



SUBMISSION TO THE

NUNAVUT WILDLIFE MANAGEMENT BOARD

FOR

Information:

Decision: X

Issue: Muskox population boundaries and associated TAHs in the Kitikmeot Region of Nunavut.

Background:

- By the early 1900's, muskox (*Ovibos moschatus*) populations in the Kitikmeot were dramatically reduced and distributed in small areas as a likely result of several natural and anthropogenic factors (Figure 1).
- After a long moratorium on muskox harvest, small quotas were implemented for selected populations in the 1960s in the high Arctic and 1970s in the Kitikmeot.
- Since then, muskox populations in Nunavut have recolonized most of their historic range but remain sensitive to natural (diseases, weather, and climate change) and anthropogenic factors (harvest, land use).
- Muskox populations require careful management to promote the health of their population and the sustainability of their harvest present and future.
- The current distribution and abundance of muskox populations in the Kitikmeot require a reassessment of population boundaries and associated TAHs to comply with the NLCA and update wildlife regulations.
- Note that, additionally to its intrinsic value for the health and integrity of the lower and high arctic ecosystems, muskox is an important species to Nunavummiut for food, culture and economy (sport hunts, meat, qiviut, leather, art, tourism).
- Since 1999, the Government of Nunavut (GN) has been working with HTOs and RWOs to update the muskox management regime in order to reflect changes in muskox population distribution and abundance.

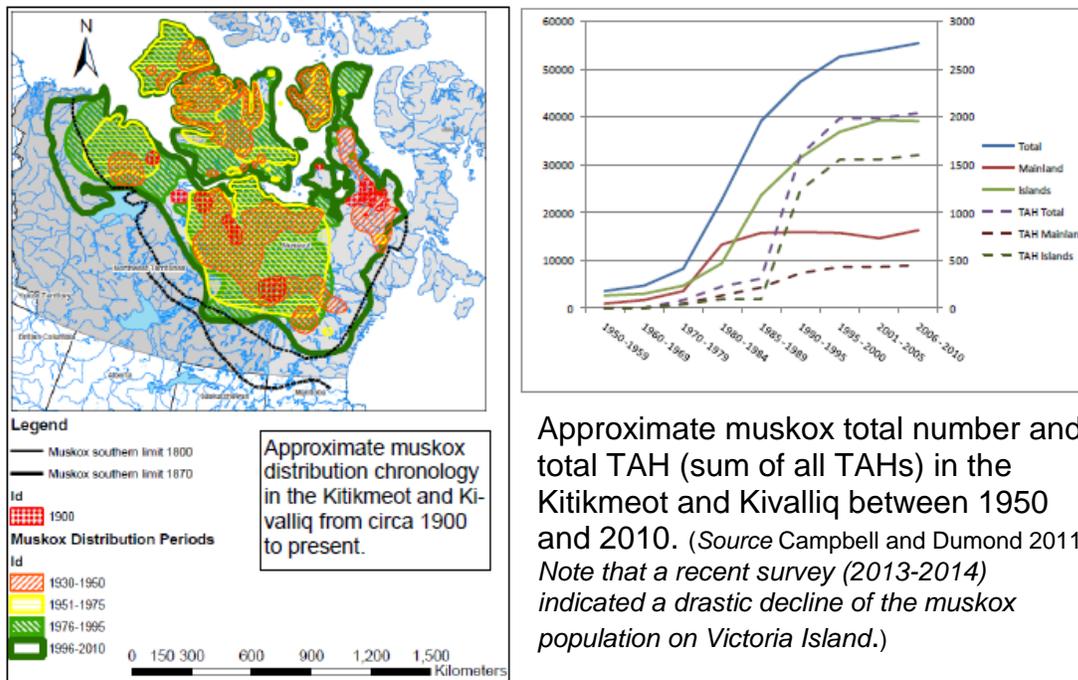


Figure 1: Muskox historical distribution and abundance in the Kitikmeot and Kivalliq regions of Nunavut.

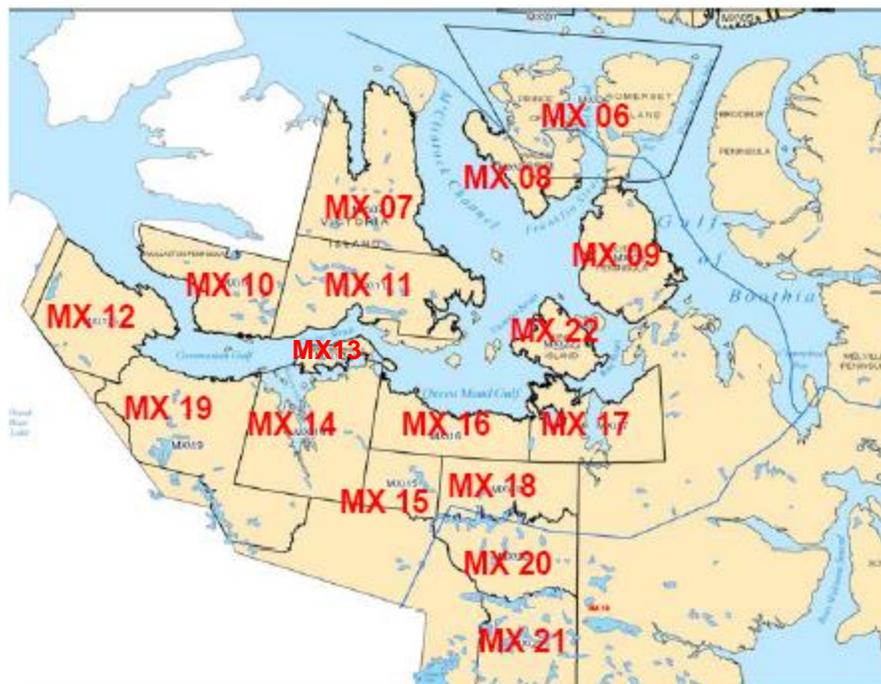


Figure 2: Muskox harvest management zones in the Kitikmeot and Kivalliq regions in 1999.

Current Status

- Based on extensive consultations (see Appendix 1) and previous NWMB decisions (Appendix 2) on population boundaries, GN-DoE propose new muskox population boundaries in the Kitikmeot Region of Nunavut (Figure 3).

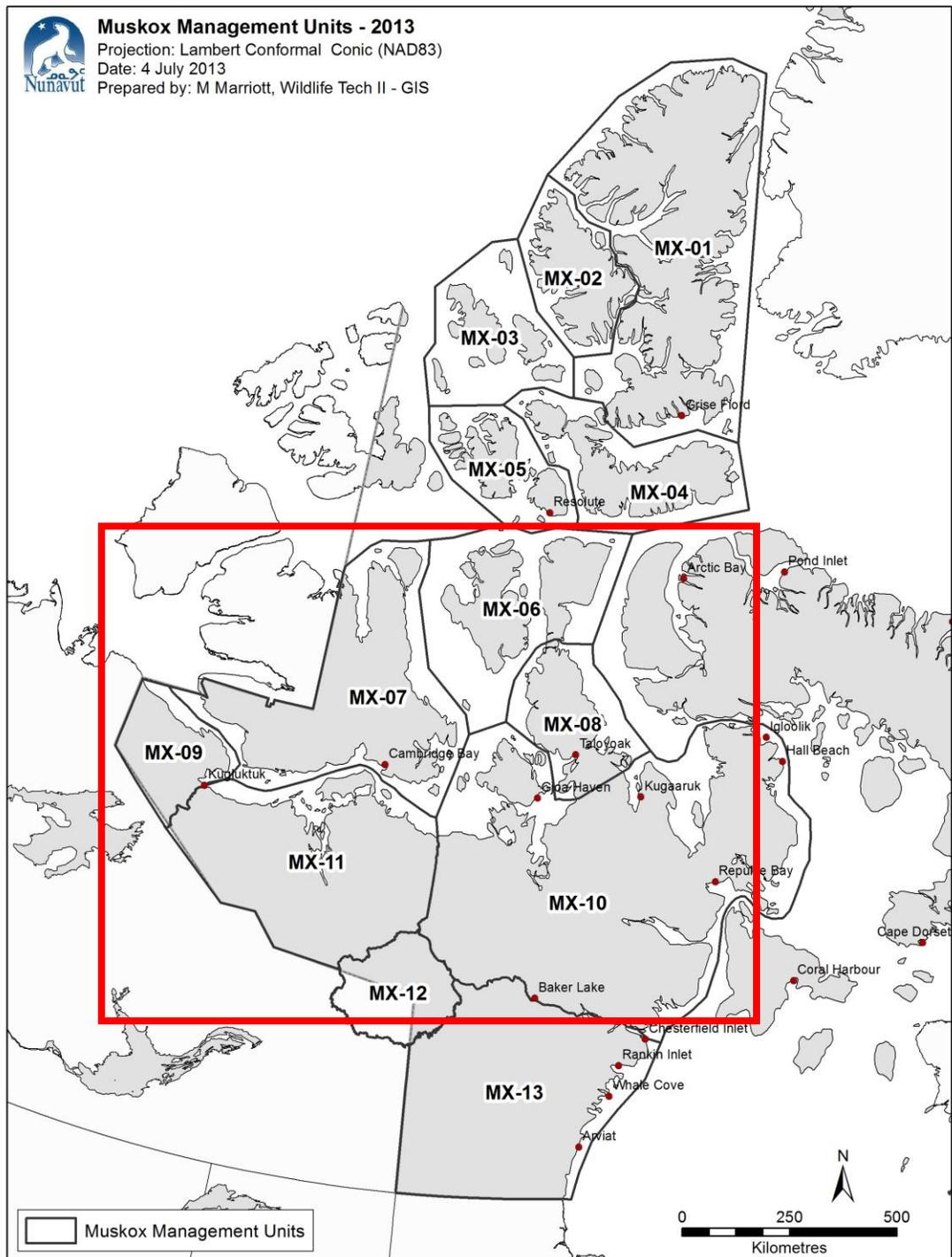


Figure 3: Proposed muskox population boundaries

- MX08 and MX10 population boundaries (Figure 3) and associated TAHs were already addressed through a request from the KRWB and a decision of the NWMB implemented by the GN through an exemption permit until new regulations can be implemented.
- The proposed MX11 population boundary was partially addressed by the NWMB through the modification of the old MX19 following a request from Kugluktuk HTO but a large area (old MX14, MX13, MX15 and part of MX16, Figure 2) was not addressed by the NWMB. Impacted communities were consulted on the proposed new boundary (Appendix 1).
- The proposed MX09 on Figure 3 is an update of the boundaries of the current MX12 on Figure 2. Kugluktuk HTO has been in support of this change but it requires a decision from the NWMB.
- TAH for MX19 (western half of proposed MX11) in the west-Kitikmeot was updated from 60 to 75 through an NWMB decision in 2011 based on the 2005 survey results (Dumond 2007) and Kugluktuk HTO observations regarding the increasing number of muskoxen in their hunting area.
- MX19 (Figure 2) was surveyed in 2013 with an estimate of $6,746 \pm 1851$ muskoxen ($\pm 95\%CI$, Leclerc 2015) representing the estimate for the western half of the proposed MX11 (Figure 3). The muskox abundance in MX19 (Figure 2) increased between 2005 (estimate of 2097 muskoxen, Dumond 2007) and 2013. However, based on community input, the muskox abundance in the eastern half of the proposed MX11 has decreased significantly, which is consistent with the trend observed between 1986 and 2005 near Bathurst Inlet (Dumond 2007). Current cumulative TAH for all the management zones in the proposed MX11 is 225.
- Muskox population in the proposed MX09 (old MX12) was last surveyed in 2007 with an estimate of 590 muskoxen (Dumond 2007) which was similar to the 1994 estimate for the same area (Fournier and Gunn 1998). Current TAH has been set at 20 since 1996 resulting in a stable population.
- Muskox population on Victoria Island (proposed MX07) was surveyed in 2013 and 2014 with a resulting population estimate of $10,026 \pm 1,184$ muskoxen ($\pm 95\% CI$, Leclerc 2015) which is a significant decline over the past 15 years (in 1999, the southeast quarter of Victoria Island was estimated to count 18,290 muskoxen, Gunn and Patterson 2000). Current TAH for Victoria Island (MX07, MX10 and MX11 on Figure 2) is 1500, mainly based on Gunn and Patterson 2000. Impacted communities were informed of the 2013-2014 survey results and a reduction of the TAH was discussed. Communities were in agreement to reduce the TAH on Victoria Island.
- The documented decline in muskoxen on Victoria Island is consistent with local knowledge. Additionally, in late 2012, Kitikmeot Foods Ltd announced that it was not going to continue the commercial harvest due to the low number of muskoxen around Cambridge Bay (Appendix 1).

- The identification of several new diseases in this population over the past 7 years also remains a concern (Appendix 3).
- The proposed new muskox population boundaries (MX07, MX09 and MX11, Figure 3) and associated TAHs require a decision from the NWMB.

Management Considerations

- Based on the requirements of the NLCA (5.6.16 to 5.6.18) and extensive consultation with impacted communities, it is requested that muskox population boundaries and associated TAHs in the Kitikmeot region are updated.
- The proposed new muskox population boundaries are based on best available information on muskox distribution and genetics, and community input during consultation (Appendices 1 and 3).
- The TAH for each muskox population is based on best practices for sustainable harvest of muskoxen and the input from the impacted communities on their management goal for each population.
- The following decisions are requested to update the management regime of muskox populations in the Kitikmeot (Table 1, Figure 4):
 - MX07 Population Boundary: Merge old management zones on Victoria Island (MX07, MX10 and MX11, Figure 2) into one population and extend boundary to include bordering sea-ice and islands (MX07, Figure 4).
 - MX11 Population Boundary: Merge old management zones in the Kitikmeot central mainland (MX19, MX14, MX15 and western part of MX16, Figure 2) into one population and extend boundary to follow the Nunavut border in the south and include bordering sea-ice and islands in the north (MX11, Figure 4).
 - MX09 Population boundary: Extend the boundary of the muskox population located west of Kugluktuk (MX12 on Figure 2) to follow the Coppermine River to the east, follow the Nunavut border in the south and west, and extend to include the bordering sea-ice and islands in the north and east (MX09, Figure 4).
 - TAH recommendation for proposed MX07: TAH of **400** (TAH reduction) based on the 2013 – 2014 survey of the entire Nunavut part of Victoria Island muskox population (MX07). The population was estimated to 10,026±1,184 muskoxen (95% CI, Leclerc 2015), which is a significant decline but consistent with local observations. Results were presented to impacted communities at the 2014 Kitikmeot Muskox Workshop and further discussed with Cambridge Bay HTO in January 2015.
 - TAH recommendation for proposed MX09: TAH of **20** (no change – same as old MX12) based on the 2007 muskox population estimate and the stable trend since 1994 (Dumond 2007) until new information is available.
 - TAH recommendation for proposed MX11: TAH of **225** (identical to the current cumulative TAHs of MX13, MX14, MX15 and MX19) based on the

2013 survey estimate of the western half (MX19, 6,746±1851, 95%CI, Leclerc 2015) and the assumption that there are at least 750 muskoxen in the eastern part of MX11 population. Anecdotal observations and community reports indicate that muskox abundance around Bathurst Inlet (eastern half of the proposed MX11) is likely to be low. TAH will need to be updated after completion of the survey of the eastern half of the new MX11 planned for 2016.

- Buffer zone for all Nunavut Muskox Populations: A muskox found inside Nunavut within 10 km of the boundary of a muskox population may be presumed to come from either the population of the area it was found in or from the bordering one. Based on movement data in Gunn and Fournier (2000), mean daily rate of travel (straight line) for muskox cows were between 0.7 and 1.4km/day. A 10km buffer around population boundaries accounts for short term movements and acknowledge the difficulty for harvesters to identify precisely the boundary line in the field.
- Removal of harvest season restrictions for all Nunavut Muskox Populations: We recommend removing harvesting season restrictions on all muskox populations in Nunavut. For clarity, we recommend that muskox harvest is authorized from July 1 to June 30. RWOs and HTOs can implement seasonal restrictions, if they wish, based on their traditional practices and management needs.

Table 1: Requested decisions to update of Muskox populations boundaries and associated TAHs.

Kitikmeot Muskox Populations (Figure 3)	Old Management Zone reference (Figure 2)	Population Estimate \pm SE (date)	Recommended TAH (% of estimated population)	NWMB Decision Requested
MX09	MX12	589 \pm 121 (2007)	20 (3.5%) ¹	Update population boundaries as per Figure 4 and establish TAH of 20.
MX11	MX19, MX13, MX14, MX15, Part of MX16	Approx. 7500 (2005, 2006, 2011, 2013)	225 (3%) ²	Update population boundaries as per Figure 4 and establish TAH of 225.
MX07	MX07, MX10, MX11	10,026 \pm 597 (2013-2014)	400 (~4%) ³	Update population boundaries as per Figure 4 and reduce TAH to 400.
All muskox populations	N/A	N/A	N/A	Establish buffer of 10km on each side of population boundaries for harvesting purpose.
All muskox populations	N/A	N/A	N/A	Remove seasonal restrictions on all muskox populations.

¹ Note that the TAH remains the same until new information is available considering that the new areas added to this population only have very low numbers of muskoxen.

² Note that MX11 TAH recommendation is based on the estimate of the 2013 survey of the western half of the population (MX19) and the assumption that there is about 750 muskoxen in the eastern half of the population distribution (based on previous trends, anecdotal observations and community reports). The TAH will be updated after completion of the survey of the eastern half planned for 2016.

³ Note that the 2013-14 Victoria Island survey results were presented to the HTO delegates at the Muskox Workshop in October 2014 in Cambridge Bay with discussion on the need to reduce the TAH. This was further discussed in January 2015 with Cambridge Bay HTO.

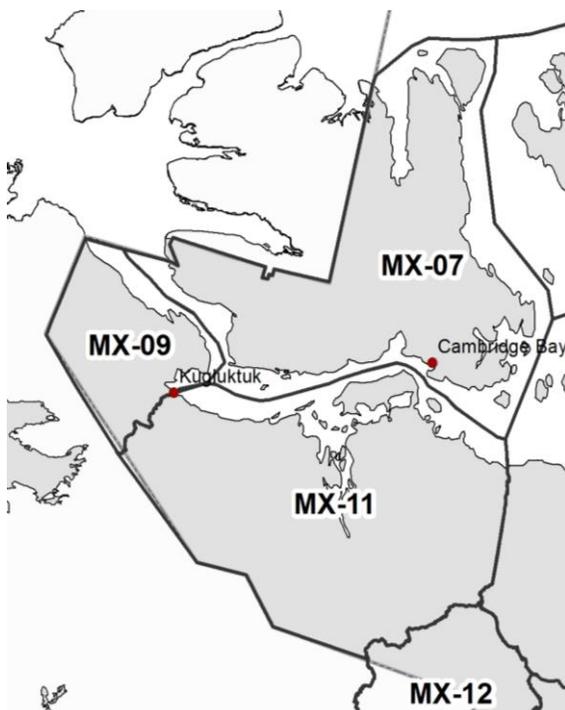


Figure 4: New muskox populations boundaries requested for the west-Kitikmeot.

APPENDICES

APPENDIX 1: Recent Consultations relevant to the proposed Muskox population boundaries, TAH and Non-quota limitations in the Kitikmeot Region of Nunavut.

- 2010 – 2011 West-Kitikmeot Consultation documents
- 2011 & 2012 KRWB AGM GN-DoE presentations
- 2012 KRWB DU Caribou and Muskox Workshop (GN-DoE presentation).
- 2012 Letter from Kitikmeot Foods Ltd.
- 2014 Kitikmeot Muskox Workshop draft report.
- 2015 Bathurst Inlet, Bay Chimo and Cambridge Bay HTO consultation

APPENDIX 2: Relevant NWMB decisions and GN-Exemption Permits already in place.

- 111107 Letter to the Minister - Kitikmeot Musk-Oxen in MX19 – ENG
- 101014-Decision Letter NWMB
- Muskox Exemption Permit East Kitikmeot 2014-15
- Muskox Exemption permit West Kitikmeot 2014-15

APPENDIX 3: Selection of reports, publications and other information related to the west Kitikmeot muskox populations.

Bay Chimo and Bathurst HTO 2015. Personal communication to Lisa Leclerc regarding the low abundance of muskoxen around Bathurst Inlet.

Campbell M. and M. Dumond. 2011. Muskox status and management in the Kitikmeot and Kivalliq regions (Poster). Arctic Ungulates Conference, Yellowknife, August 2011.

Campbell, M. et al. *Unpublished data*. Wildlife observations database during the June 2011 Beverly and Ahlak calving ground survey.

Dumond 2007 Muskoxen distribution and abundance in the area west of the Coppermine River, Kitikmeot Region, Nunavut May 2007. GN-DoE File Report # 33.

Dumond, M. *et al. Draft*. Muskoxen Productivity, Recruitment and Sex Ratio in two adjacent areas with different Population Dynamic, Western Kitikmeot Region, Nunavut (MX12/MX19). Interim Report December 2007

Dumond, M. *Draft*. Muskoxen Status in the Kitikmeot Region of Nunavut. Draft File Report.

- Fournier, B. and A. Gunn. 1998. Muskox Numbers and Distribution in the Northwest Territories, 1997. File Report #121, Department of Resources, Wildlife and Economic Development, Yellowknife, NWT.
- Giroux, M.-A., M. Campbell, M. Dumond and D. Jenkins. 2012. Availability of caribou and muskoxen for local human consumption across Nunavut. Report presented to the Nunavut Anti-Poverty Secretariat. Version 1.8.
- Gunn, A. 1990b. Distribution and abundance of muskoxen between Bathurst Inlet and Contwoyto lake, NWT, 1986. NWT DRR File Report No.100. 28pp.
- Gunn, A. 1992. Distribution and abundance of muskoxen on Minto Inlet, Northwest Victoria Island, NWT. 1992. File Report No.?? Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Yellowknife.
- Gunn, A. 1995. Distribution and abundance of muskoxen west of Coppermine, N.W.T. 1987-88. File Report No.109. Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Yellowknife. 28pp.
- Gunn, A. 2005. Distribution and Abundance of Muskoxen Northwest of Contwoyto Lake, NWT, 1991. DENR – GNWT Manuscript Report. 12pp.
- Gunn, A. and B. Fournier. 2000. Calf survival and seasonal migrations of a mainland muskox population. File Report No.124. Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Yellowknife.
- Gunn, A. and J. Lee. 2000. Distribution and Abundance of Muskoxen on Northeast Victoria Island, N.W.T. August 1990. Manuscript Report No.119. Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Yellowknife.
- Gunn, A. and B.R. Patterson. 2000. Distribution and Abundance of Muskoxen on Southeastern Victoria Island, Nunavut 1988 and 1999. File Report No.?? Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Yellowknife.
- Gunn, A. and G. Wobeser. 1993. Protostrongylid lungworm infection in muskoxen, Coppermine, N.W.T., Canada. *Rangifer* 13(1):45-47.
- Hoberg, E.P., L. Polley, A. Gunn, and J.S. Nishi. 1995. *Umingmaktstrongylus pallikuukensis* gen.nov. et sp.nov. (Nematoda : *Protostrongylidae*) from muskoxen, *Ovibos moschatus*, in the Central Canadian Arctic, with comments on biology and biogeography. *Canadian Journal of Zoology* 73(12):2266-2282.
- Jingfors, K. 1984b. Abundance, composition and distribution of Muskoxen on southeastern Victoria Island. DRR – GNWT File Report No 36. 24pp.
- Jingfors, K. 1985. Abundance and distribution of Muskoxen on northwestern Victoria Island. DRR – GNWT File Report No 47. 22pp.

Kingsley, M.C.S. 1979. Winter Muskox Survey, Bathurst Inlet, N.W.T. Canadian Wildlife Service, Edmonton, Alberta. 11pp.

Kutz, S.J. 1999. The biology of *Umingmakstrongylus pallikuukensis*, a lung nematode of muskoxen in the Canadian arctic: Field and laboratory studies. Ph.D. Thesis, University of Saskatchewan, Saskatoon. 208pp.

Kutz, S.J., E.P. Hoberg, and L. Polley. 2001. A new lungworm in muskoxen: an exploration in arctic parasitology. *Trends in Parasitology* 17:276-280.

Kutz, S.J. et al. 2002. Development of the muskox lungworm, *Umingmakstrongylus pallikuukensis* (Protostrongylidae), in gastropods in the Arctic. *Canadian Journal of Zoology* 80:1977–1985.

Kutz, S.J. et al. 2004. “Emerging” Parasitic Infections in Arctic Ungulates. *Integr. Comp. Biol.*, 44:109–118.

Kutz, S., T. Bollinger, M. Branigan, S. Checkley, T. Davidson, M. Dumond, B. Elkin, T. Forde, W. Hutchins, A. Niptanatiak and K. Orsel. 2015. *Erysipelothrix rhusiopathiae* as the cause of recent and widespread muskox mortalities in the Canadian Arctic. *Canadian Veterinary Journal* 2015-0046.

Kutz, S.J., S. Checkley, G.G. Verocai, M. Dumond, E.P. Hoberg, R. Peacock, J.P. Wu, K. Orsel, K. Seegers, A.L. Warren and A. Abrams. 2013. Invasion, establishment, and range expansion of two parasitic nematodes in the Canadian Arctic. *Global Change Biology* 19:3254–3262.

Leclerc, L.M. DRAFT. Kitikmeot Muskox Workshop.

Leclerc, L.M. 2015. Muskox Aerial Survey (*Ovibos moschatus*) of the Kitikmeot Region, Nunavut. Final Report to the NWMB. Project 32-13-11.

McLean, B.D. 1992. An aerial survey of muskoxen north of Great Bear Lake, August 1987. DRR - GNWT File report No. 103. 19pp.

Nishi, J.S. 1997. Population trend and effects of commercial harvesting on southeast Victoria Island muskoxen (MX/11). Proposal to the RWED Wildlife Research Workshop.

Nishi, J.S. et al. ????. Distribution and abundance of Muskoxen in the Rae and Richardson River Valleys, west of Coppermine, NT. (1993-94). File Report No.?? Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Yellowknife.

Panayi, D. and B.R. Patterson. 1998. Commercial muskox harvesting in Cambridge Bay, 1993 to 1998 – Progress report to the RWED Wildlife research workshop.

Patterson, B.R. 1998. Status of muskoxen in management zone N/MX/14 and N/NMX/15. Research proposal to the to the RWED Wildlife research workshop (project never conducted).

Pool, K.G. 1984. Muskox Survey on Southwestern Victoria Island. Northwest Territories Wildlife Service. Manuscript Report.

Salisbury, C.D.C., A.C.E. Fesser, J.D. MacNeil, J.R. Patterson, J.Z. Adamczewski, P.F. Flood, and A. Gunn. 1992. Trace Metal and pesticide levels in Muskoxen from Victoria Island, Northwest Territories, Canada. Intern. J. Environ. Anal. Chem. 48:209-215.

Shank, C.C. and R. Graf. 1992. Abundance and distribution of muskoxen near Aylmer Lake, NWT, July 1991. DRR – GNWT Manuscript report No56, 21pp.

Spencer, W. 1976. Musk-oxen (*Ovibos moschatus*) survey central western arctic July 15 – July 24, 1976. GNWT - Manuscript Report 7pp.

Urquhart, D.R. 1982. Life history and current status of muskoxen in the NWT. Wildlife Service Report No.1, GNWT-DRR, Yellowknife, 139pp.

Van Coeverden de Groot P.J. 2001. Conservation genetic implications of microsatellite variation in the muskox *Ovibos moschatus*: the effect of refugial isolation and the Arctic Ocean on genetic structure. *PhD Thesis*. Queen's University, Kingston, Canada.

Wu, J. S. Kutz, M. Dumond and S. Checkley. Health survey of Muskoxen on Victoria Island, Nunavut, Canada. (Poster). Arctic Ungulates Conference, Yellowknife, August 2011.