

Habitat Indicators for the Bathurst Caribou Herd

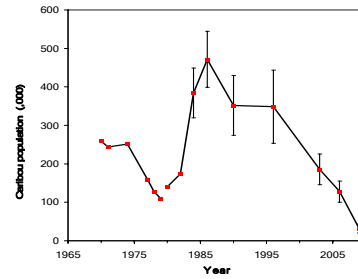
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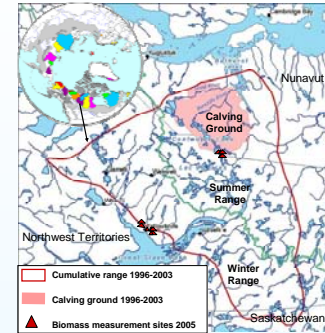
Objectives

The Bathurst caribou herd is used by ten northern communities (i.e., Behchokö, Cambridge Bay, Dettah, Gamëti, Kugluktuk, Lutsel K'e, N'Dilo, Wekweëtì, Whatì, and Yellowknife). From 1986 to 2009, the population of the caribou herd decreased by ~96%. A complex of factors (e.g., habitat, harvest, predators, diseases/parasites, extreme weather events, climate change, and pollution) may interact to influence the abundance. To understand the interactions of those factors with caribou abundance especially in the face of a changing climate, we need to quantify these factors. The objectives of this study are: (1) to define a comprehensive set of habitat indicators: calving ground forage availability and forage quality; summer range forage availability, forage quality, and insect harassment severity; winter range forage availability, forage quality, and forage accessibility; and pre-calving migration snow condition; (2) to develop historical datasets of these habitat indicators for the Bathurst caribou herd using field measurements, satellite remote sensing imagery, and climate records; and (3) to analyze the relationships between climate variables and these habitat indicators for the Bathurst caribou herd.

Results



Winter Range



Migration Range

Conclusions

- (1) Before and during peak calving, there was no significant amount of foliage biomass on the calving ground in most years during 1985-2006. Caribou eat primarily lichens, which was in a general decrease in recent decades.
- (2) On the summer range, climate warming increased forage availability, but also increased insect harassment and decreased forage quality.
- (3) On the winter range, we used two indicators of the winter forage accessibility: annual maximum snow depth and mean ice content in snow (ICIS). There was a significant increasing trend in ICIS during 1963-2006, but no trend in maximum snow depth. Both indicators showed large inter-annual variations. The percent of years in which ICIS > 10 mm water equivalent increased from 14, 20, 20, 30, to 43%, respectively, during 1963-69, 70s, 80s, 90s, and 2000-06. Thaw-freeze cycles contributed ~90% of ICIS, while rain on snow events contributed ~10%. In addition, there was also a significant decrease in mature forested area, which is used as a measure of lichen availability in the winter, during recent decades due to increase in burned area.
- (4) During the pre-calving migration, the percent snow cover along the migration routes showed large inter-annual variation but no significant trend.

Next Steps

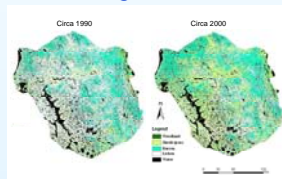
- To update the habitat indicators for the Bathurst Caribou herd to 2009;
- To develop similar sets of habitat indicators for other major migratory tundra caribou herds in Canada;
- Caribou researchers/managers to understand and assess the linkage between habitat indicators and caribou body/health conditions as well as population changes.

Publications

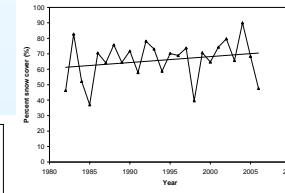
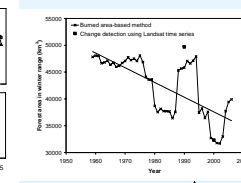
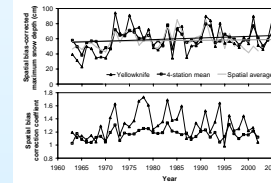
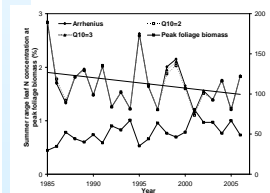
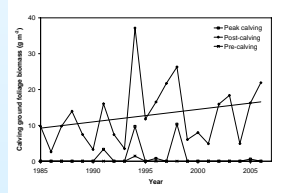
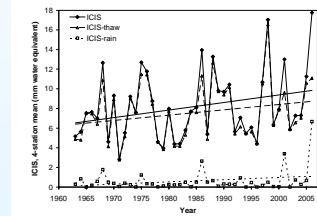
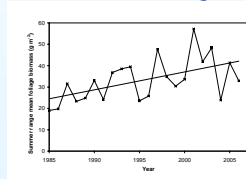
Chen W, Russell DE, Gunn A, Croft B, Li JH, Chen WR, Zhang Y, Koehler K, Olthof I, Fraser RH, Leblanc SG, Henry GR, White RG, Finstad GL (2009a) Habitat indicators for migratory tundra caribou under a changing climate: calving ground and summer range. *Climatic Change* (submitted)

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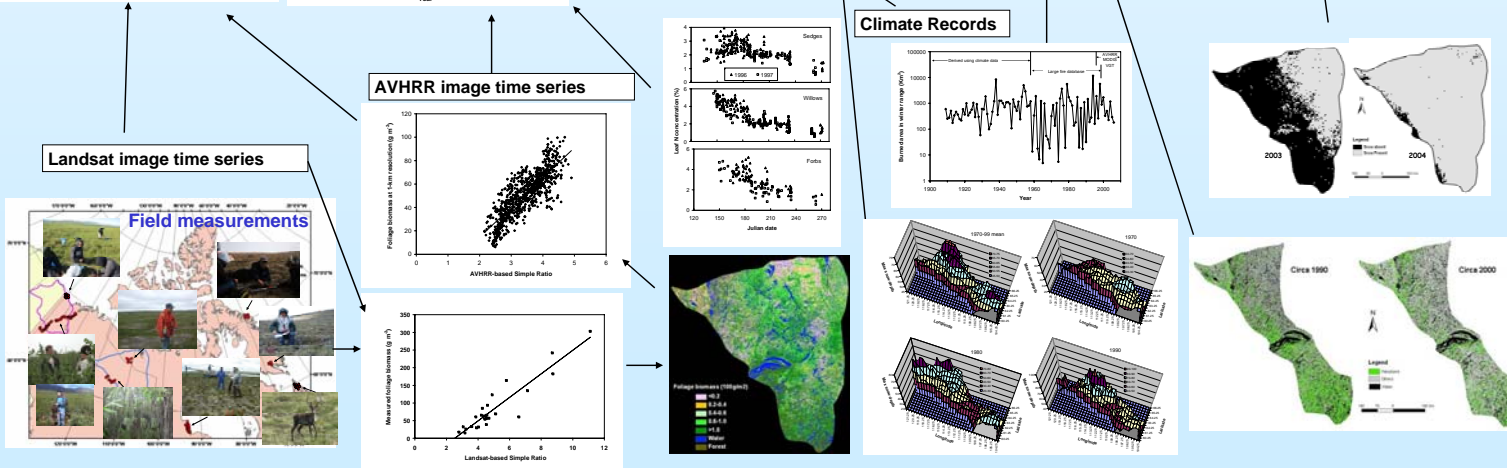
Calving Ground



Summer Range



Inputs Data/ Methods



Natural Resources Canada

Ressources naturelles Canada

