Abundance Trends of the Beverly Mainland Migratory Subpopulation of Barren-Ground Caribou (*Rangifer tarandus groenlandicus*) June 2011 – June 2018

EXECUTIVE SUMMARY

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The Beverly barren-ground caribou (*Rangifer tarandus groenlandicus*) herd migrates annually into Nunavut from winter ranges in northern Saskatchewan and the southeastern Northwest Territories. Abundance estimates suggest that the herd has declined from an estimated 276 000 individuals in 1994 to approximately 136,608 animals in 2011. Since 2011, reconnaissance surveys conducted in 2013 and 2016 indicated further declines in relative densities of Beverly caribou. The results of these monitoring efforts provided impetus for an updated estimate of the Beverly subpopulation abundance in 2018. A general eastward shift in the Beverly herd's calving distribution towards the Adelaide Peninsula was also detected. While the Adelaide Peninsula is also used by the Ahiak subpopulation, analysis of historical collar data demonstrated that the Beverly herd showed a greater affinity for the area than the Ahiak or other NEM herds (Wager Bay and Lorillard).

In June 2018, we estimated the abundance of the Beverly barren-ground caribou herd based on the estimated numbers of breeding and non-breeding female barren-ground caribou within the herd's annual concentrated calving area (ACCA). The Beverly ACCA extends from the Queen Maud Gulf coastline to the eastern shores of Chantrey Inlet. We further re-assessed our 2011 abundance estimate to include the Adelaide Peninsula based on updated information gathered from collared Beverly caribou movements between 2011 and 2018.

We conducted the June 2011 and 2018 abundance surveys in five main stages, including a collar reconnaissance, Reconnaissance survey, abundance survey, calving ground composition survey, and fall composition survey. We used a systematic aerial transect visual survey technique for reconnaissance surveys to stratify the survey area by caribou density. Following reconnaissance, we flew a stratified systematic aerial transect visual survey to estimate the number

of adult and yearling female and breeding female caribou within the Beverly ACCA. Our survey protocol employed a dependant double observer pair method, developed during the 2011 abundance survey, and survey effort focused on estimating the number of adult and yearling caribou during peak calving. Additionally, we conducted composition surveys within all abundance survey strata to estimate the proportion of breeding and non-breeding females in each stratum. To obtain estimates of females, breeding females, males, and overall adult and yearling caribou within the the survey area, the estimated number of adult caribou (≥1 year old) for each survey stratum were multiplied by the sex and age class proportions of that stratum as estimated during composition surveys. Finally, whole herd estimates were extrapolated using sex ratios, quantified during fall composition studies.

The June 2018 abundance survey, including the Adelaide Peninsula, yielded a breeding female estimate of 48,977 (SE = 2600.9; CV = 0.053) and a total female estimate of 61,070 (SE = 2887.8; CV = 0.047). The extrapolated June 2018 whole herd estimate, based on the proportion of females within the herd, was 103,372 (SE = 5109.3; CV = 0.049).

Following an in-depth analysis of collar movement data, we reanalyzed June 2011 results to include the Adelaide Peninsula as an abundance stratum based on new findings suggesting the Beverly subpopulation from 2011 through 2018, showed a greater affiliation to the Adelaide Peninsula than the NEM caribou subpopulations. The reanalysis of the June 2011 results showed a change in the breeding female estimated abundance from 52,834 (SE = 2638.0; CV = 0.05) not including the Adelaide Peninsula, to 67,414 (SE = 3250.5; CV = 0.048) when the Adelaide Peninsula was included. Similarly, the estimate of adult females changed from 62,620 (SE = 2936.3; CV = 0.047) to 80,705 (SE = 3724.3; CV = 0.046). The extrapolated herd size using the proportion of females quantified using fall composition studies, changed from 105,995 (SE = 5199.0; CV = 0.049) to 136,608 (SE = 6603.3; CV = 0.048) with the inclusion of

the Adelaide Peninsula. Our June 2018 estimate and revised 2011 estimate suggest an annual rate of decline from June 2011 to June 2018 of between 4 and 5%. We performed t-tests for the significance of the observed decline. The decline in females, the most precise metric of change from our survey method, proved statistically significant, confirming a continued decline in the Beverly subpopulation.

Key words: Calving ground visual survey, Caribou calving ground, Kitikmeot region, Double observer pair method, Barren-ground caribou, Beverly Subpopulation, Ahiak subpopulation, Northeast Mainland, Queen Maud Gulf, Adelaide Penninsula, Nunavut, *Rangifer tarandus groenlandicus*, abundance, population survey, decline.