

# POLAR BEARS AND CLIMATE CHANGE: HOW MUCH MORE DO I NEED TO FAST, I NEED TO EAT AS WELL!

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## ABSTRACT



The Canadian Arctic is home to approximately two-thirds of the world's polar bear population. In Hudson Bay of the Canadian Arctic, being dependent on sea ice for survival, polar bears are on the verge of becoming extinct due to its melting by climate change which has greatly affected their survival, especially during the open-water season. This research project aims to find out how the survival of polar bears in Western Hudson Bay has been affected by climate change during the open-water season. Relevant studies have been investigated to find out what significant results have been gained to support this research. In Western Hudson Bay, climate change has reduced the ice coverage to about 50% from the year 1970 to 2004, which forces the polar bears to fast 7 to 8 days earlier every decade. Thus, polar bears are forced to deal with prolonged periods of fasting during the open-water season, mainly due to the scarcity of food, greatly affecting their survival.

## RESEARCH QUESTION

How does prolonged fasting due to climate change during open-water season affect the survival of polar bears in Western Hudson Bay of the Canadian Arctic?

## INTRODUCTION

- Canadian Arctic is home to 2/3 of the world's polar bear population
- They are an 'ice-obligate species'
- They depend on the stored fat reserves obtained during the sea ice freeze-up period.
- Main preys are ringed seals and bearded seals on sea ice
- Abundance of the main prey species and sea ice covers has a great impact
- Naturally not able to slow down their metabolism to adapt to prolonged open-water periods of fasting
- Climate change has caused significant amount of reductions in sea ice covers and sea ice thickness that has led to early ice breakup.



## METHOD

Secondary research conducted mainly using data from two journal articles, that have done extensive research on this issue

- Use of Boundaries: movements of tagged bears, satellite radio collars on adult females, Genetic studies
- Satellite Sea-ice Data: used 2 satellite passive microwave data sets: 1) SMMR 2)SSMI
- Provided daily data records of sea-ice covers since 1987
- Physical Examination of Polar Bears: measurements of body length and girth taken during Fall season of 100-300 immobilized bears to obtain an estimate of weights and body conditions.
- Comparing the sea-ice covers in Western Hudson Bay and other regions of the Arctic

## RESULTS



- In Western Hudson Bay, the sea-ice coverage has decreased to about 50% or even less that follows the winter maximum during the years 1979-2004. Melting of sea-ice ~7-8 days earlier/decade. Thus, they are forced to come onto the shores and start their fasting early and for longer periods usually during summer months.
- Early ice breakup forced the polar bears to hunt for energy-rich food in a short period.
- Due to main prey being more difficult to find on-shore, they must rely on the stored fat reserves to survive through prolonged fasting. This will usually lead to a decline in body condition which in turn risks the survival of the polar bear.
- Early sea-ice breakup has led to a decline in population size by 22%, numbers going down from ~1200 to 950 from 1989-2004.
- Polar bears in Eastern Hudson Bay were in better body condition during the open-water season since sea ice broke up later and so they had a longer time to hunt before beginning to fast



## CONCLUSION

- Cleared out the misconception that polar bears can adapt to the warming of the climate.
- This is not possible as being forced repeatedly to fast for longer periods during open-water season can lead to a decline in the population size of polar bears
- Early sea-ice breakup primarily due to climate change shortens the time to find prey (food) that can be stored as fat for fasting until the next sea-ice breakup. Thus, this can result in very weak body conditions.
- Extension of open-water periods means that polar bears have less time to feed on ice and will have to spend more time on-shore by fasting.

