Variation in body condition of female-calf pairs in two herds of migratory caribou in Northern Québec/Labrador

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I am very glad to be present at the workshop today to share with you some results from of my phD project.

The results I will show concern first the variation of body condition of adult females and calves of Rivière George and Rivière aux Feuilles. Secondly, I will introduce our recent body condition monitoring effort to relate the body condition of female-calf pairs.

Body condition monitoring

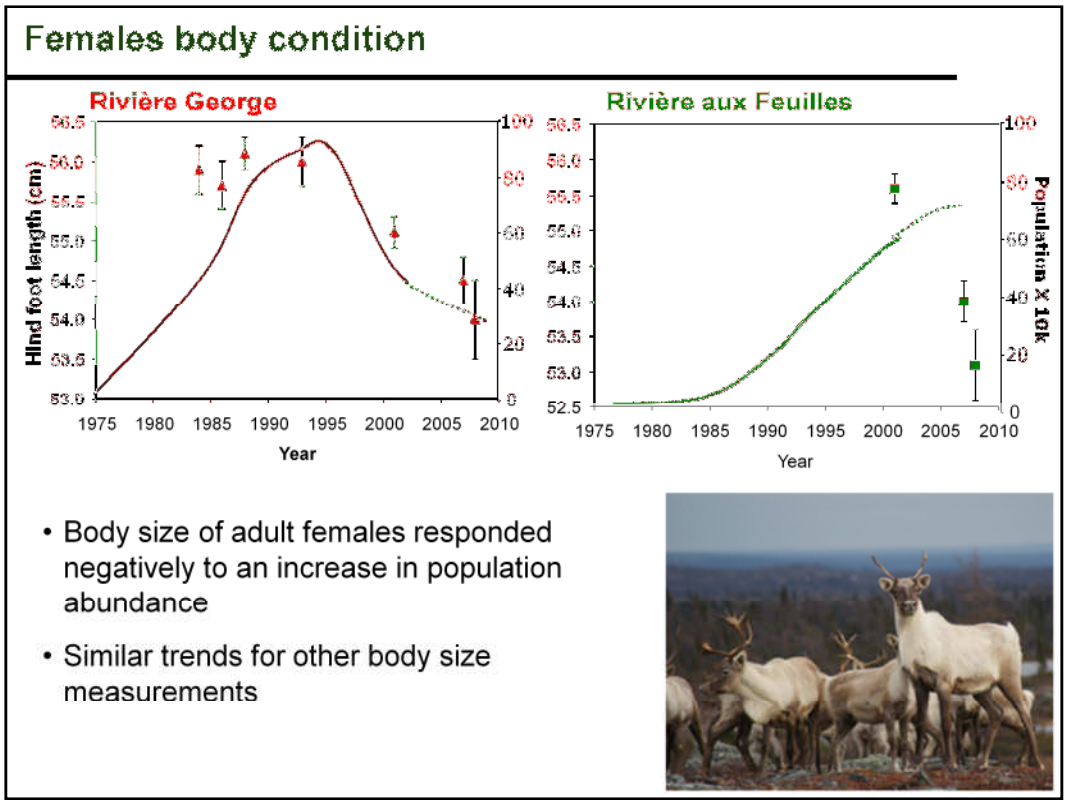
- 1975-2002: random adult females and calves
- 2007-2008 : June & Oct.-Nov.: female-calf pairs (n=15 to 20 for each herd)

- **Measurements :**
  -body mass (kg)
  -body size : body length, chest girth and hind foot length (cm)
  -Fat reserves : kidney fat (%)

Méthodes : suivi de condition physique

-Body mass : un des meilleurs indicateurs de condition des animaux. Cette mesure reflète les variations annuelles de l'habitat.

-Body size measurements : est un indicateur des conditions rencontrées par les animaux à la naissance et lors de la croissance



First I will show some long-term data of adult females body condition.

1-Présenter les graphiques avec les axes : year - Hind foot length in centimeters for both herds. Strong variations among years.

2-Surperpose population size of both herds. Body size of adult females, measured with hind foot length, respond negatively to an increase of population abundance.

Similar trends for other body size measurements and body mass. Tendances similaires pour autres mesures de taille squelettique

3-These results suggest an influence of population abundance, probably throught over-used of summer habitat, on the body size of individual.

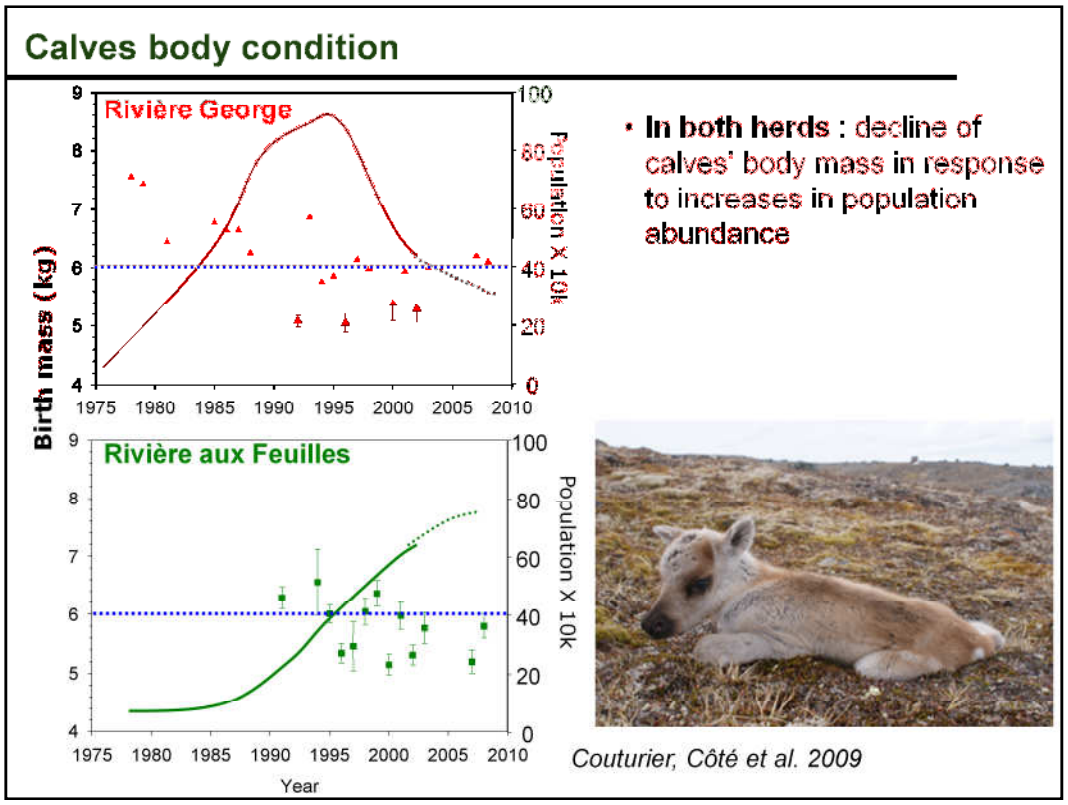
Réponse masse et taille à une augmentation de l'abondance de population : ces données à long terme suggèrent que la taille corporelle est maximale au début de la croissance démographique et décline par la suite jusqu'à ce que la population plafonne.

Délai : effet démographique pouvait être exercé par la surutilisation de l'habitat d'été mais également par des variations des taux de mouvement étant donné que le caribou migrateur augmente ses déplacements lorsque la taille de la population s'accroît.

*** Mouvements sont positivement reliés à la taille de la population chez les deux troupeaux. Le variation temporelle des mouvements semble être l'un des mécanismes impliqués dans la réduction de la condition corporelle des femelles adultes

Une aire estivale petite et sur-broutée, ainsi que des effets densité-dépendants, auraient affecté la nutrition estivale.

Comme nous avons montré dans une étude parallèle, le taux de mouvement a un effet sur la masse des faons et la condition durant la période juvénile pourrait avoir une influence



Long-term data of calves body condition.

Données **FAONS**

1-Présenter les graphiques avec les axes : year - birth mass. seulement body mass
Blue line : treshhold birth mass identify by the phD work of Serge couturier.

From his work, we can consider that for a birth mass under this line, the population size should be decreasing and above it stable or increasing.

Similarly to adult females, we observed variations in the birth mass of calves.

2-Adding the population size population, we note, for both herd, a decline of birth mass in response to increases in population abundance.

Réponse très rapide de la masse à l'augmentation d'abondance de pop

Importance of birth mass :

Smaller calves = -reach secual maturity later

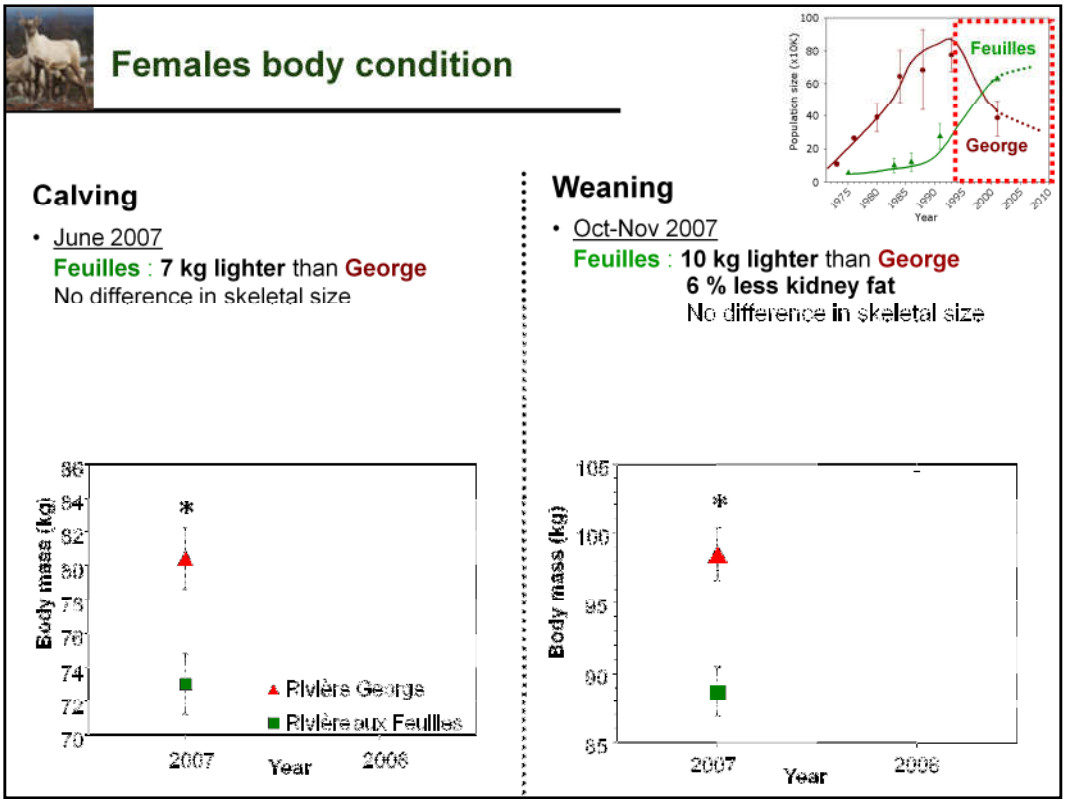
-give birth to smaller offspring

-negative impacts on survival

and future reprod success

3-Explication les plus plausibles : Up and down annuels :

influence positive de la qualité de l'habitat en juin (NDVI) et de l'indice climatique



Data from our female-calf pairs monitoring of 2007 and 2008.

Calving : in 2007 : Females from the Feuilles were much more ligther at Calving and Weaning than females of the George.

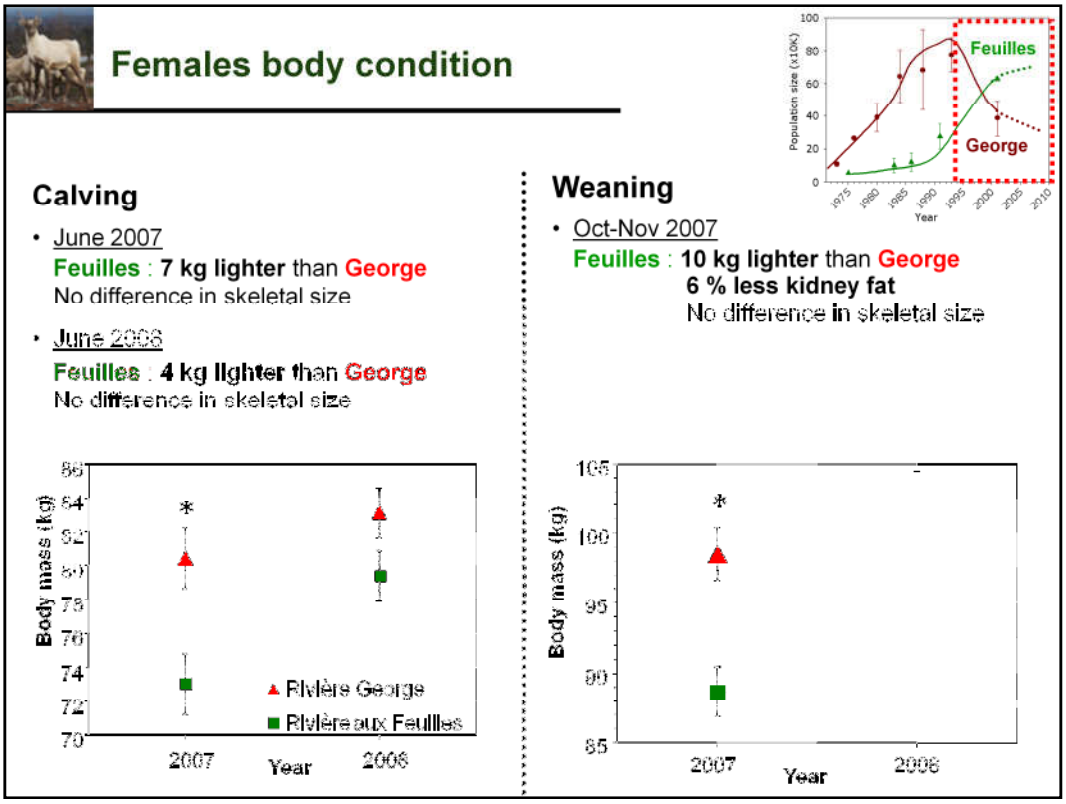
Females were 7kg lighter at Calving and 10kf ligther at weaning. Moreover, they presented less kidney fat than Rivière George females at weaning.

We found, however, no difference in skeletal size.

These results are consistent with a negative influence of population size on body condition which could represent less resource availabilty per individual on the high-population size Feuilles herd than the lower population size George herd.

Calving : importance des différences =high energy costs of lactation

Weaning : importance des différences = high energy costs of lactation and prior to winter and larger migration movements.



Did we foung the same tendancy in 2008.

Calving : in 2008 : Females from the Feuilles were much ligther at Calving but the difference was not significant. and Weaning than females of the George.

These results suggest that females from the Feuilles have been able to rebuild their body condition from 2007 to 2008 to a level similar to the body condition of females of the George.

Explanations ? Decline of the Feuilles herd ?

Calving : Winter condition (temperature and snowfall) ? Spring movement pattern ?

Weaning : Less competition for summer habitat ? Better summer condition ? influence positive de la qualité de l'habitat en juin (NDVI) et de l'indice climatique continental de NAO

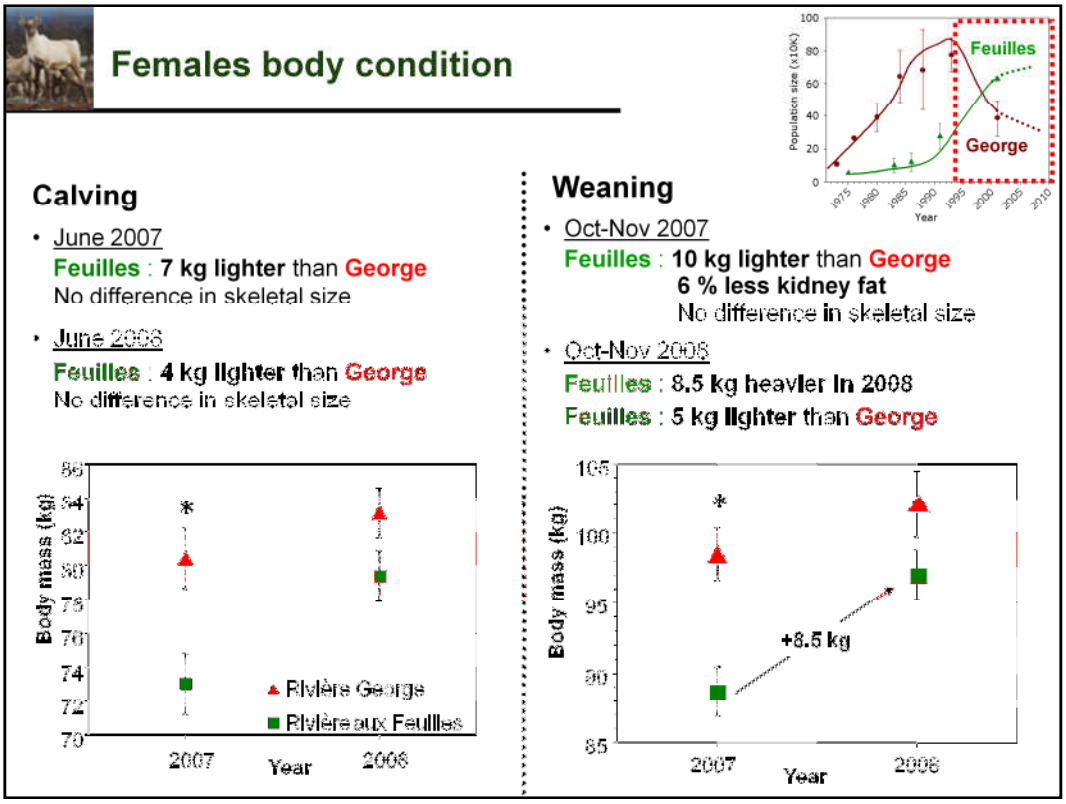
We found, however, no difference in skeletal size.

Données **femelles adultes** pour le **Feuilles**

4- 2007, alors que le troupeau présentaient des effectifs AHHHH, et que le George abondance semble se stabiliser après un épisode de grande abondance : différence non négligeable entre masse corporelle des femelles des deux troupeaux.

Calving : importance des différences =

Weaning : importance des différences =



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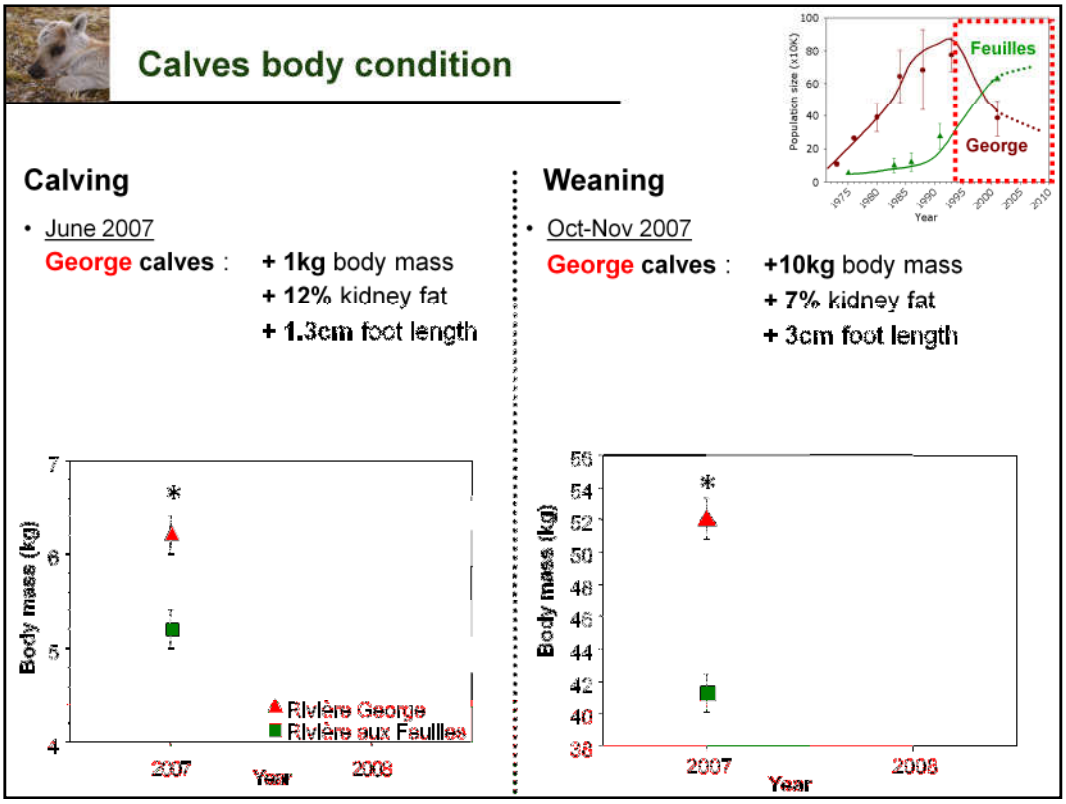


Data from our female-calf pairs monitoring of 2007 and 2008.

Calving : in 2007 : Similarly to what we found for the adult females in 2007.Remember that female from George were 7kg heavier at calving. Calves produced on the GeorgeRiver herd were much heavier, longer and fatter than calves produced on the Feuilles.

In fact, calves were 1kg heavier at Calving and 10kg at weaning. Moreover, they also presented more kidney fat and longer hind foot length than Rivière aux Feuilles calves.

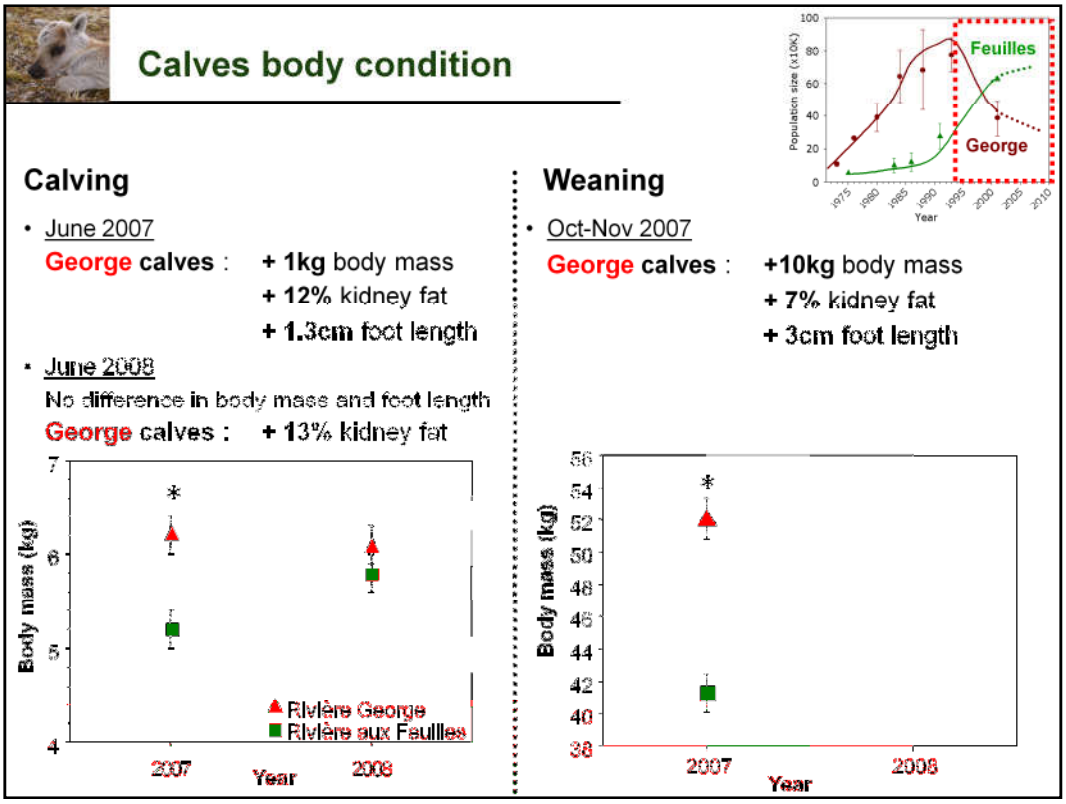
These results are consistent with the difference in body condition of females of both herds at calving. Result at weaning suggest that George calves had access to a better quality of summer range to sustain their needs during the first weeks of growth compare to calves from the Feuilles. Morever, females were in better condition and probably more able to sustain costs linked to lactation.

Données **FAONS**

Juin 2007 George vs Feuilles

Conséquences pour un faon d'être petit :

Smaller calves = -reach secual maturity late



Did we found the same tendancy in 2008.

Calving : in 2008 : Calves produced on both herds presented similat body mass and hind foot length. These results are also consistent with the absence of difference in body condition of females of both herds at calving in 2008. We noted, however, a greater percentage of kidney fat for George calves.

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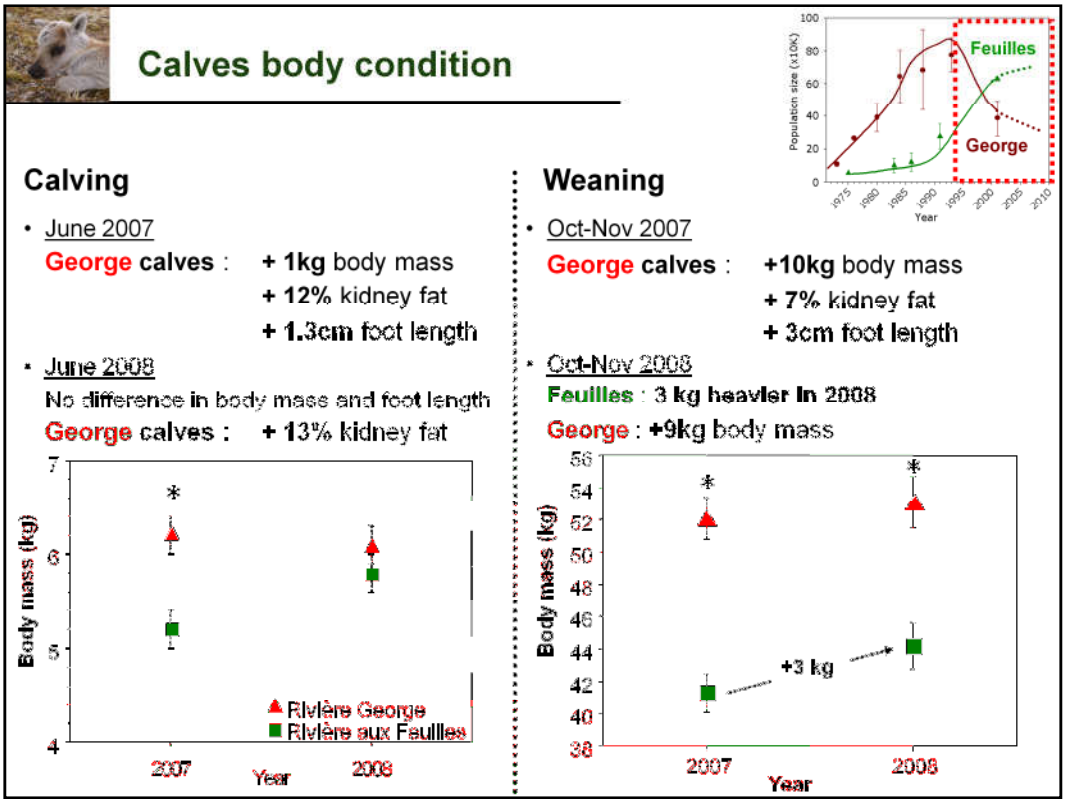

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Connectivity of caribou in a circumpolar perspective