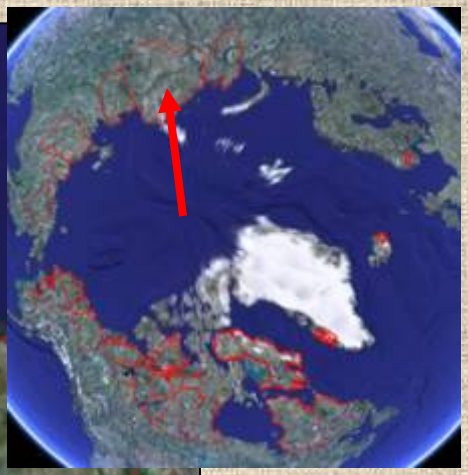
The Taimyr Herd: Where has it come from - where is it going?



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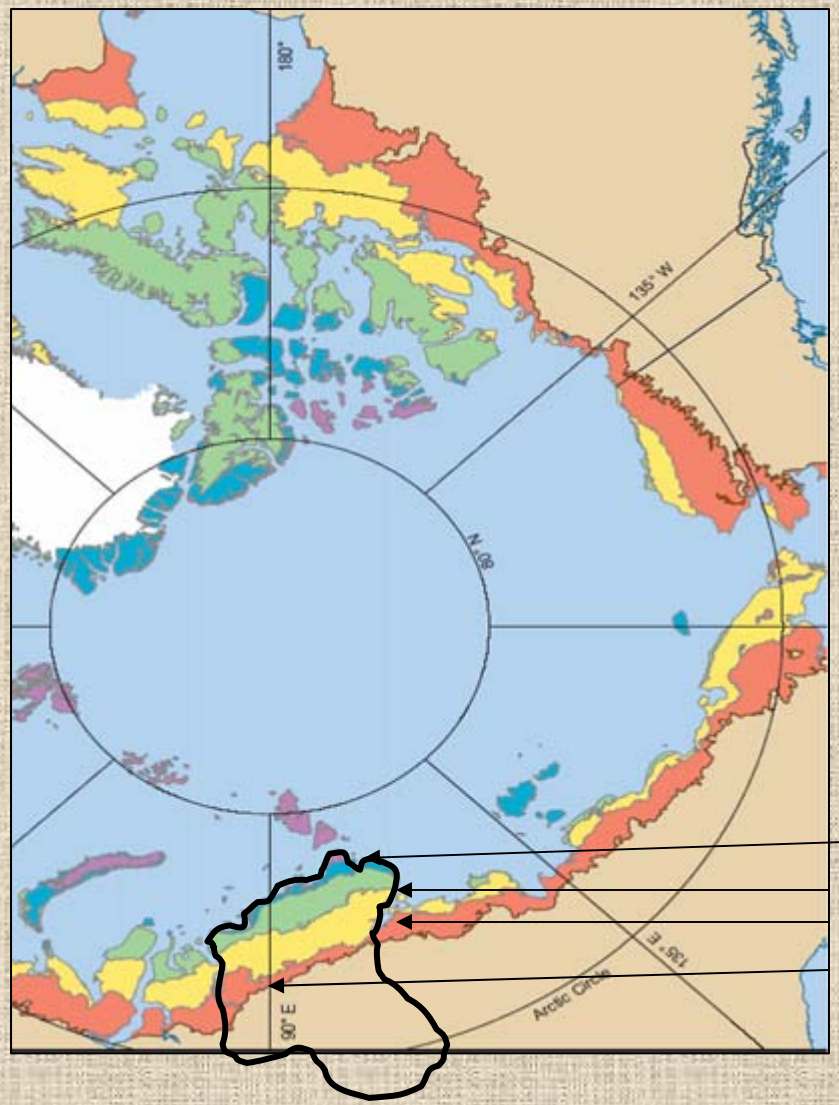
Dec 2, 2008
CARMA 5

Outline

- Range
- Current status
- How important are seasonal ranges
  - Seasonal variation
  - Human impacts
  - Impacts in distribution
- Phases of herd management
- Role of hunting
- Role of predators
- Future projections

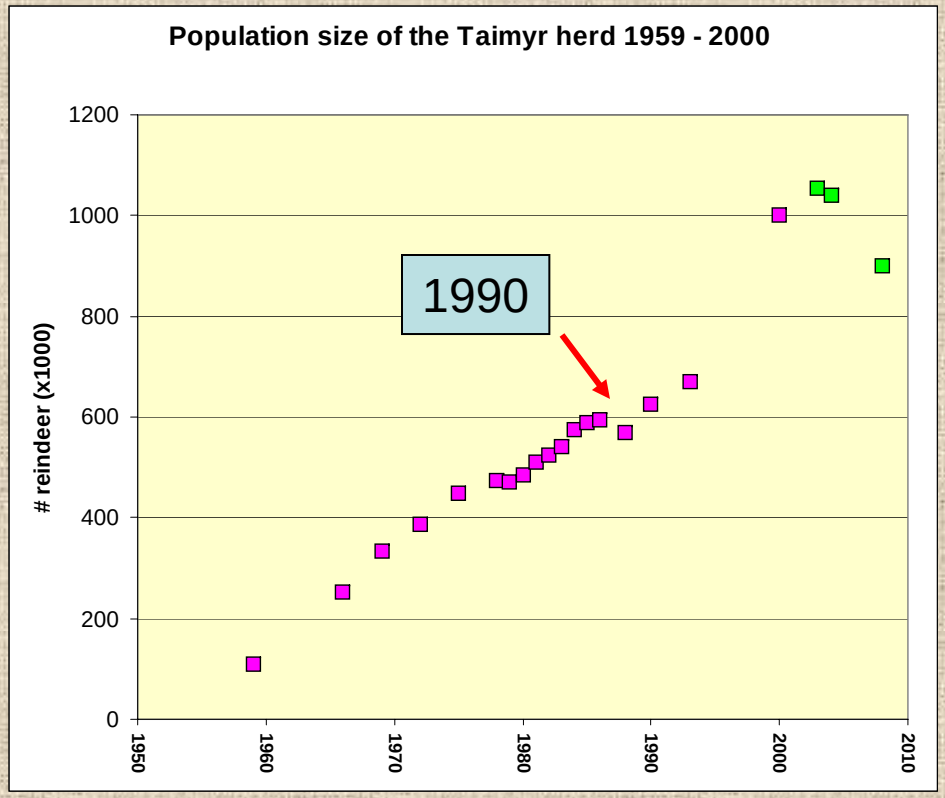
Seasonal ranges

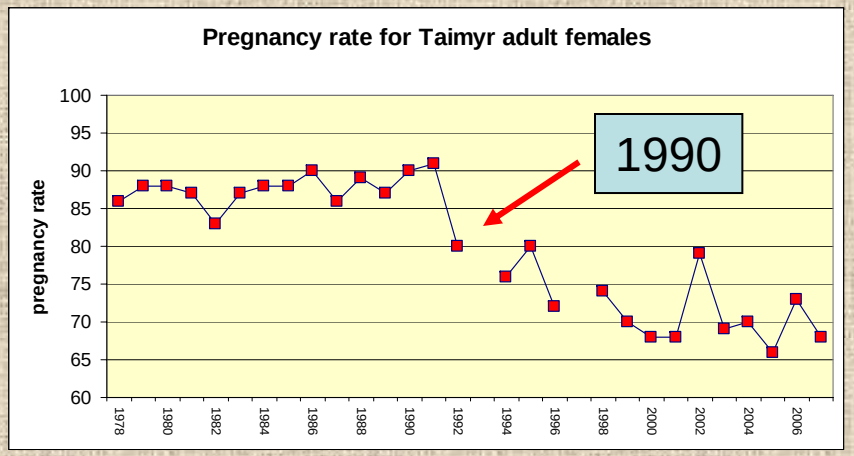


-**Compared to other tundra herds, much of 1.5 Million sq km range is north of treeline**
-**Reached peak over 1 million animals in early 2000s**

- **Prostrate dwarf shrub zone**
- **Hemi-prostrate dwarf shrub zone**
- **Erect dwarf shrub zone**
- **Low shrub zone**

General trend in numbers and pregnancy





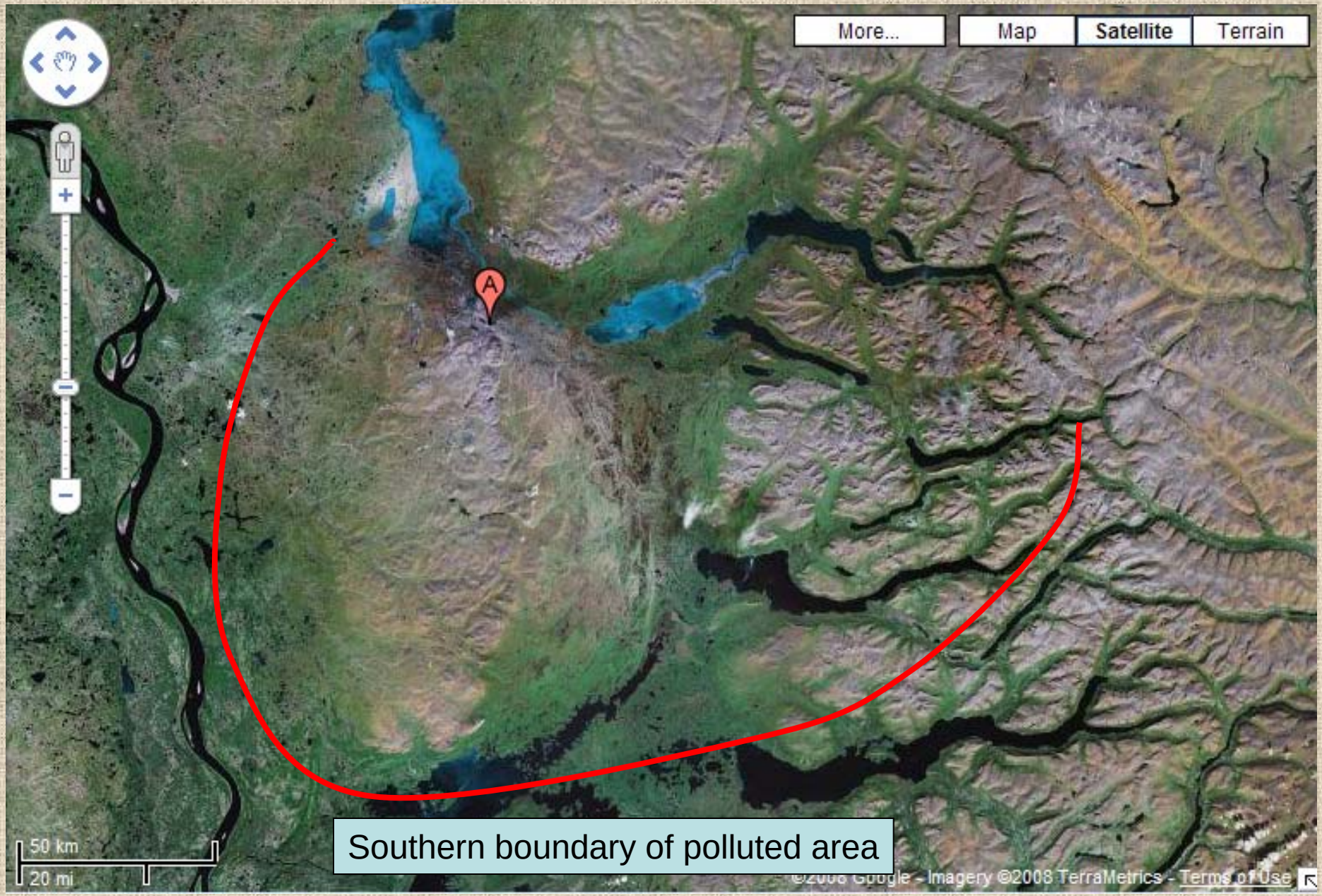
After 1990 the herd rapidly increases, coincident with falling pregnancy rates

How important are seasonal ranges: annual variation?

- Nutrition and weather impact size and health of the Taimyr herd
- During last 40 years, 7 years were adverse for the Taimyr herd – impacting different seasonal ranges:
  - **1968 and 1971** – high winter mortality due to lack of access to food and high movement rates
  - **1979** – extremely hot summer lead to severe insect harassment
  - **1989** –extremely late spring, snow in July resulted in retarded plant growth, low plant biomass, poor physical condition and unusual migration patterns
  - **1995** – deep snow combined with icing conditions resulted in high winter mortality
  - **2008** – normal snow melt was followed by a prolonged cool period, little food for calves, gastrointestinal diseases and high (30%) mortality of newborns

How important are seasonal ranges: trends in range degradation?

- Coincident with annual variability, there has been a degradation of range
- Increasing population density has resulted in a depletion of winter lichen stands
  - From 1970 to 2000 lichen depleted by a factor of 10
- Increased frequency of fires
- Norilsk Nickel smelter has resulted in 18% decline in lichens in a 180 km radius; 6000 sq km of forest are “dead” (0.5 % of the range)
- Range degraded by anthropogenic sources over 74,000 sq km (>5% of the range)


More...
Map
Satellite
Terrain
A
50 km
20 mi
Southern boundary of polluted area
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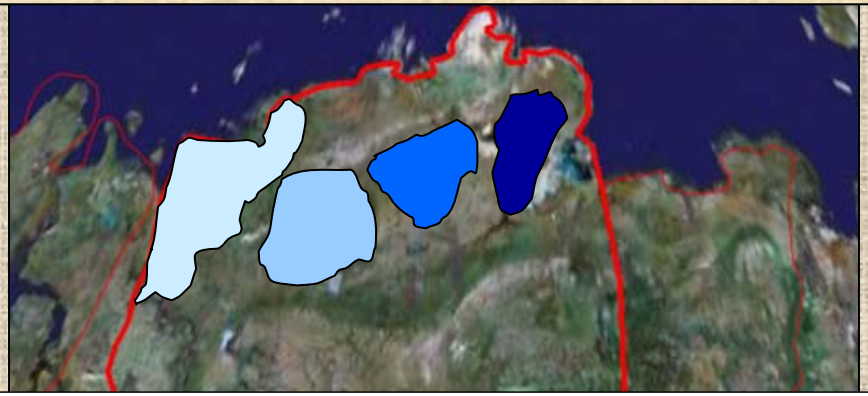
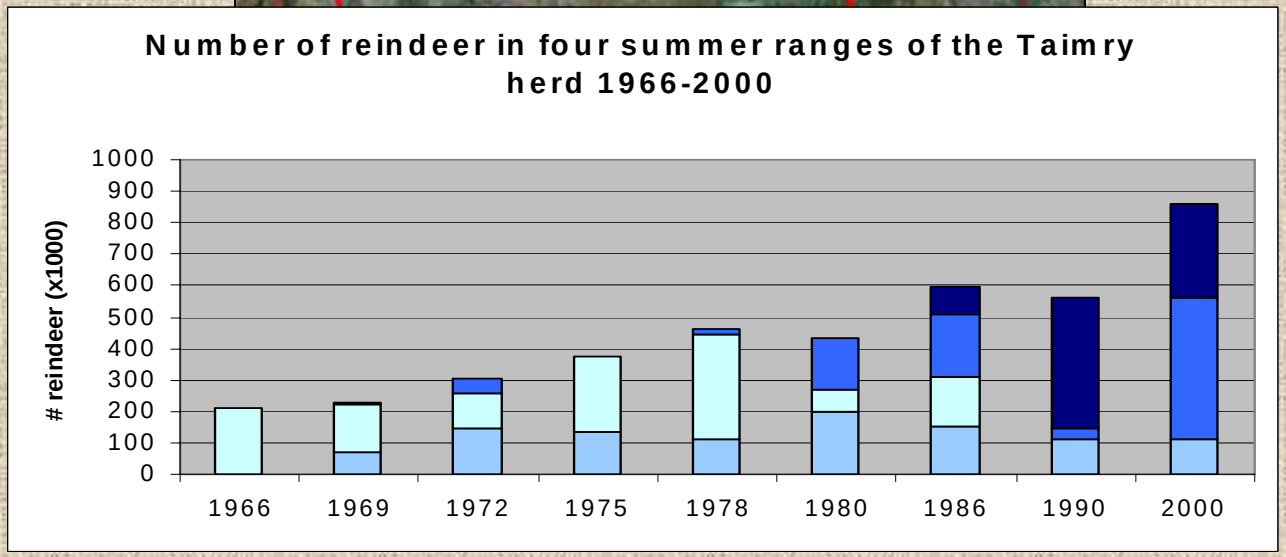
How important are seasonal ranges – impact on migration and distribution

• during the increase phase density has remained constant, while range expanded



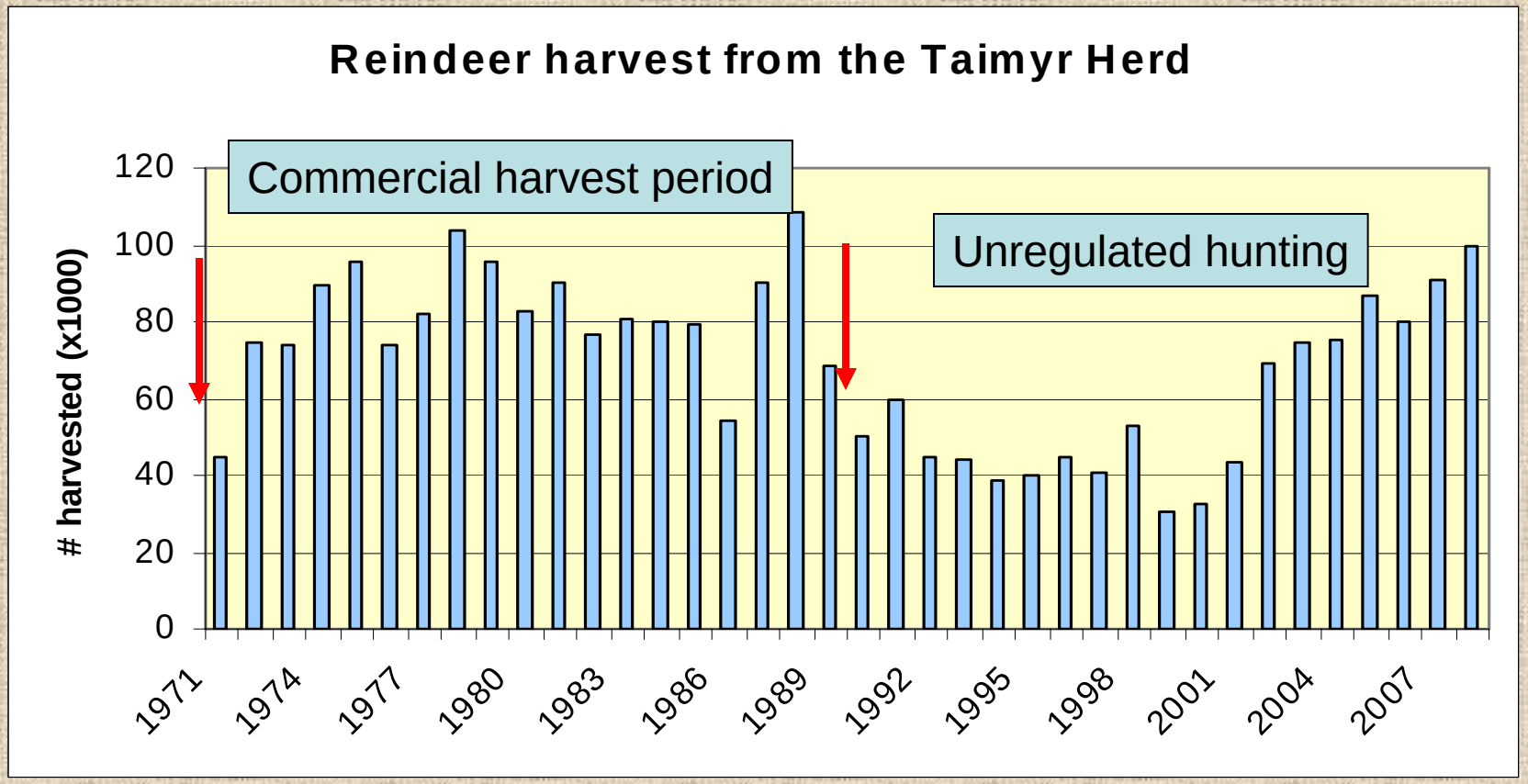


What is the role of harvest?

Russian scientists divide the last 4 decades into:

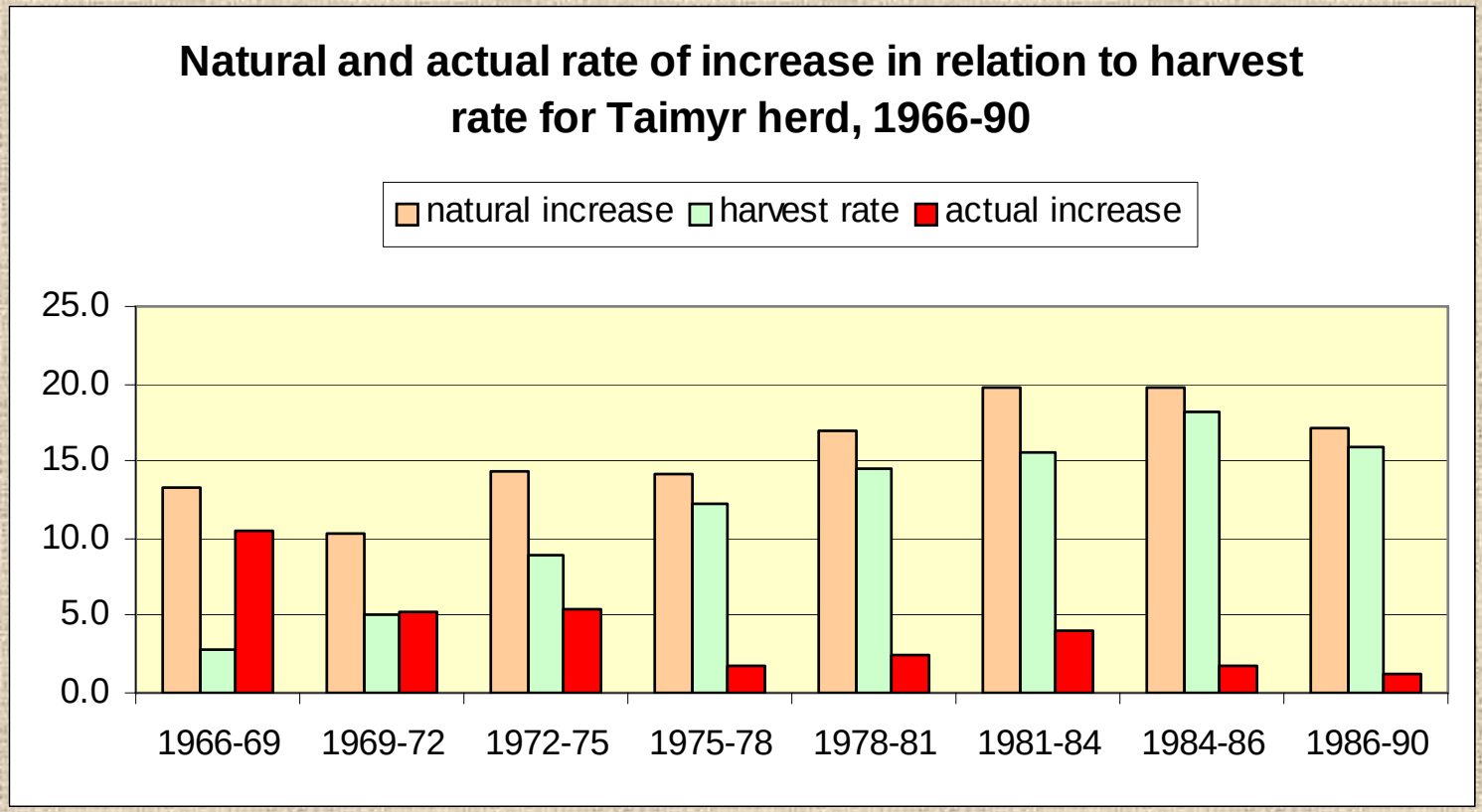
- ***Pre-commercial period***: population grew from a low (110,000) in the 1950s to over 300,000 in 1970; harvest low; domestic stock lost to wild population
- ***Commercial hunting period***: intensive, controlled "farming" of wild population to stabilize population and promote social and economic progress. Herd "stabilized" at ~ 600,000 by end of period
- ***Uncontrolled period:*** subsidies removed, not economical to "farm" wild reindeer; drastically reduced harvest, population grew rapidly to 2000 to 1 million.

What is the role of harvest?

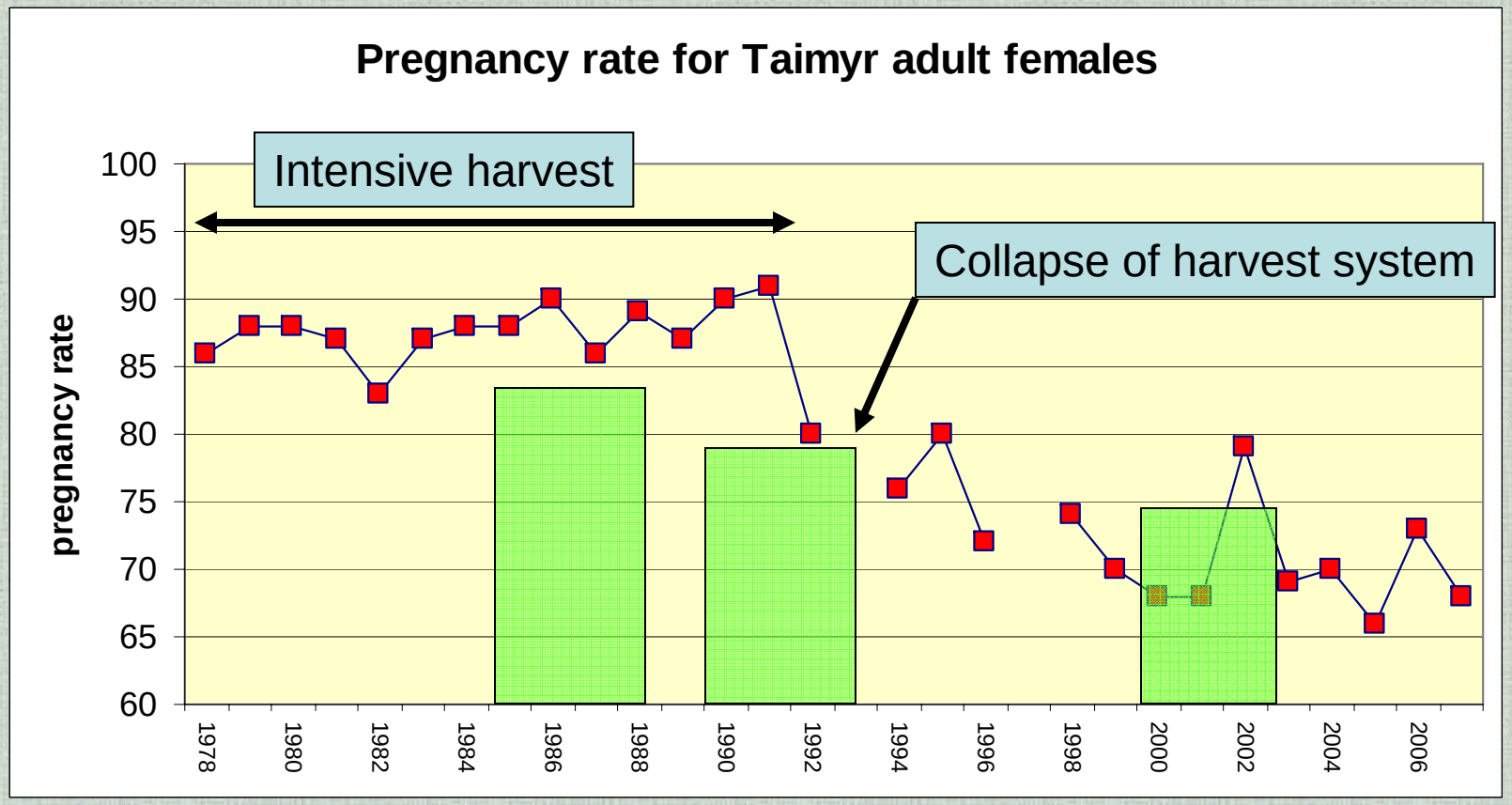


Impact of harvest on productivity of Taimyr herd

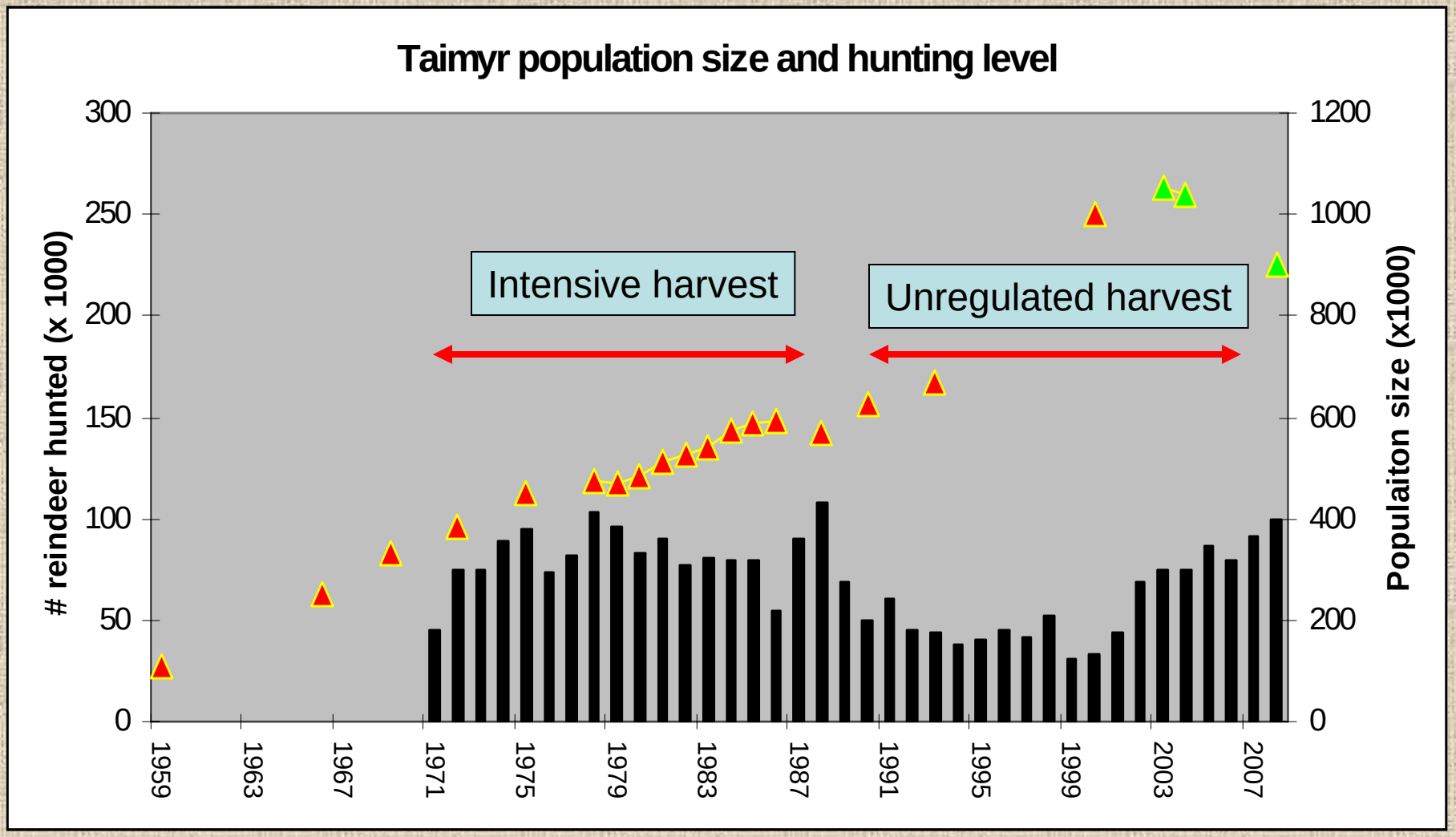
- **the commercial harvest industry, 1970-1990, became the major factor determining the numbers, sex, age, migration patterns and genetic diversity of the herd**



Taimyr pregnancy rates and body weight of pregnant reindeer

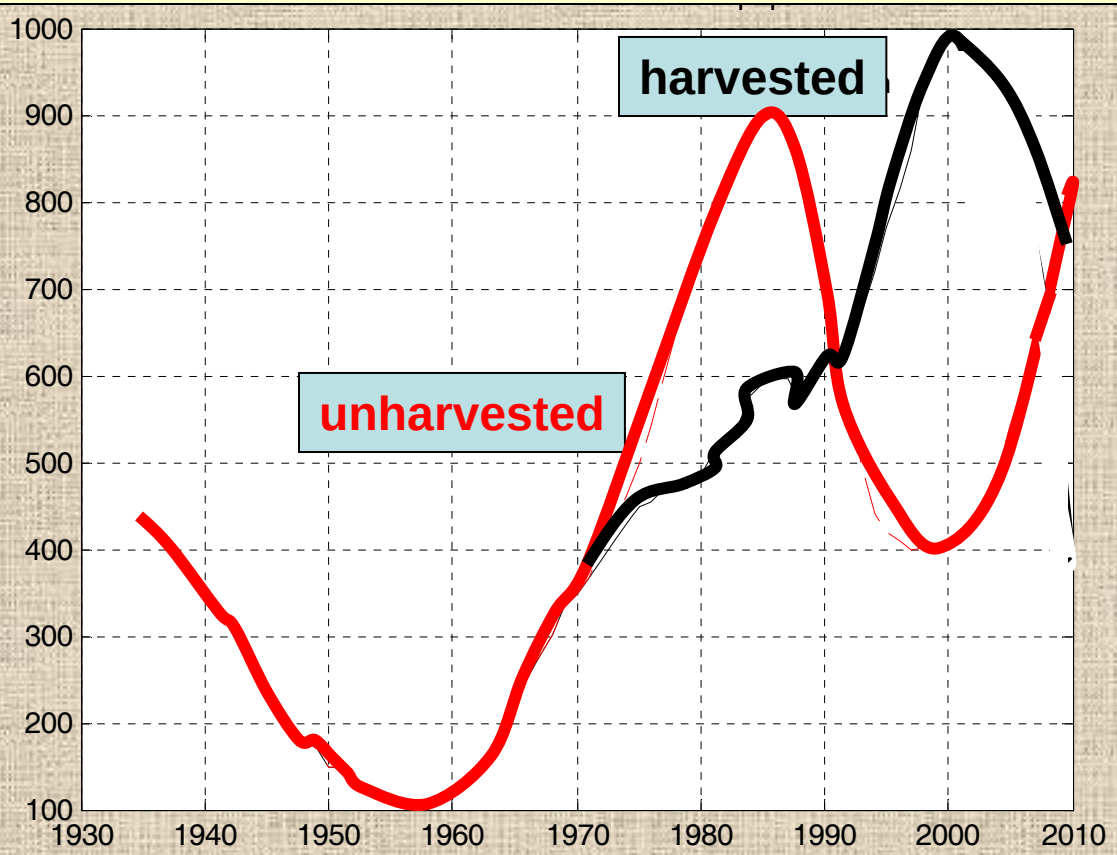


Population size and harvest policy



How important is harvest?

Researchers have modeled the impact of harvest on the herd



What is the role of predators?

- Wolves are only predator capable of regulating herd numbers
- During the intensive harvest period (1970-1990) up to 500 wolves were removed from the range of the herd annually
- During this time wolves had only a minor role in demography of the Taimyr herd
- Aerial hunting of wolves stopped for the last 20 years
- Presently wolves have increased and may act in regulating the herd numbers

The present situation of the herd

- The last intensive monitoring and census of the herd was in 2000
- There is currently little monitoring of the distribution and calving ground locations
- It is impossible to give an objective evaluation of the current state of the herd
- However there is a evidence:
  - of depleted lichen resources,
  - lower body weights,
  - low fat reserves,
  - decline in the bull component,
  - drop in pregnancy rates,
  - increase in wolf predation,
  - increased illegal kill, and
  - increase spread of disease (30% brucellosis incidence)
- Current projection is for herd to decline to 300,000 to 490,000 by 2010

Conclusions

- Over the last 4 decades harvesting (sometimes up to 22% of the herd) has regulated population size in the Taimyr herd
- The result was a 15 year delay in the population peak
- Once harvest was drastically lowered, the herd growth rate increased dramatically despite lower body condition and pregnancy rates
- It is believed that natural regulation (population outstripping food supply) halted the increase
- All indicators point to a declining herd although current monitoring efforts are insufficient to confirm