

*Interactions between caribou,
moose and wolf*

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Introduction

- Predation and hunting are probably the main causes of caribou declines
- Habitat modifications seems to increase hunting and predation
 - Increased access that favours hunting (and predation)
 - Stimulate browse production
 - Favours moose population growth
 - Increased wolf number
 - Increased predation of caribou
- Possible to maintain caribou in landscapes modified by forest fires and clear cuts?
- Examined with computer simulations

Contents



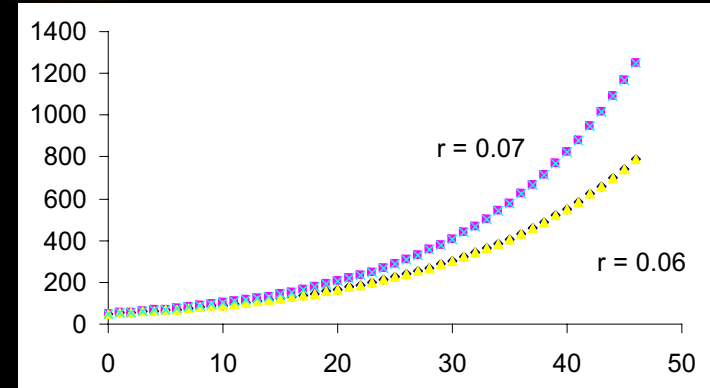
- Population limitation and regulation concepts
- Description of a regulation model for moose populations
- A caribou model in presence of wolf
- Impact of moose and wolf on caribou after simulations

Population Limitation and Regulation

The intrinsic rate of increase of a population is rarely observed

– Due to limiting factors

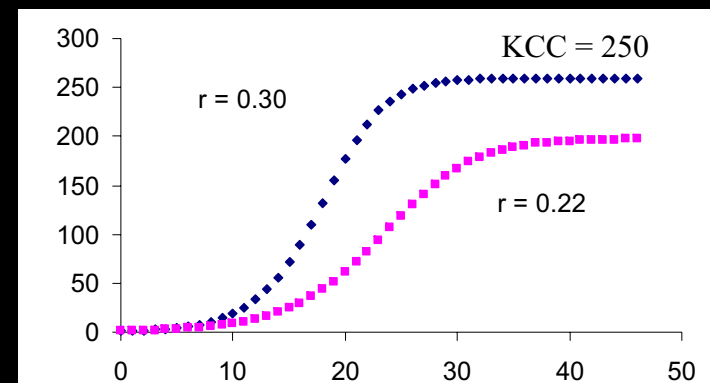
- Any kind of mortality (accident, hunters, etc.)
- Slow down the growth rate
- Gen. independent of population density



Populations do not grow indefinitely

– Presence of regulating factors

- Increased influence with density
- Abundance levels at a specific point



Regulation of Moose Populations



Food in absence of wolf

- European nordic countries
- South of the St. Lawrence River

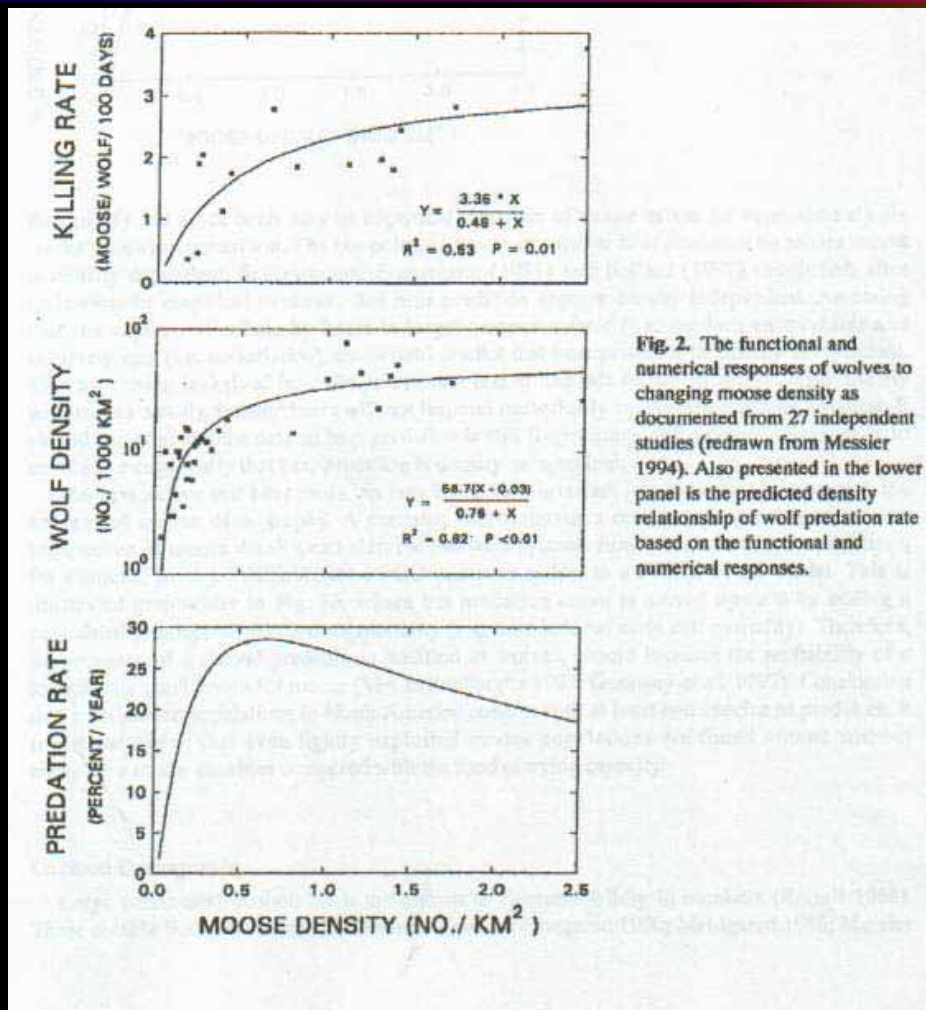
Wolf predation when this species is present

- Most areas in North America
- North of the St. Lawrence River

Other mortality causes: limitation factors

- Black bear, hunting, climate, etc.
- Diminish the growth rate, provoke fluctuations in abundance
- Sometimes avoid observation of regulating factors
- Côte-Nord: climate effects on female productivity

A Regulation Model for Moose Populations



Messier, F.
1994.
Ecology 75:
478-488.

Regulation of Caribou Populations

Insular barren-ground caribou

- Available food (no wolf)

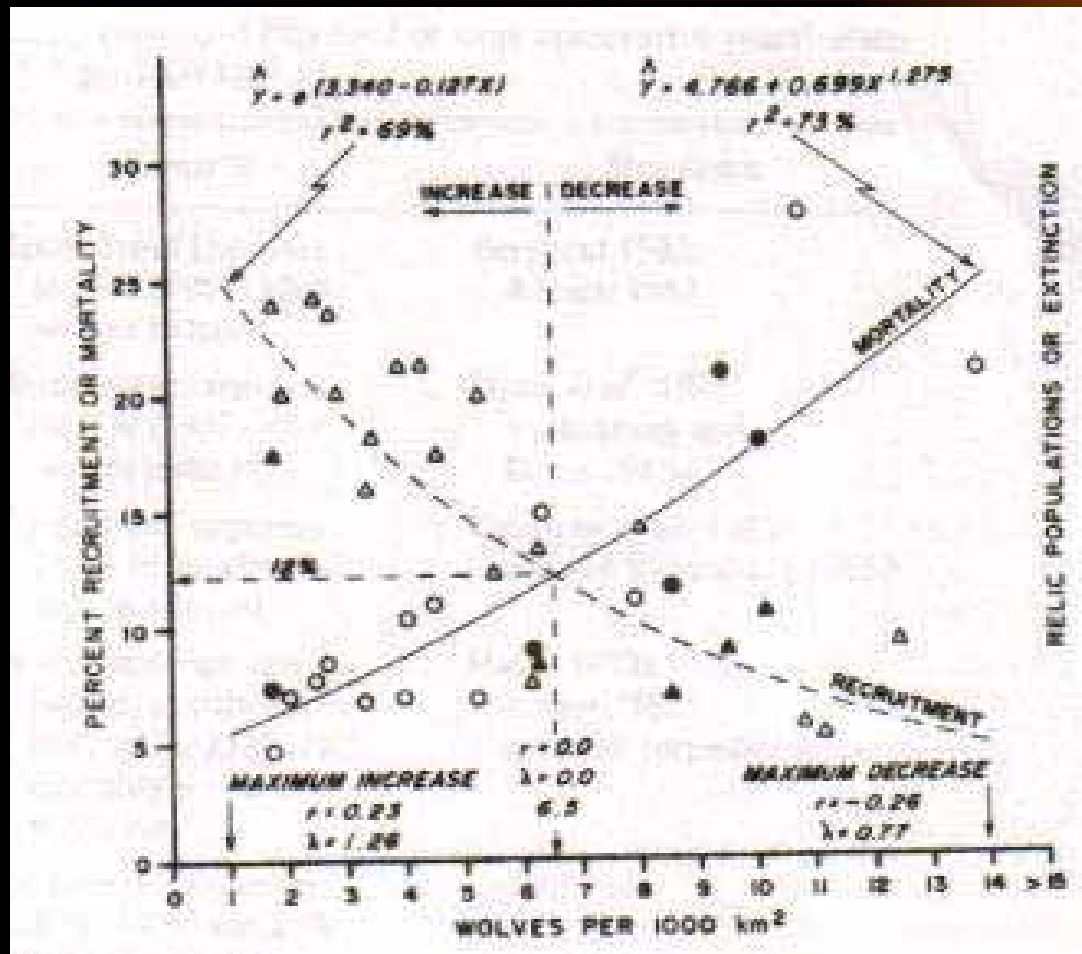
Continental barren-ground caribou

- Available food (migrations)

Forest-dwelling caribou

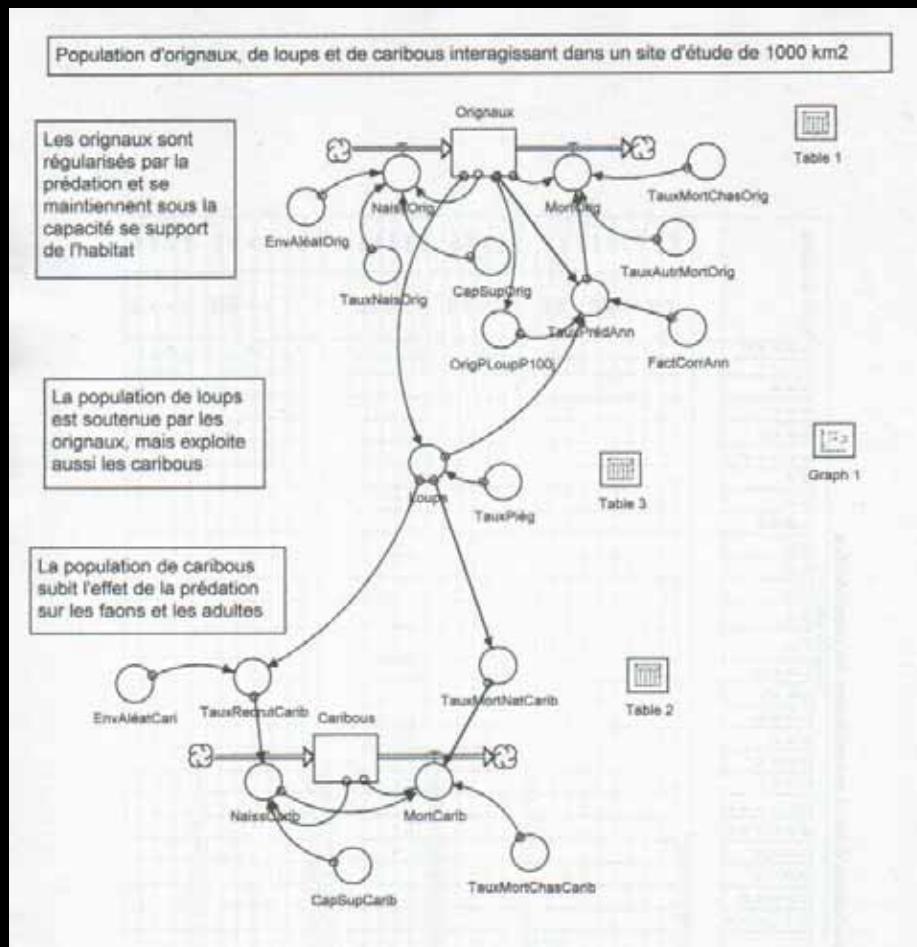
- Limited by hunting and predation – no apparent regulation
- Densities too low densities to support stable wolf populations
- Wolf densities change independently of caribou
- Caribou can be extirpated if moose numbers increase sufficiently to support > 6.5 wolves / 1000 km²

A Caribou Model in Presence of Wolfe



Bergerud and
Elliot. 1986.
Can. J. Zool.
64: 1515-1529.

Forest-Dwelling Caribou in a Moose-Wolf Ecosystem



In changing moose density,
the model can predict:

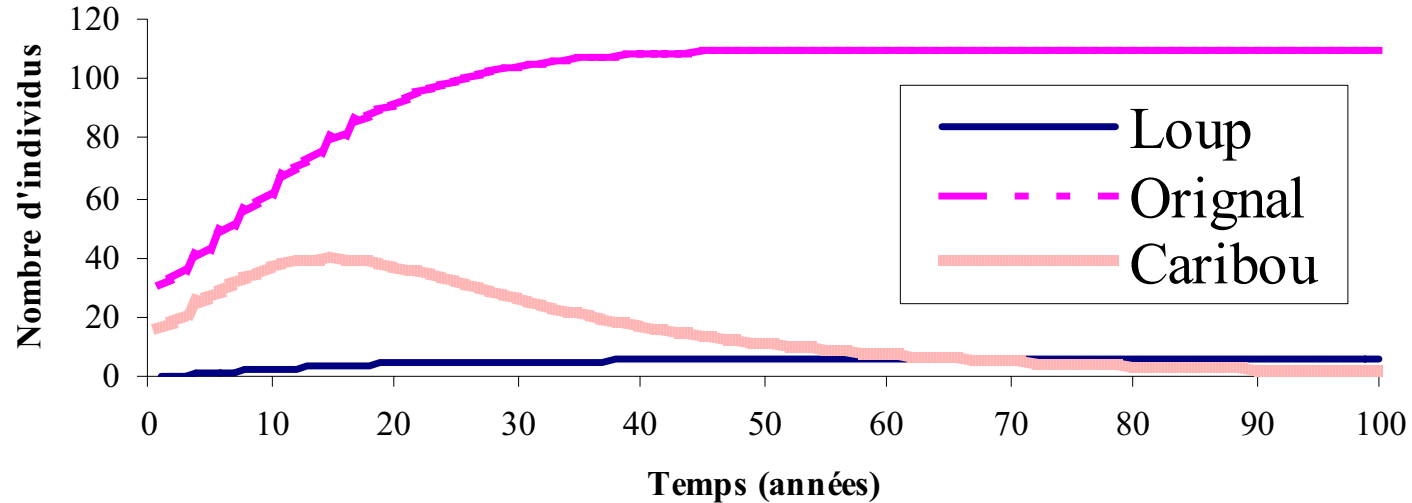
- wolf density
- caribou predation
- caribou density

Can simulate the impact of
different management
scenarios like:

- caribou hunting rate
- moose hunting
- wolf trapping
- etc.

Simulation 1: Situation Before Autumn 2002

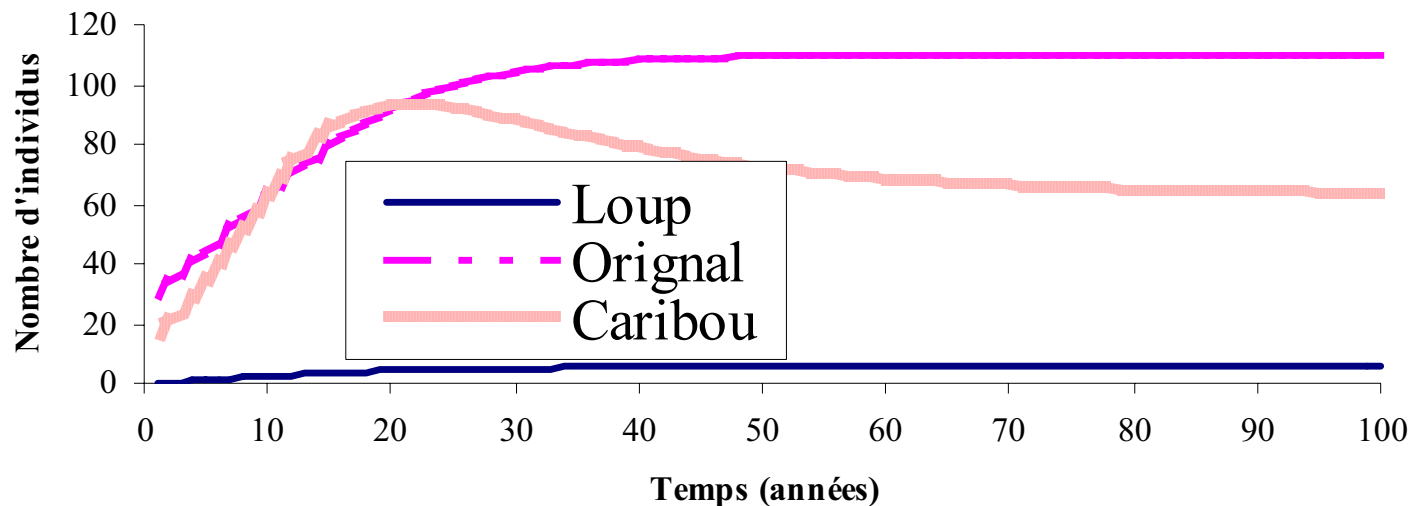
Chasse de l'orignal (9%) et du caribou (8%)
sans piégeage du loup



1000 km² study site

Simulation 2: Ban on Caribou Hunting

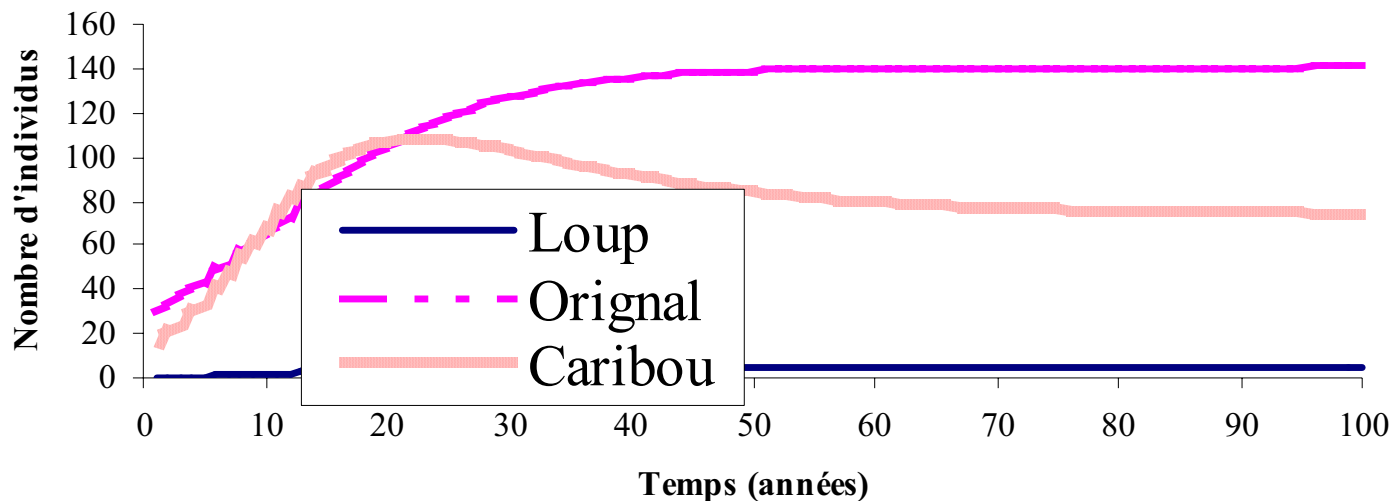
Chasse de l'orignal (9%) et arrêt de la chasse du caribou sans piégeage du loup



1000 km² study site

Simulation 3: Increased Wolf Trapping

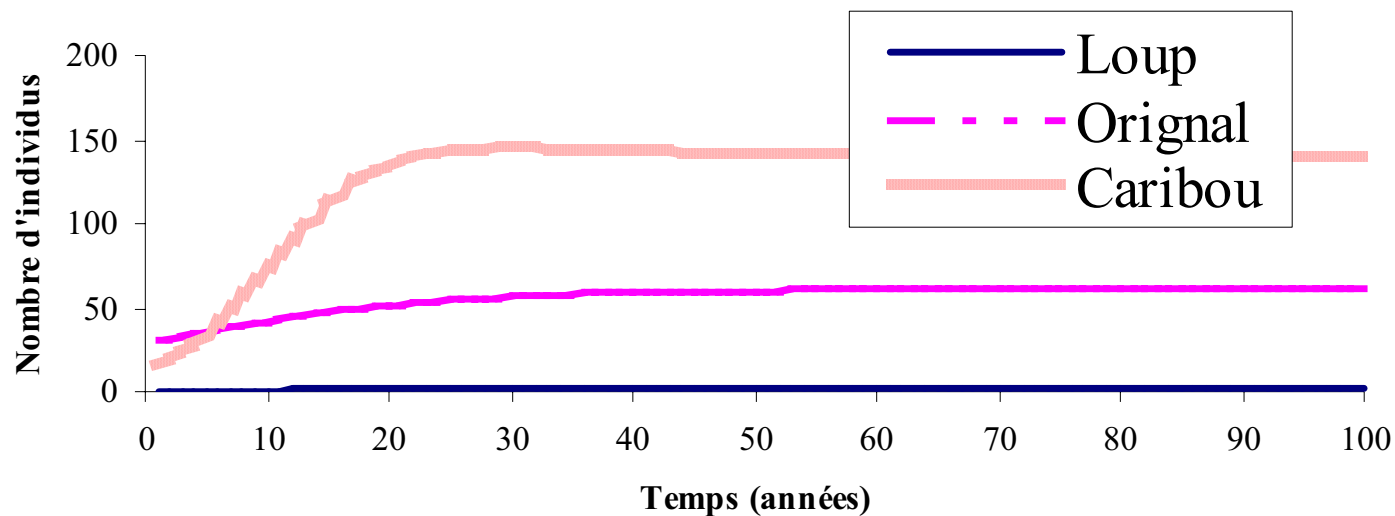
Chasse de l'orignal (9%), arrêt de la chasse du caribou et piégeage du loup (30%)



1000 km² study site

Simulation 4: Increased Moose Hunting

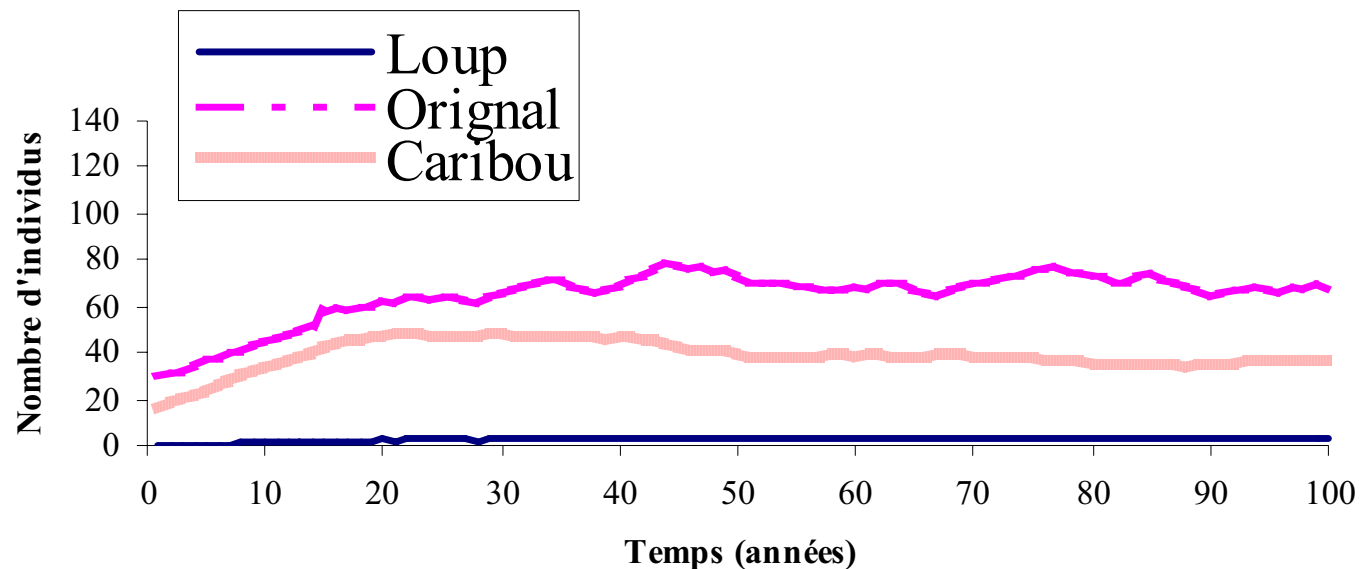
Accentuation de la chasse de l'orignal (15%) et arrêt de la
chasse du caribou sans piégeage du loup



1000 km² study site

Simulation 5: Impact of Climate (snow and rain)

Chasse de l'orignal (9%) et du caribou (8%) sans piégeage du loup. La natalité de l'orignal et du caribou varient annuellement de façon aléatoire ($\pm 40\%$ et $\pm 20\%$ respectivement).



1000 km² study site

Conclusions

Simulations show that it seems possible to maintain caribou in presence of moose and wolf

- Stop caribou hunting
- Increase moose hunting (15%; density $< 0,7/10 \text{ km}^2$)
- Avoid increasing habitat carrying capacity for moose

Weaknesses of the model

- Wolf abundance regulated by moose density
- Wolf density could be underestimated by the moose model
- Caribou habitat carrying capacity perhaps underestimated
- Population structure (sex ratio, age class, etc.) not taken into account

Conclusions

Projected test in the Charlevoix caribou herd

- Wolves, caribou, black bears will be followed by telemetry
- Manipulate wolf, moose and bears densities (hunters, trappers)
- Forest management plan: old-growth conifer in seasonal home ranges, movement corridors

