KIA Technical response to NWMB's issues relevant to the Government of Nunavut's proposal to modify the TAH for Bluenose East caribou

To address NWMB's issues, on behalf of KIA, I reviewed GN's briefing note and presentation for NWMB's December 2019 regular meeting and given that the submission was a summary, I also reviewed GNWT's information specifically the 2018 calving ground survey report which was provided to NWMB[1]. Relevant information is available through the WRRB proceedings and so I also reviewed the technical information summarized in the WRRB's Reasons for Decision reports[2] as well as using the NWMB and SRRB's public registry to find relevant information and documents.

Abbreviations and Acronyms

ENR-GNWT	Department of Environment and Natural Resources, Government of Northwest Territories
GN	Government of Nunavut
KHTO	Kitikmeot Hunters' and Trappers' Organization
KIA	Kitikmeot Inuit Association
SRRB	Sahtu Renewable Resource Board
TAH	Total Allowable Harvest
TG	Tłı̨chǫ Government
WRRB	Wek'èezhìi Renewable Resource Board

1. Responses and feedback on the most recent science population abundance estimate for Bluenose East caribou, particularly about:

1.1. The recent steep decline in population size (by half in 2015-2018) and feedback on the assumptions associated with the statistical models used to estimate the current population abundance.

Summary: The evidence supports that the two main assumptions for the 2018 estimate of the Bluenose East herd (the estimates are accurate and precise and all the breeding cows return to their calving ground).

Comment: The Bluenose East herd declined 50% between 2015 and 2018 which is an annual and high rate of decline of about 20%. Only slightly less than a quarter of the caribou estimated in 2010 were left in 2018 (an 82% decline). The estimate in 2018 was 19,294 2+ years old and its statistical confidence limits were 6,527-22,524 which do not overlap those estimated in 2015 (33,859-43,325).

The 2018 estimate of herd size is based on extrapolating from the number of caribou estimated during a systematic aerial survey of the calving ground using visual and aerial photography methods that have become standardized since 2010. The number of caribou is then extrapolated to estimate the number of breeding cows and then in a further extrapolation, to the total number of 2 year and older caribou in the herd. The first assumption is that all the breeding cows migrate to the calving ground. In 2018, all 16 collared cows with a known calving location history returned to within the 2018 mapped Bluenose-East calving ground. Movements of collared cows between Bluenose East and the neighboring Bluenose

[1] https://www.nwmb.com/en/public-hearings-a-meetings/meetings/regular-meetings/2019/rm-004-2019-kugluktuk-december-4-2019/english-9

[2] https://www.wrrb.ca/public-information/public-registry

West and Bathurst calving grounds since 2010 have been extremely infrequent so there is no current evidence that emigration is a factor.

The second assumption is that the estimates are both accurate (minimal bias) and precise. Although in June 2018, patchy snow cover meant caribou were not easy to see, paired observers and recounting was used to estimate and correct levels of accuracy for both aerial and photo counts. The allocation of survey effort and the photo coverage were reasonable and lead to conventionally acceptable levels of precision for example; the estimate of breeding females was precise (7.7%). The extrapolation of the counts of caribou on the calving ground to herd size has been standardized since 2014 in NU and is conceptually and statistically consistent.

The report for the calving ground survey is detailed and I did not find any substantive issues to question the methods or whether the under-lying assumptions were invalid or weak. Even with rigor of methods and detailed statistical analyses, it is worth remembering that the emphasis is on standardization to ensure the estimates are comparable over time (to measure trend). The resulting numbers are estimates: a mid-value within a likely range of values.

1.2. The area covered and the duration of the aerial surveys

Summary: Extensive reconnaissance flights covered a large area and the survey was anchored to the peak of calving (when movements are minimal) with no delays.
Comment: There were no weather-caused delays during the survey that could have influenced the estimated numbers. The peak of calving was about 8 June which is within the typical date range (for example, 5-6 June in 2015). Extensive reconnaissance flights covered a large area. The calving area including the high density has shifted slightly west but overall, the area covered in June 2018 is similar to other calving ground surveys in 2010, 2013 and 2015.

1.3. The level of Inuit involvement in the study and use of Inuit Qaujimajatuqangit in the population assessment.

Summary: While four Inuit were observers during the 2018 survey, there was no evidence that Inuit Qaujimajatuqangit was used for the assessment of herd size in 2018.
Comment: The 2018 Bluenose East calving ground report acknowledges four Kugluktuk HTO representatives who were observers during the survey. I did not find mention of Inuit Qaujimajatuqangit for the calving ground survey in GN's presentation in December 2019 although for example, IQ was previously shared with GN in 2007[3] on the Bluenose East caribou herd.

It is a current and recurring theme that management decisions struggle to be based on the co-production of knowledge (in this case, science and indigenous society). For example, in the WRRB's 2019 Bluenose East hearings, Dr. John B. Zoe (TG) recounted that "One (1) purpose of traditional knowledge research is to gather and use the Elders' knowledge, but also create space for that knowledge in decision-making and management".[4]

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[3] Dumond, M. 2007. Western Kitikmeot caribou workshop. Government of Nunavut, Department of Environment, Final Wildlife Report: 19, Iqaluit, 47 pp.
[4] Transcript – April 9, 2019 (DAY 1) - 2019 Bluenose-East Caribou Herd WRRB Public Hearing. p 82

2. Any information which is used in demographic models including indices of cow and calf productivity/survival, and collar movement data.

Summary: The demographical model integrates field data on adult cow and calf survival, adult sex ratio, number of breeding females and an assumed harvest rate.
Comment: GNWT's computer demographic model uses GNWT's field data on spring and fall calf cow, and bull cow ratios and integrates them with the collared cow survival rates to generate rates such as adult and calf survival and productivity. The model has the strength that it incorporates trends in the field data. Details for the field data are not published but are summarized in the GNWT calving ground survey reports. The calving ground reports have been at roughly 3-year intervals which imposes a time lag in the availability of the annual estimates.

The individual field estimates tend to align with the model estimates but the devil is in the details. Annual variability in adult survival is high partially because sample size is relatively low. Adult survival, for example, was especially low in 2012/2013 (60%), recovered to 93% in 2015, but then declined for the next 3 years to 76% in 2017 based on the collared caribou. However, to illustrate, there can be differences between field and model estimates such as *the model* estimate of cow survival for 2017 is 72%. Based on the demographic model, adult survival suggests the same declining trend in cow survival from 2015 to 2018 collar estimates but the 3-year average suggests an increase although lower than the level expected for halting the decline and recovery.

Although these differences in field and model adult survival rates are a few percentage points, they are noteworthy as trends in herd size are especially sensitive to levels of adult female survival (as adult females are the typically the majority of a herd). Both GN and GNWT refer to the modelled survival rate of 72% for 2017/18 which is too low to expect the decline to halt without management actions to increase it. The survival estimates include harvest mortality which was 373 caribou in 2016-2017 and 323 caribou in 2017-2018.

GNWT's demographic model projects estimated numbers of breeding females which align closely with the field estimates. This adds credibility to using the model. Thus there is no evidence to disagree with GNWT's conclusion that harvest likely had minimal effect on survival rates from 2015 to 2018 (in contrast to before 2015). Furthermore, using the model, GNWT projected that by 2021, the herd would be reduced to about 10,000 (a further halving of herd size) and that a harvest between 100 and 300 would not have a detectable impact.

2.1. Habitat conditions and potential impacts from human activities in the range of the Bluenose East caribou herd.

Summary: Information on habitat conditions and potential impacts from human activities were not included in the GN's 2019 TAH submission.
Comment: The GNWT 2018 calving ground report was not designed to address this although concerns for habitat and human activities especially for calving and summer ranges were reviewed and are the basis for recommendations in the 2019 WRRB's Reasons for Decision report. The recommendations included one for mobile protection measures for Bluenose East

caribou in the NWT which echoes the recommendation in Kugluktuk's draft 2019 Community Management Plan filed at the NWMB December 2019 meeting.

3. Information regarding the relationship between environmental variables and health of Bluenose East caribou.

Summary: Information on environmental variables and health were not included in the GN's 2019 TAH submission although some information on weather and caribou survival is available in GNWT's 2018 calving report.
Comment: Although preliminary, GNWT's analysis suggests that June temperatures correlate with cow survival: the drought index was unusually severe in summer 2012 when adult survival was reduced to 60%. Summer hot temperatures and low wind speeds are favorable to warbles flies harassment which in turn correlates with calf survival. However, more analysis is needed including updated trends in weather and a more detailed understanding of why survival is affected.

4. The Government of Nunavut's proposed TAH and any alternative recommendations, if any, and why.

Summary: GN recommended in 2019 for the Bluenose East caribou herd a TAH of 107 caribou with the Non-Quota Limitation of a male only harvest while TG and GNWT have accepted WRRB's more conservative TAH of 193 for the range of the Bluenose East herd.
Comment: At the December 2019 NWMB regular meeting, the GN briefing note recommended that the NWMB reduce the TAH for the Bluenose East caribou herd to 107 caribou with the Non-Quota Limitation of a male only harvest based on a herd-wide TG/GNWT recommendation TAH of 300 bulls.

The GN briefing note mentioned the January 2019 TG and ENR-GNWT joint management proposal for WRRB with its recommendation of a herd-wide TAH of 300 bulls using the same harvest allocation used in 2015 (35.8% for Kugluktuk). GN noted that WRRB had, in June 2019, determined a total allowable harvest of 193 bulls as a more conservative TAH than TG and GNWT. GN did not summarize WRRB's reasoning for the more conservative TAH which, however, WRRB did share with NWMB in December 2019. WRRB's reasons are the recent high rate of decline, uncertainties about the underlying mechanisms for the decline, the importance of caribou for food security and cultural strength, and the comparison to the rate of decline of the Bathurst herd.

There is then, an alternative recommendation for the TAH as TG and GNWT had in August 2019 accepted WRRB's determination for TAH of 193 caribou and also accepted the determination for the proportional allocation of the total allowable harvest for the 2019/20 and 2020/21 harvest seasons as Tłı̨chǫ Citizens: 39.29% (76 animals) and members of an Indigenous people who traditionally harvest Sahtì ekwǫ̀ includes Nunavut): 60.71% (117 animals).

The Kugluktuk Hunters and Trappers Organization (KHTO) has developed a community-based management plan for the Bluenose-East herd which was provided to NWMB in December 2019. KHTO explained that it has implemented 4 of the 7 proposed management

actions (No organized community or sport caribou hunts; no sale/purchase of caribou under the country food distribution program; support a shift in harvest to alternate species like muskoxen and create a no harvest zone for the BNE around the community). The other management actions include KHTO setting harvest limits, a requirement for reporting and educating KHTO members and reaching out for partners to create a predator management program.

In 2019, GN did not include a recommendation for wolf management but GNWT did in their 2019 joint proposal to WRRB acknowledge they were drafting a wolf management proposal which became available in January 2020 for the NWT.

5. Inuit Qaujimajatuqangit of the Bluenose East caribou, related to:

- Inuit approaches to caribou management in times of decline
- the socio-economic and cultural value of the Bluenose East caribou herd to Inuit
- knowledge of caribou behaviour, especially about the location of calving grounds and changes over time

IQ is outside my field although I am aware that the Inuit have a remarkable amount of information some of which has been compiled on these topics especially by the KHTO and is summarised in, for example, the KHTO Community Bluenose East Management Plan.

6. Inter-jurisdictional considerations when setting management actions for shared herds.

Summary: Information on monitoring and management is shared between the NWT and NU jurisdictions through the Advisory Committee for Cooperation on Wildlife Management while specific information on harvest management is shared through the jurisdiction of three co-management boards.

Comment: The KHTO Community Bluenose East Management Plan acknowledges that while Kugluktuk is the only community in NU that harvests the Bluenose East, the herd is harvested in the NWT.

In the NWT and Nunavut, the Bluenose East herd falls under the jurisdictions of three governments: TG, GNWT and GN and three co-management boards NWMB, SRRB and WRRB and the Yellowknives Dene First Nation, NWT Métis Nation, and North Slave Métis Alliance. The SRRB is developing community based management plans (Colville Plan - Dehlá Got'ıné ʔədə Plan and Deline Community Conservation Plan).

Management knowledge and actions are coordinated through the Advisory Committee for Cooperation on Wildlife Management (Gwich'in Renewable Resources Board, ʔehdzo Got’ıné Gots’ę́ Nákedı, Wek’èezhìi Renewable Resources Board, Kitikmeot Regional Wildlife Board and Tuktut Nogait National Park Management Board, Nunavut Wildlife Management Board).

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