

**Utaqqiisaagallartumik 2010-mi ukiaaneraniit/2011-mi ukiuuneranut  
tunngatillugu tuttuk pisaqarnissamut siunnersuut**

**NAMMINERSORLUTIK OQARTUSSANUT SIUNNERSUUT**

**suliarinnittut**

**Christine Cuyler, Josephine Nymand & Fernando Ugarte**

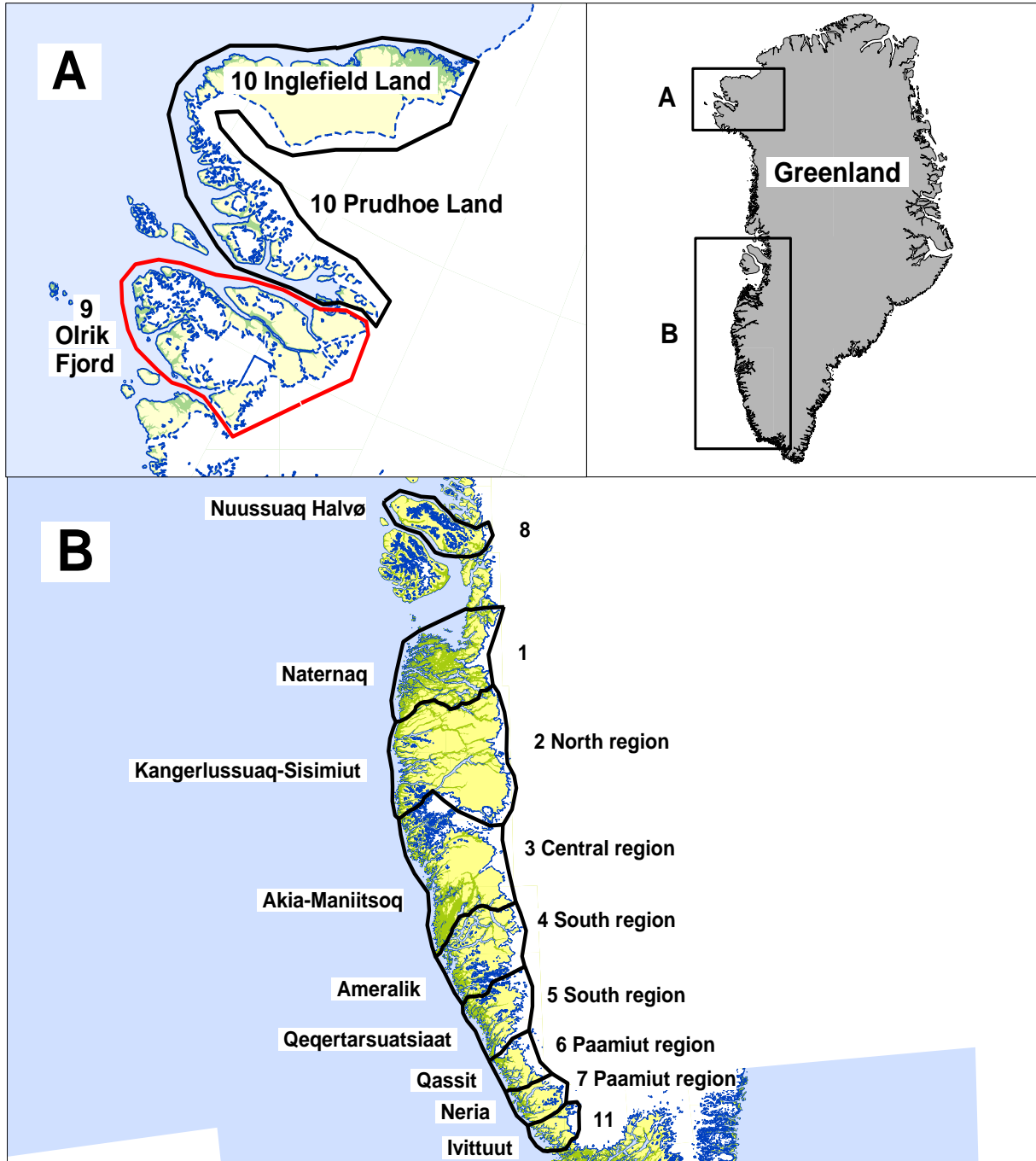
**Pinngortitaleriffik – Grønlands Naturinstitut, Nuuk**



**31. maj 2010**

**2010-mi ukiaaneraniit/2011-mi ukiuuneranut tututassanut siunnersuut**

Pinngortitaleriffimmiit Aalisarnermut, Piniarnermut Nunalerinermullu naqitaq una nassiutaq tassaavoq Kitaani Avannaanilu 2010-2011 ukiakkut/ukiukkut tutunniarnissamut tunngatillugu siunnersuutaagallartoq.



**Figur 1.** 2010-mi kalaallit tuttoqarfii/nujuitsunik tuttoqarfii piniarfissatut normulersukkat, pisariaqaraangal-  
lu tamatuma taaguutaanik nalunaarsimasut.

Tuttoqarfiit taakkua 11-t avannaaniit kujammut (nunap immikkoortuata taaguutaa ungaluuserlugu) nalunaarsukkat (fig.1):

- **Inglefield Land / Prudhoe Land:** tuttui ikittuinnaapput
- **Olrik Fjord / Pituffik:** tuttui ikittuinnaapput
- **Nuussuaq Peninsula:** tuttui ikittuinnaapput
- **Naternaq (Naternaq):** tuttui ikittuinnaapput
- **Kangerlussuaq–Sisimiut (avannaa):** tuttorpassuaqarpoq
- **Akia–Maniitsoq (qeqqa):** akunnattumik amerlassusilinnik tuttoqarpoq
- **Ameralik (kujataa):** akunnattumik amerlassusilinnik tuttoqarpoq middelstor population
- **Qeqertarsuatsiaat (syd):** tuttui ikittuinnaapput
- **Qassit (Paamiut):** tuttui ikittuinnaapput
- **Neria (Paamiut):** tuttui ikittuinnaapput
- **Ivittuut:** qanoq amerlatiginerat ilisimaneqanngilaq (tuttut nujuitsut)

Tuttoqatigiikkuutaat killingi (Fig.1) nalinginnaasumik tassaapput nunap ilaa/nunap immikkoortua, tuttoqatigiinnik taakkuninnga piniarfigineqarsinnaasut. Inglefield Land-ili ilaatinneqanngilaq, tassami tamatuma kangisinnerusortaa 2005-imiit piniarfigeqqusaanani eqqissimatitaasimammat. Kitaanut tunngatillugu siunnersuummi taamaallaat pineqarput tuttoqarfiit sungaartumik nalunaaqutserneqarsimasut.

### **Kitaani tuttoqarfinni arfineq marluusuni 2010-mi piniarnissamut siunnersuut**

Kitaani tuttoqarfinni 2010-mi ukiakkut/2011-mi ukiukkut tutturniarnissamut tunngatillugu inassuteqaatit makkua atorneqarsinnaapput. Kitaanik oqarnermi isumagineqarpoq avani Disko Bugtimiit qavunga Paamiut kujataannut aammalu avannaaniit kujammut tuttoqarfiit makkua tassaniipput (fig. 1B): Naternaq, Kangerlussuaq-Sisimiut, Akia-Maniitsoq, Ameralik, Qeqertarsuatsiaat, Qassit Nerialu.

Ukiuni kingullerni qulini tuttoqarfiit region 2, 3, 4, & 5 tassaasimapput tuttoqarfiunerpaat (imaappoq katil-lugit 150.000 sinnerlugit peqarlutik) aammalu tassaallutik tutnunut pisaasimasunut tunngatillugu pingaar-nerpaat.

### **Kitaani 2010-mut tunngatillugu inassuteqaatit:**

- 1) *Regionini tamani ammasumik piniarneq ingerlatiinnarli, imaappoq, kitaani tuttoqarfinnut tamanut tunngatillugu pisassat amerlassusii aalajangernaqit, tamatumuuna siunertaralugu tutut amerlassusiata annikillisarneratigut naasunik/ivigartorfimminnik mangiarpalaarnerat nungullarsaanerallu annikillisinniarlugu.*
- 2) *Kitaani regionini ukiuunerani aavartoqassanngitsoq – taamaallaat region 2 (Kangerlussuaq-Sisimiut) pinnagu.*
  - Ukiuunerani aavartoqartarnera kulavannut naartusunut ilungersunarsinnaasarpog. Kulavaat ima peqqillutillu nukittutigigaangamik naartusinnaanngorsinnaanngortarput taakkulu naartu-lerlutillu norrisinnaasarput massakut pissutsit atuukkaluartillugit, taakkorpiaappullu tuttoqatigiit klimap allanngorarneranik, igivartorfissarliornermik aamma/imaluunnit nappaalalerner-mik pissuteqartumik tutut ikilerujussuarnermik eqqorneqassagaluarpata kinguaariit kingor-nussassaannik pisariaqartinneqartumik tigummisallitartut.

- Ukiuunerani aavarnissaq *Kangerlussuarmut-Sisimiunut* inassutigineqarpoq, tamaanimi suli tutut amerlallutillu eqimaqimmata massa 2003-miilli sivilisuumik killilersugaanngitsumillu aavarfiugaluartoq.
- 3) *Regionini tamami, taamaallaat region 2 (Kangerlussuaq-Sisimiut) pinnagu, ukiakkut aavarneq sivikillili.*
- 2010-mi regionini tamani, region 2 kisiat pinnagu, aavarneq qaammatip pingajua qiteqqullugu sivilisutiginersooq isumaliutigineqarsinnaavoq.  
*Region 2, Kangerlussuaq-Sisimiut taamatut aavarnissamik sivikilliliinermi ilaatittariaqanngilaq.*

### **Inglefield Land-imi, Olrik Fjord-imi, Nuussuarmi Ivittuunilu 2010-mi aavarnissamut siunnersuut**

2006-imi (Cuyler & Witting 2006, bilag 2) tuttoqarfinnut taakkununga sisamanut tunngatillugu siunnersuutigineqartumik nutarterinissamut tunngaviusinnaasunik pissarsisoqarnikuunngilaq. 2006-imisulli inassutigaarput tuttoqatigit pineqartut aqutsivigineqarneranut tunngatillugu aalajangiinissat najukkani pisortat atuisullu isumasiorlugit ingerlanneqassasut.

### **Tuttut ajornartorsiortillugit siunnersuineq – tutut ikileriaataassagaluarpata inassuteqaatit**

Ungasinngitsukkut Kalaallit Nunaanni tuttoqatigiit tamarmik tuttoqatigiilluunniit amerlanersaasa tuttuusa ikileriarujussuarnissaat ilimagineqarmat taava sumi, qaquguugaluarnersooq ikileriarujussuarneqarpat iliussissat makkua pilersinneqarsinnaapput. Inassuteqaatit taakkua siunertaraat tuttu ataasiakkaat amiakkuutinnissaat siunissami tuttoqatigiit amerliartoqqilernissaanni toqqammaviuniassammata.

- 1) *Ukiakkut aavarfiit sivikitsut*, assersuutigalugu augustusip aallartinnerani weekendit pingasut akornanni sap.ak. marlunnik sivilisussilerlugit tuttu amerlanersaat suli tikikkuminaatsumi tiffasikkallartillugit. Taamatut aasaanerani/ukiaanerani sakkortuumik anorlerajunnerata nala iluatsillugu sakkortuumik aavarnermik sivikillineq pissutigalugu aavartut ilarpasui peqarfimmut anngussinnaasarnaviannngilat. Tuttummi ikililluinnarpata aavarneq weekendit marluk akornannut suli sivikilleqqinneqarsinnaavoq. Aavartut sinerissamiit tuttoqarfimmi tiffarsinnaanerata aamma killilerneqarsinnaavoq, assersuutigalugu 10 km sinnernagu. Tuttu nunap timaanut qutsissumulluunniit illikarsimasut taamaallutik aavarnermit eqqissiviillortinneqarnissaq (pisarineqarnissarluk) pinngitsoorsinnaassagaluarpaat.
- 2) *Ukiuunerani aavartoqassanngilaq.* (Inglefield-Prudhoe Land-ilu immaqta tamatumani ilaatinngitsoorneqarsinnaassapput taakkuami qimarnguissaqareermata/eqqissisimatitaaffeqareermata).
- 3) *Qimanguissat annertuut/eqqissisimatitat/eqqissisimatitsiviit/regionini eqqorneqartuni pilersillik.* Regionini ataasiakkaani ataasiinnaanngitsumik eqqissisimatitsiviliisoqarsinnaavoq. Regionini ataasiakkaani tamaanimiunik/piniartut kattuffiiniq oqaloqateqarnikkut tuttu immikkut pingaaruteqarsorisat toqqartorneqarsinnaapput. Taamaalioinermi aallaavigineqassapput tuttu norravigisartagaat norrinerullu kinguninngua najortagaasa ukioq kaajallallugu aavarfiusussaannngitsut.
- 4) *Kulavaat norrisartut piniarneqassanngillat.* Kulavaat norraqanngitsut pisarineqarsinnaassapput.
- 5) *Piniarnermi sapinngisamik arnavissat angutivissallu amerlaqatigiikannersumik pisariniarneqassapput.* Pingaartumik tuttu ikitsillugit angutigiaannaat piniarneqarnissaat inassutiginnngilarput, tassami tuttoqatigiit kingornuttakkamikkut akiuussinnaassuseqarlutillu nukittuujuusariaqarmata. Tuttoqati-

giit ikittunnguugaangata angutiviaannarnik piniarnikkut tuttu taakku ajortumik sunnerneqarsinnaapput.

- 6) *Killilersugaanngitsumik piniarneq ingerlaannarpoq.* Taamatut inassuteqarneq immaq immiut akerlilernertut isigineqarsinnaagaluarpoq, taamaattorli killilersugaanngitsumik piniarnissaq sakkortuumik inassutigineqarpoq, tassami ilimanarmat taamaanngippat tuttu ikittuinnaat pisarineqassagunarmata. Aavarnerli augustusip aallartinneraniitikkaanni (tak. Punkt 1), sulikiallartillugu (klimap allanngorneri) taava tamatuma kingunerissavaa tuttu ikittuinnaat sinerissap qanittuaniikkumaartut. Killilersugaanngitsumik sivikitsuarannguamillu aavarneqarpat aavartorpassuit ataatsikkut aavarfimmikkumaarput. Tuttullu tamaani amiakkuusut erniinnaq navianartoqarnera malugissavaat ungasinnerusumukarlutillu, taamatut aavartut amerlanerata aavarfiup nalaani killilersugaanngikkaluamik tuttuassat killilersimaarumarpai. Qimarnuissanik piniarfigeqqusaanngitsunik pilersitsinikkut tuttuqatigiit ilaasa pigiinnarneqarnissaannut iluaqutaajumarpoq.

# Appendix 1

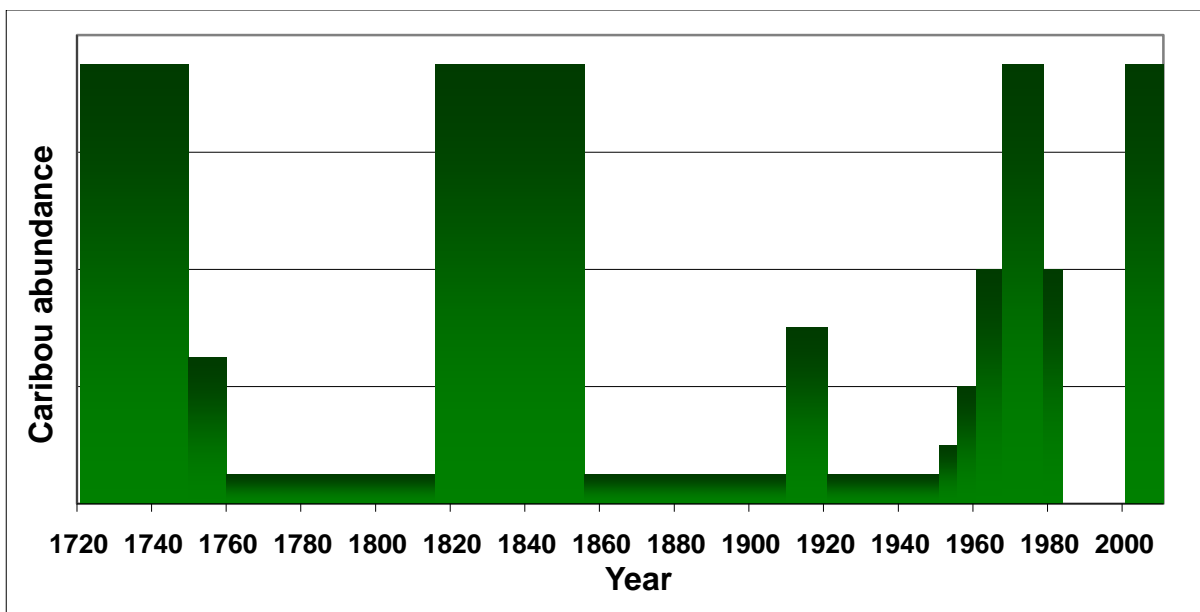
## Supplementary Background Information

The Greenland Institute of Natural Resources attempts to provide harvest recommendations, which will promote sustainable harvest / use of the caribou herds. Natural extreme fluctuations in abundance can be expected. Caribou numbers have been high for more than a decade. However, the situation can change and it is unlikely we could force a continued high abundance by any intervention on our part. In the past population declines have probably been the result of a combination of natural cycles and stochastic events (e.g., icing event or drought) rather than hunter harvest. Future declines are expected to follow this pattern.

### 1721 to Present Day

Records, since Hans Egede's time (Fig. 3), indicate that caribou abundance in West Greenland fluctuates between minimum and maximum extremes, which make several points apparent:

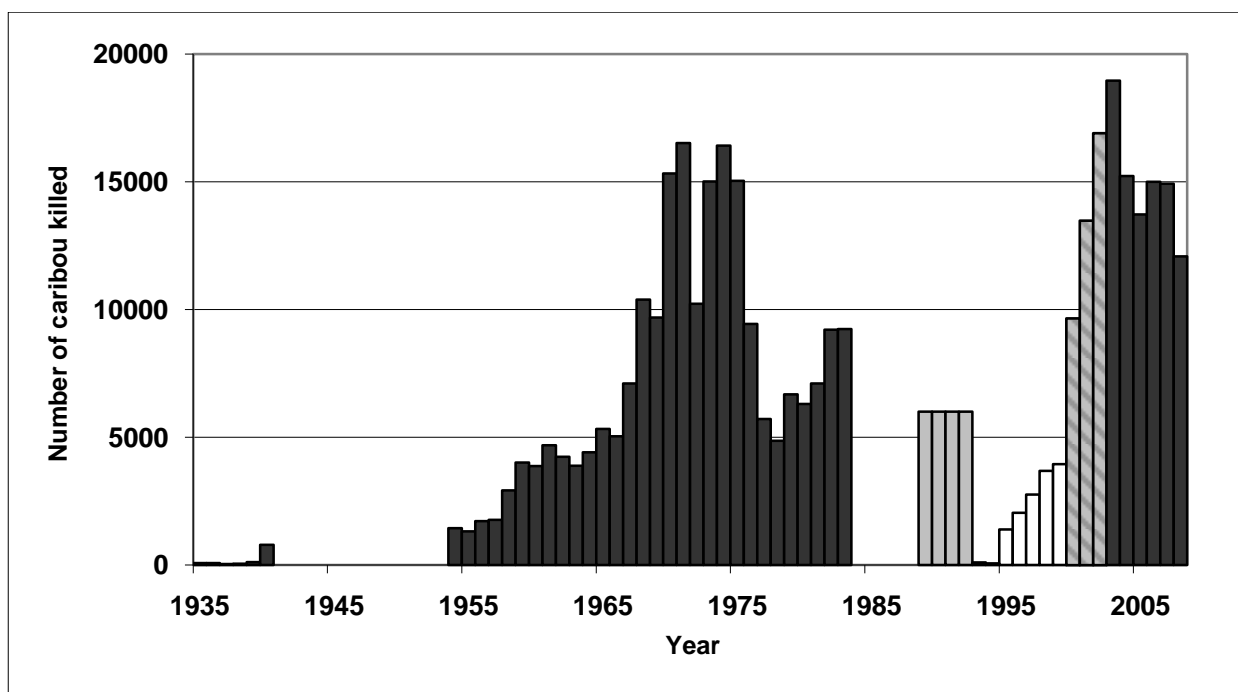
- 1) Fluctuations are natural,
- 2) Fluctuations are analogous to a mouse versus an elephant on a scale of size,
- 3) Time duration of a minimum far exceeds maximums (e.g., minimums may last the better part of a century or more, while maximums may last four decades or less),
- 4) In the past caribou populations eventually recovered creating a new abundance boom.



**Figure 3.** Historical rise and fall cycles of relative caribou abundance in West Greenland based on Vibe (1967), Meldgaard (1986) and the 2001 abundance estimate. Only general trends are illustrated, since the caribou populations in west Greenland do not cycle in absolute synchrony (Meldgaard, 1986), and estimates were unavailable before 2001. During periods of low abundance, records suggest caribou disappear almost entirely. No harvest records were available from 1983 to 1995. (from Cuyler 2007).

It would appear that caribou maximums occurred from ca. 1721 to 1760, from ca. 1815 to 1855, and during the latter half of the 20<sup>th</sup> century perhaps continuing until present day. The first two boom periods lasted

about 40 years, and then abundance plummeted in West Greenland. Annual reported harvests were almost non-existent until the next boom. After the crash of 1855, caribou remained scarce in West Greenland until well into the 20<sup>th</sup> century. Their scarcity was the main incentive behind the decision to bring semi-domestic reindeer from Norway to the Godthåb region in 1952. The semi-domestic reindeer were intended to provide a replacement source of meat for Greenlanders. By the 1970's, however, reported wild caribou harvests for West Greenland were typically well over 10,000 animals annually. Was this the beginning of the present period of caribou abundance? Local hunter knowledge from the Godthåb region suggests that caribou numbers increased steadily from 1950 up to about 2000, with no apparent population crashes. Meanwhile, harvests remained high, albeit somewhat variable, until harvest reporting ceased in 1983. After a hiatus of 12 years harvest reporting resumed in 1995, however, owing to the restrictive quotas enforced between 1995- 2000, harvest for this period do not reflect caribou abundance. Since open harvests began in 2002 harvests once again reflect caribou abundance. This information in conjunction with the abundance estimates available since 2000 indicate that caribou numbers in West Greenland have been high for the better part of the last 40 years.



**Figure 4.** Caribou harvest records 1935 – 2005 (Anon: Grønlands fangstlister, Piniarneq). No records were kept from 1983 to 1995. Dark columns, 1935-1983 and 2003-2005, are open harvest. Light grey columns, 1989-1992, are assumed harvest level (Peter Nielsen, pers. comm.). Open columns, 1995-1999, are harvests under low quotas. Grey columns with diagonal lines, 2000-2002, are reported harvests attained when legal quotas were dramatically increased. Results for 2008 are the preliminary harvest up to end of September 2008 only. (modified from Cuyler 2007).

It is unlikely that hunting has played any significant role in the oscillations of abundance observed since 1721. Human harvest was an improbable principle factor behind the 1760 or 1855 crashes. The human population was too few and hunter equipment and mobility too primitive to substantially impact the seven West Greenland herds each possibly numbering 50,000 to 100,000 animals at a peak in abundance. Even today, with intensive and modern hunting implemented as a management tool to reduce population numbers over the past decade (with an eye to preserving vegetation from overgrazing and trampling), we have been unable to make a visible impact on the abundance of the largest caribou population (Kangerlussuaq-Sisimiut).

Given recent and past harvest records (Fig. 4), caribou abundance has been probably high since the 1970's, a period of about 40 years. Past periods of abundance lasted about 40 years, which suggests that the present period of high abundance is approaching its end. Herds were at high numbers around the turn of the century. Since then, surveys for abundance and open harvest data indicate that these same herds have declined steadily.

Today, much of the vegetation across the several ranges in West Greenland appears to be overgrazed and in places severely trampled (unpublished data). Further, since 1997 general body condition and reproduction have declined in the two largest caribou herds in West Greenland (unpublished data). The other five herds may be similarly affected. The declines, poor condition and reproduction appear correlated with the loss of vegetation.

Given that West Greenland caribou do not have any large predators or competing species, we propose that the severe fluctuations in caribou numbers are the result of West Greenland's simple land-limited feed-back system, whose central role in affecting caribou numbers has been previously overlooked. In brief: the climate limits the quality, quantity and availability of vegetation, which in turn limits the number of caribou. Hence the theories regarding the North Atlantic Oscillation (NAO) with its effect on precipitation in Greenland and ultimately caribou numbers (Vibe 1967, Forchhammer et al. 2002). A further important dimension to the Greenland feed-back system: at peak animal abundance, the caribou in turn limit (overgraze and trample) the vegetation, destroying the very foundation of their continued existence. The ultimate result would be the extreme cycles of caribou numbers evidenced in West Greenland.

## **Discussion**

The West Greenland caribou populations (and also the wildlife managers) face a challenging future. Climate change is occurring and weather conditions in any season could become unusual or unstable. Whether the ultimate result will be positive or negative is unknown, however in the short term of the next several decades, negative impacts are expected. Concurrently, the slow growing arctic vegetation, which is the food resource and ultimately the basis for healthy caribou populations, appears overgrazed and in places severely trampled across several ranges in West Greenland, the result of many years high caribou abundance and density. Deteriorating range conditions are evidenced by the currently declining body condition and reproduction in the two largest and most productive herds in West Greenland.

The vegetation caribou depend upon to survive the arctic winter does not regenerate quickly. Specifically, preferred lichen species are slow growing (Kärenlampi 1971, Helle et al. 1983, den Herder et al. 2003). Dry summers stop growth because lichens are poikilohydric i.e., their growth depends on their water status and the irradiance they receive when wet (Palmqvist and Sundberg 2000, Gaio-Oliveira et al. 2006). Meanwhile, summers with increased rainfall, fog and cloud cover can alleviate the negative effect of trampling (Cooper et al 2001). Under optimal conditions lichens may need a grazing pause of 20-40 years or more before recovering (Crittenden 2000).

The available area suitable for caribou in West Greenland is relatively small. Caribou density today and in the latter half of the last century has far exceeded the recommended target for sustainable range use by caribou (1.2 caribou per sq km). There is a limit to the amount of overgrazing and trampling arctic vegetation can withstand without collapse. The vegetation is the food resource foundation upon which caribou herd abundance and health is dependent. Caribou populations inevitably decline when vegetation is compromised or in short supply. Caribou body condition suffers resulting in for example poor reproductive success, poor immune response and decreased survival. With high density additionally contributing to patho-



gen transmission, then disease prevalence and parasite loads can be expected to increase and further contribute to poor calf production plus calf and adult mortality.

The pressures of climate change coupled with poor food availability, quantity and quality could drastically and immediately impact herds negatively through among other things severe winter thaw-freeze events, or extended summer droughts. Even without sudden stochastic events, given the current reduction in caribou body condition, the combination of unstable changing climate and poor range could influence pathogen dynamics, altering transmission and disease. The incidence of parasites and infectious disease could increase and over a short period of years seriously decrease reproduction and ultimately animal number in any or all West Greenland herds.

With indications that Greenland caribou abundance may already be declining, and climate uncertainty a reality, the future of the West Greenland caribou populations will need flexible and often rapid innovative management measures in the face of possible abrupt drops in abundance. Similar widespread declines in caribou abundance across Canada, suggest that our situation is not unique. In any event, the vegetation (i.e., what remains despite overgrazing and trampling), which is the corner-stone for caribou abundance and health, must be protected [from further overgrazing and trampling] to ensure a healthy future for West Greenland caribou however few or many they may be in future.

Furthermore, in anticipation of greater hunter access to remote caribou areas brought about by increased mining and mineral exploration activities and infrastructure development, GINR suggests that for the future the following be taken into consideration:

- a) A general hunting prohibition in the vicinity (e.g., 5 km) of roads, settlements and development infrastructures.
- b) Prohibit the use of motorized vehicles (e.g., car, trucks, ATV's, quads, or skidoos) regardless of season, and apply this to all hunters, i.e., commercial, sport and trophy hunters, when hunting or transporting caribou.

The former may reduce disturbance where development opens hitherto untouched wilderness to the public. The latter would prevent further degradation of vegetation and reduce physiological stress on the caribou.

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