Yukon

SR-19-02

Status of the Joe Mountain thinhorn sheep population 2016

May 2019

Status of the Joe Mountain thinhorn sheep population, 2016

Government of Yukon
Fish and Wildlife Branch
SR-19-02

Author[s]
Troy M Hegel and Kyle Russell

Acknowledgements
We thank P. Emerson (Ta'an Kwäch'än Council), R. Giesbrecht (Laberge Renewable Resources Council), L. Jessup and H. Milligan (Yukon Department of Environment) for their assistance. TRK Helicopters (pilots R. Girard, R. Marks, and R. Stevenson) provided safe and efficient air transportation. This report was reviewed by Nicole McCutchen, Matt Clarke, and Christine Cleghorn.

Copies available from:
Environment Yukon
Fish and Wildlife Branch, V-5
Box 2703, Whitehorse, Yukon Y1A 2C6
Phone (867) 667-5721
Email: environmentyukon@gov.yk.ca
Online: www.env.gov.yk.ca

Suggested citation:
HEGEL, T. M. AND K. RUSSELL. 2019. Status of the Joe Mountain thinhorn sheep population, 2016 (SR-19-02). Government of Yukon, Whitehorse, Yukon, Canada.

Key findings

- The population of thinhorn sheep in the Joe Mountain management unit of GMZ 8 was surveyed in 2015 and 2016.
- The current non-lamb sheep population in the unit is 66 animals.
- The current 5-year average licensed harvest rate in the unit is 3%.
- In 2015, the first sheep harvested by a non-resident hunter occurred since 1996.
- At the present time, harvest is within sustainable rates in the management unit

Abbreviations

GMS	Game Management Subzone
GMZ	Game Management Zone
KDFN	Kwanlin Dün First Nation
OA	Outfitting Area
PHA	Permit Hunt Authorization
TKC	Ta'an Kwäch'än Council
TTC	Teslin Tlingit Council

page is intentionally blank

Table of contents

List of figures

List of tables

Introduction

The thinhorn sheep (*Ovis dalli*) population in the Joe Mountain area northeast of Whitehorse is a relatively small and isolated population. It is located within GMZ 8, in GMSs 8-08 and 8-12 to 8-16 (Figure 1). The primary mountain blocks on which the population is found are Joe Mountain, Mount Slim, Mount Byng, Mount Laurier, and Lime Peak. Occasional sightings have occurred on Cap Mountain and one animal was found on Gray Mountain (also known as Canyon Mountain) on the outskirts of Whitehorse. Sheep in this population are darker in color than the white Dall's sheep, and based on recent genetic analyses are an admixture (or hybrid) of Dall's (*O. d. dalli*) and Stone's (*O. d. stonei*) sheep and are considered Fannin sheep (Sim et al. 2016). Given the lack of geographic closure among mountain blocks in this area, we consider all the sheep in this area to be members of one population and thus are viewed as a single management unit. This approach is similar to that from previous survey efforts (Lortie et al. 1978).

The majority of the population is found within the traditional territories of KDFN and TKC, with the easternmost portion of its distribution, in the Mount Byng area. The population also overlaps with the traditional territory of the TTC. Much of the population's distribution is located on TKC category A and B settlement land. Industrial activity is somewhat limited in the area; however, there is an active quartz mineral claim block on the southeast region of Joe Mountain which is currently under active exploration and which directly overlaps with known sheep distribution. Access to this area is also increasing due to ORV trail proliferation extending from Whitehorse northward.

Roughly half of the sheep population occurs within OA 17, and is currently open to both resident and non-resident harvest. OA 17 bisects the population (Figure 1) and includes sheep in the eastern portion of the range (i.e., areas west of the OA boundary running north-south through Joe Mountain are outside of OA 17). From 1999-2012, OA 17 was not under operation and thus no non-resident harvest occurred during this time.

The Joe Mountain sheep population is geographically isolated from sheep to the west by Lake Laberge, from sheep to the east by the Teslin River, and sheep to the south by the Yukon River and Whitehorse. To the north, there is lower elevation terrain generally not suitable to support sheep.

The population has been infrequently surveyed. In 1976, Lortie et al. (1978) observed 48 sheep and estimated roughly 60 sheep, accounting for unobserved animals, in this area following its first formal survey. The next survey of the population occurred in 2009 (Russell and Hegel 2011) where only 22 sheep were observed; however, results from this survey were deemed unreliable given the near lack of nursery sheep observations.

Given the population's isolation, increased accessibility, increasing levels of industrial activity, and the resumption of non-resident harvest following a 10-year hiatus, there is concern regarding its status with respect to licensed harvest. This report describes results from survey work on the population over the 2015 and 2016 summer seasons to assess current harvest sustainability.

Methods

On 26 June and 13 July 2015, and 5 July 2016, the Joe Mountain sheep population was aerially surveyed via helicopter [Bell 206B (Jet Ranger)] following methods described by Hoefs and Barichello (1985). The 2015 survey was broken into two days due to poor weather conditions on

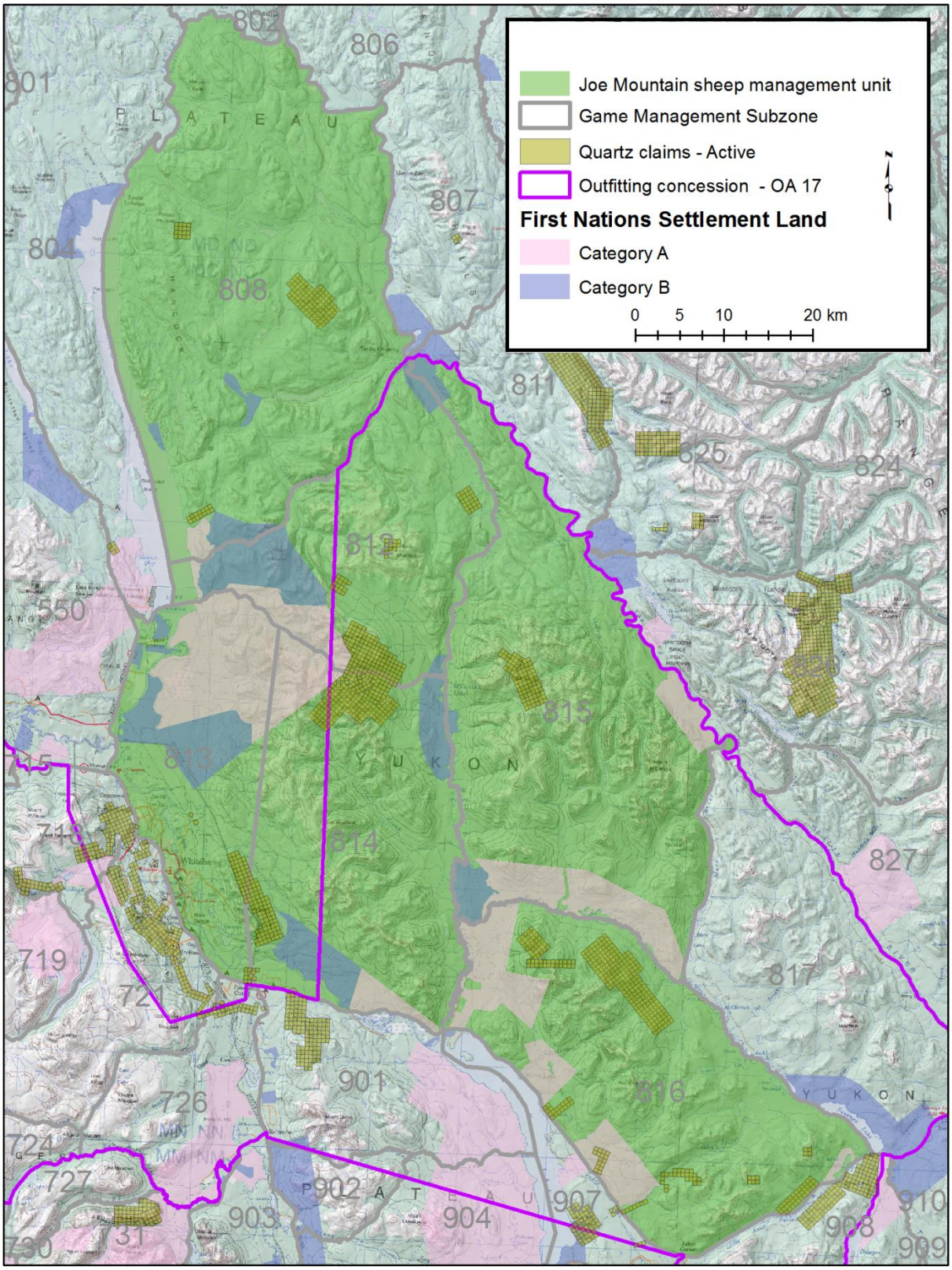

Figure 1. Location and general features of the Joe Mountain sheep management unit.

June 26, however the same areas were not generally surveyed and we are confident that double-counting did not occur. Three observers were present on all surveys with the helicopter "contouring" a mountain block in a counter-clockwise direction. Aircraft speeds typically ranged from 100 to 120 km/hour, but this could vary depending on wind and terrain conditions. The altitude of the helicopter also varied depending on wind/terrain conditions.

The same navigator/primary classifier (Russell) was present on all surveys. When a sheep group was located, its total size was tallied and animals classified. The survey method used here was a total minimum count, thus results are not corrected for sightability (Udevitz *et al*. 2006). Rams were classified based on their horn curl size into ¼, ½, ¾, or full curl categories. While there is variability in the ages of rams having different horn curl sizes due to annual differences in horn growth (Hik and Carey 2000), roughly speaking ¼ curl rams are ages 1 to 2, ½ curl rams are ages 3 to 4, ¾ curl rams are ages 5 to 6, and full curl rams are ≥7 years of age (Barichello *et al*. 1987). The number of lambs was also recorded and yearlings, ewes, and young rams (i.e., ewe-like sheep) were classified as nursery sheep. Young (¼ curl) rams are typically found in these nursery groups and are often indistinguishable from ewes when classified from the air and were not further distinguished to avoid added disturbance of these animals. Thus, the nursery sheep class does not solely represent reproductive females. Classifying nursery sheep in this manner is typical of management agencies elsewhere (e.g., Strickland *et al*. 1992).

Data from each GMS were summarized to include a total count of all animals, a count of non-lambs, a ram:nursery sheep ratio, and a lamb:nursery sheep ratio. Results were also summarized over the entire management unit. Because ¼ curl rams are typically found in nursery groups, all ¼ curl rams observed in a GMS were included in the nursery sheep category to ensure consistency in the calculation of demographic ratios. The ram:nursery sheep ratio is an index (i.e., an indicator but not a true measure) of the sex ratio of the population. That is, because nursery sheep include young males it cannot be interpreted as a true sex ratio and will be biased low relative to the true population sex ratio. Likewise, the lamb:nursery sheep ratio is an index of lamb productivity and is also biased low relative to, for example, a lamb:ewe ratio. Nevertheless, while these ratios do have biases associated with them (Festa-Bianchet 1992), they can still be useful for monitoring and comparative purposes.

The average annual licensed harvest rate during 2012 - 2016 was calculated for the overall management unit. A five-year period was used as it was deemed to represent current population conditions while also accounting for annual variability in the number of sheep harvested. Harvest rates are based on the number of sheep harvested by licensed hunters divided by the non-lamb count within the management unit. Non-lamb counts are used rather than total counts because of the high degree of annual variability in the lamb cohort size and because there may be considerable lamb mortality from the time of the survey to one year of age. Thus, non-lamb counts are a more stable indication of the size of a sheep population. Harvest rates do not include First Nation subsistence harvest, which is not required to be reported, and thus may be biased low.

Results

In 2015 and 2016, a total of 45 and 66 non-lamb sheep were observed (Table 1), respectively.

During the past five years, there has been an average of 2 sheep/year harvested by licensed hunters (Table 3), resulting in a harvest rate of 3% of the non-lamb population. However, there has been variability in the number of rams harvested, ranging from none in 2016 to 4 in

Table 1. Current and historical non-lamb sheep counts for the Joe Mountain management unit.

	Non-lamb counts			
Area	**2016**	**2015**	**2009**	**1976**
GMS 8-08	0	15	0	6
GMS 8-12	23	26	20	0
GMS 8-13	0	0	0	11
GMS 8-14	42	4	0	0
GMS 8-15	1	0	2	20
Overall	66	45	22[a]	37

a: Survey results not deemed reliable.

Table 2. Current and historical lamb:nursery sheep and ram:nursery sheep ratios for the Joe Mountain sheep management unit.

	Lamb:nursery sheep				Ram:nursery sheep			
Area	**2016**	**2015**	**2009**	**1976**	**2016**	**2015**	**2009**	**1976**
GMS 8-08	N/A	73:100	N/A	N/A	N/A	0:100	N/A	N/A
GMS 8-12	25:100	9:100	N/A	N/A	475:100	136:100	N/A	N/A
GMS 8-13	N/A	N/A	N/A	56:100	N/A	N/A	N/A	22:100
GMS 8-14	23:100	N/A	N/A	N/A	8:100	N/A	N/A	N/A
GMS 8-15	0:100	N/A	N/A	30:100	0:100	N/A	N/A	0:100
Overall	23:100	46:100	N/A[a]	38:100	50:100	73:100	N/A[a]	28:100

b: Only 2 nursery sheep were observed during the survey so ratios are unreliable and not provided.

Table 3. Recent (2012 to 2016) licensed harvest of sheep in the Joe Mountain management unit.

Area	**2016**	**2015**	**2014**	**2013**	**2012**
GMS 8-08	0	0	0	0	0
GMS 8-12	0	0	1	4	1
GMS 8-13	0	0	0	0	0
GMS 8-14	0	1	2	0	0
GMS 8-15	0	0	0	0	1
Overall	0	1	3	4	2

2013. Prior to the cessation of non-resident harvest in OA 17 in 1999, licensed harvest averaged roughly 3 sheep/year. During the absence of non-resident harvest, resident harvest declined until 2009 after which licensed harvest began increasing (Figure 3). Following 2012, when OA 17 resumed operations, the first non-resident to harvest a sheep occurred in 2015. Additionally, in 2008, a 5-year old ram was illegally harvested in GMS 8-13 near Grey Mountain on the outskirts of Whitehorse and subsequently recovered by Government of Yukon conservation officers.

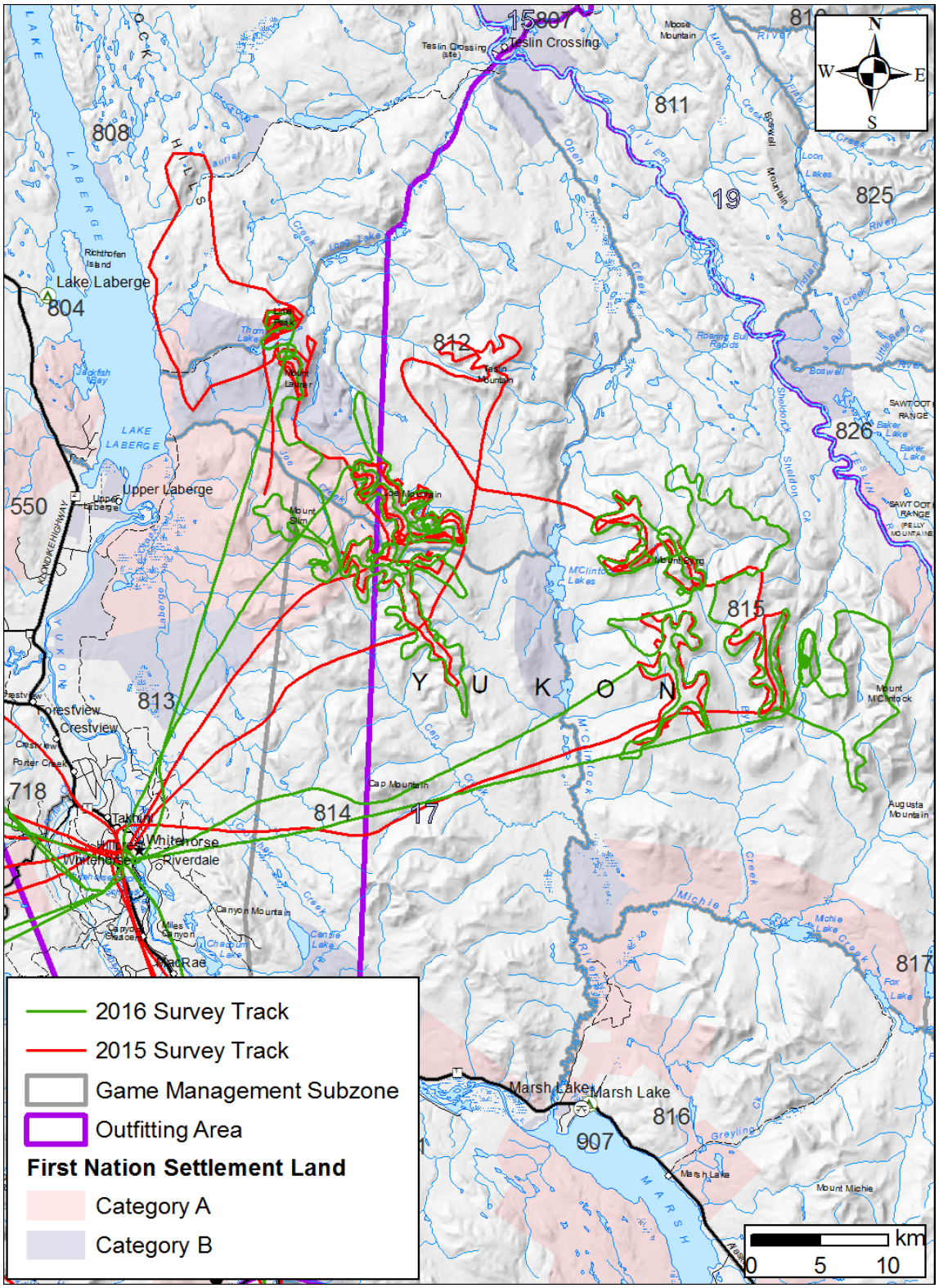

Figure 2. Survey tracks flown during the 2015 and 2016 surveys of the Joe Mountain management unit.

Discussion

Historically and presently, non-lamb sheep numbers in the Joe Mountain management unit have not been high relative to other areas in southwest Yukon (Table 1) (Hegel and Russell 2018). The 2016 survey provides the most reliable assessment of the current population status in the management unit. The 2015 survey likely missed a nursery group given an unreasonably high ram:nursery sheep ratio and the similar number of rams observed in 2015 and 2016 (Environment Yukon, unpublished data). The 2009 survey results are not reliable given the assumed unobserved nursery sheep in that survey (i.e., virtually no nursery sheep were observed; Environment Yukon, unpublished data).

Based on a non-lamb population of 66 animals, a 4% harvest rate would result in an average of 2.6 sheep harvested per year. A 4% harvest is the maximum harvest rate recommended in Environment Yukon's current sheep management guidelines (Environment Yukon 2017). Given the current average licensed harvest of 2 sheep per year over the 2012 to 2016 period, the management unit is near its maximum recommended harvest rate. This rate does not include First Nation subsistence harvest of sheep in this unit, which is not required to be reported.

References

BARICHELLO, N., J. CAREY, AND K. JINGFORS. 1987. Population ecology, range use and movement patterns of Dall sheep (*Ovis dalli dalli*) in the Northern Richardson Mountains. Yukon Renewable Resources Technical Report, Whitehorse, Yukon, Canada.

ENVIRONMENT YUKON. 2017. Science-based guidelines for management of Thinhorn Sheep in Yukon. Yukon Fish and Wildlife Branch Report MR-17-04. Whitehorse, Yukon, Canada.

FESTA-BIANCHET, M. 1992. Use of age ratios to predict bighorn sheep population dynamics. Proceedings of the Biennial Symposium of the Northern Wild Sheep and Goat Council 8:227-236.

HEGEL, T. M, AND K. RUSSELL. 2018. Status of thinhorn sheep in Game Management Zone 7 (2015 and 2016). Yukon Fish and Wildlife Branch Report, Whitehorse, Yukon, Canada. In Review.

HIK, D. S., AND J. CAREY. 2000. Cohort variation in horn growth of Dall sheep rams in the southwest Yukon, 1969-1999. Biennial Symposium of the Northern Wild Sheep and Goat Council 12:88-100.

HOEFS, M., AND N. BARICHELLO. 1985. Distribution, abundance and management of wild sheep in Yukon (pp. 16-34), *in* (M. Hoefs, ed.) Wild Sheep: Distribution, abundance, management, and conservation of sheep of the world and closely related mountain ungulates. Northern Wild Sheep and Goat Council Special Report.

LORTIE, G., M. HOEFS, T. WAGNER, W. KLASSEN, L. MYCHASIW, ET AL. 1978. Wildlife inventories in GMZ 8 and GMZ 10 Yukon Territory with an evaluation of present levels of sheep harvest – 1976 & 1977. Yukon Game Branch Technical Report TR-77-01. Whitehorse, Yukon, Canada.

RUSSELL, K. AND T. HEGEL. 2011. Dall's sheep survey: Southern Lakes Region, 2009. Yukon Fish and Wildlife Branch Report TR-11-09. Whitehorse, Yukon, Canada.

SIM, Z., J. C. HALL, B. JEX, T. M HEGEL, AND D. W. COLTMAN. 2016. Genome-wide set of SNPs reveals evidence for two glacial refugia and admixture from postglacial recolonization in an alpine ungulate. Molecular Ecology doi: 10.1111/mec.13701.

STRICKLAND, D., L. L. MCDONALD, D. TAYLOR, K. JENKINS, AND J. KERN. 1992. Estimation of Dall sheep numbers in the Wrangell-St. Elias National Park and Preserve. Biennial Symposium of the Northern Wild Sheep and Goat Council 8:237-255.

UDEVITZ, M. S., B. S. SHULTS, L. G. ADAMS, AND C. KLECKNER. 2006. Evaluation of aerial survey methods for Dall's sheep. Wildlife Society Bulletin 34:732-740.