed (shot) in Kugluktuk (n = 2) area in 2021 and 2022, respectively. Overall, 29% of the wolverines harvested in Nunavut during that period were juveniles, 34% were yearlings and 37% were adults (Table 2). A greater proportion of young animals in the harvest moderate the conservation risk of harvest (Mowat et al. 2020). However, the proportion of adult females in the harvest increased (13%) for this period (2019-23) compared to 2014-18 (9%, Awan 2020). Wolverine harvest appears to be biased towards younger males (Rausch and Pearson 1972, Lee 1994) probably due to their higher movement rates and vulnerability (Scrafford et al. 2024). Kukka et al. (2017, 2023) describe the high proportions of young males in the harvest to be because vacant areas created by the harvest of resident animals may be filled by dispersing young males (Magoun 1985). Others have reported long dispersal movements in yearlings from their natal area before reaching sexual maturity (Copeland 1996, Mulders 2000, Vangen et al. 2001, Inman et al. 2012) and movement of wolverines from areas with lower mortality to those

with higher mortality (Gervasi et al. 2015, 2016). The high proportion of juveniles and yearlings (63%) and the low proportion of females (36%) among adults in the harvest may signal the importance of dispersal in the population dynamics of this species within the traditional harvesting areas. Yearlings and juveniles represented 64% of the known age male harvest, in contrast to 81% reported by Lee (1994) in the Kitikmeot region in the early 1990's, and by Rausch and Pearson (1972) who also reported wolverine harvest biased toward younger males in Alaska and Yukon.

Table 2. Age and sex distribution of reported wolverine harvest in Nunavut, from 2019 to 2023.

Age Class	Sex		Total (% of total)
	Males (% of males)	Females (% of females)	
Adult (≥ 2 years)	108 (36.5%)	61 (39%)	169 (37%)
Yearling	108 (36.5%)	47 (30%)	155 (34%)
Juvenile (< 1 year)	80 (27%)	50 (31%)	130 (29%)
Total	296	158	454

Figure 5 illustrates the temporal variation in the harvest according to age class. The harvest was dominated by younger age class during the winter while the harvest of adult individuals was comparatively high in March/April, which is similar to other wolverine harvest studies (Lee 2016, Kukka et al. 2017). For males, this corresponds to the time when maximal size of testes and highest levels of testosterone are attained (Pasitschniak-Arts and Larivière 1995), probably marking the start of the breeding season and resulting in increased movements and increased vulnerability of sexually mature males for harvest.

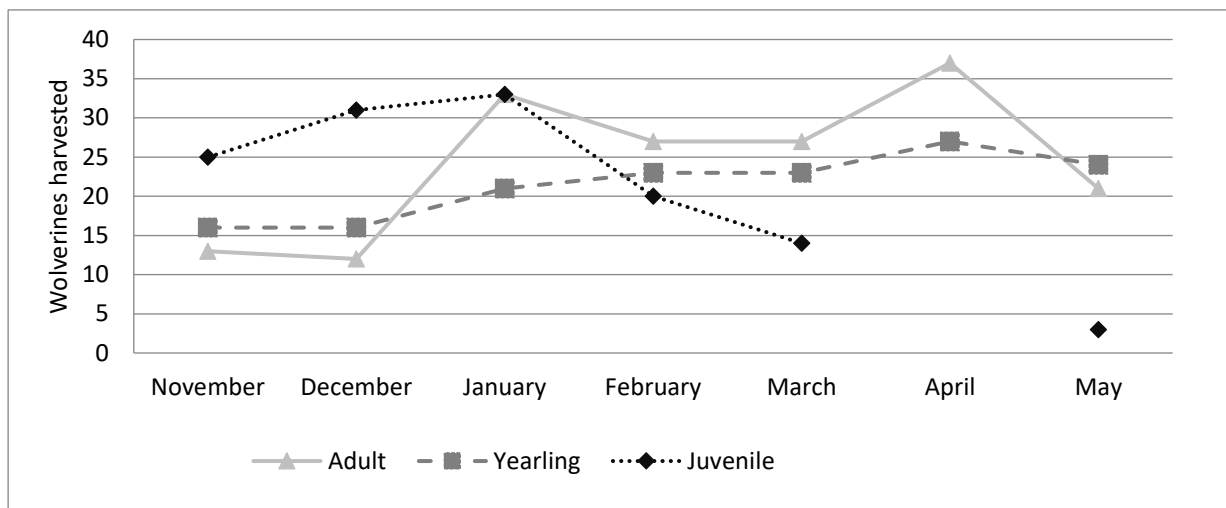


Figure 5. Monthly reported wolverine harvest per age class in Nunavut, from 2019 to 2023.

Wolverine populations in Nunavut are considered healthy. This seems to be supported by the sex and age distribution of the harvest. However, the relatively low number of mature females (13%) in the harvest is important to note and should be monitored closely.

In an effort to obtain information on wolverine population relative abundance, wolverine harvesters (a hunter may provide >1 harvested wolverine to the program within and among years) were asked to answer the following question when bringing back samples to their wildlife office: “Do you think the wolverine population is decreasing, stable or increasing?”. Harvesters’ perception about trends in wolverine populations differed among regions, but majority believed that numbers were stable. In the Kitikmeot (n = 371), most respondents believed the population was stable (67% stable, 32% increasing) while most respondents of the Kivalliq (n = 255) also believed their local population was stable (61% stable, 39% increasing). However, over the long term, the increasing resource development on the tundra and climate change may adversely affect the species, which suggests a need for continuous monitoring of the health of the wolverine population. Monitoring of the wolverine population is also important as part of

predator research and management as it relates to ungulate species management in both the Kivalliq and Kitikmeot regions.

4.0 Acknowledgments

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