Wek'eezhii Renewable Resources Board
102A, 4504 49th Ave
Yellowknife, NT, X0E 1W0

Re: Information Request Round No. 2 – Diga Revised Joint Management Proposal

Dear Chairman Judas, Members of the WRRB, and Participants

We recently submitted an article showing that barren-ground caribou are best described as a cyclic species. This finding has implications for proposed management actions (including wolf control) on barren-ground subpopulations (including the Bathurst and East Bluenose subpopulations). In our article (Bongelli et al. 2020) we showed that the best numerical description for both Bathurst and the East Bluenose barren-ground subpopulation dynamics was the sine cycle. Using the discrete version of the logistic equation, we were able to back-calculate the carrying capacity (K) for each year of the cycle. The figures below show the estimated number (N) for each year, the estimated carrying capacity (K) for each year and time required for caribou numbers to increase to apparent carrying capacity (increase phase) or decline to apparent carrying capacity (decline phase).

The results demonstrate that barren-ground caribou numbers are always only a few years away from carrying capacity throughout their cycle. In Bongelli et al. (2020) we show that carrying capacity is driven mostly by range rise and range productivity.

The relevance of these results to the proposed wolf control program is that barren-ground caribou cannot increase faster than their range recovers. Similarly, barren-ground caribou decline at about the same rate as carrying capacity declines. The lag times (time it takes for N(t) to reach K(t)) for both the increase phase and the decline phase are short (<2 years) suggesting that factors other than range are neither retarding nor enhancing barren-ground caribou rates appreciably. How much would wolf control enhance recovery of barren-ground caribou given that barren-ground caribou appear to be perpetually close to carrying capacity? We suggest an "accept and accommodate" approach to barren-ground caribou management during the cycle lows simply because anything short of range enhancement may be ineffective at modification of the natural caribou cycle appreciably.

Sincerely,

Eric Bongelli

Figure 1: The projected population (N) cycle of Bathurst caribou (blue) is compared to the logistic carrying capacity (K) in orange. The difference between the projected population abundance and carrying capacity (green, left axis) is no greater than approximately +/- 2,300 individuals at any point throughout the population cycle.
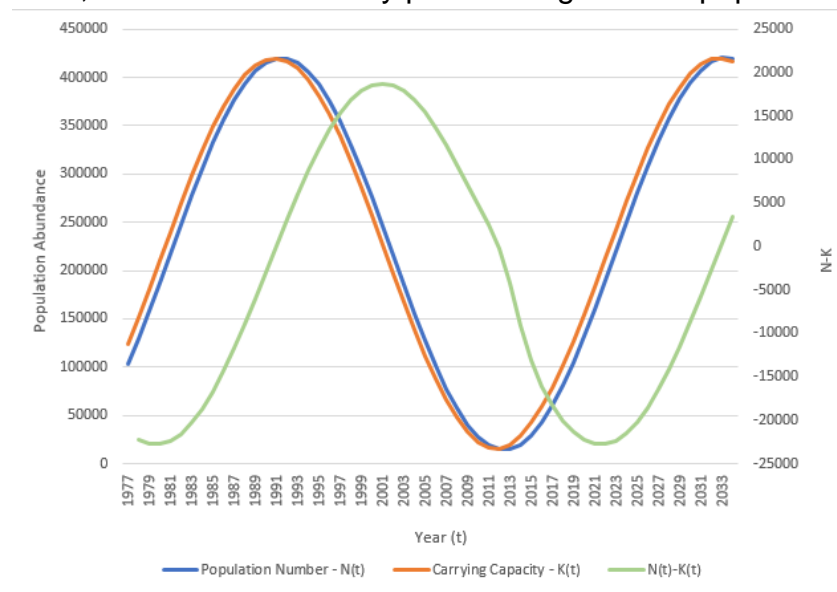

Figure 2: The projected population abundance of Bathurst caribou (blue) is compared to the projected carrying capacity (orange). The lag time (in years) between population abundance and carrying capacity never exceeds 2 years, with an average lag time of 0.97 years suggesting that Bathurst caribou population numbers track carrying capacity closely throughout the high and lows of the population cycle.