

TRANSLOCATION OF *URSUS MARITIMUS* TO ANTARCTICA AND EFFECT ON *PYGOSCELIS ADELIAE* POPULATIONS

Abstract

Declining sea ice is having a negative impact on polar bear populations with the Arctic environment. Sea ice is declining at a rapid rate due to increasing global CO₂ and temperatures which is concentrated in Arctic environments. A loss of food for polar bears is thought to be driving this decline. It has been hypothesised that polar bears could be moved to Antarctica to save this species. In this study we moved a number of polar bears to colonies of adelic penguins to observe the impact on penguin mortality this would have. This was done on the Antarctic Continent. We observed polar bears for a period of time along with environmental parameters. We found polar bears do graze on penguins and can use them as a possible food source this caused higher mortality of the colony. Future research is needed to analyse the impact this may have on a long term ecology.

Introduction

Increasing global temperatures is amplified in polar regions, particularly the Arctic which is leading to a rapid decline of sea ice. This decline in sea ice is leading to a population decline of *Ursus maritimus*, the top-predator of the Arctic. In contrast, at the bottom of the world, Antarctic sea ice has been observed to be increasing. Due to the separation between these two regions and the large oceanic distance from Antarctica to continental land, very few marine mammals are found. In this study we set out to observe the impacts of introduction of *U. maritimus* onto the Antarctic continent and its impact on populations of *Pygoscelis adeliae*.

Methods

Three polar bears were introduced at three separate locations close to penguin colonies. We also observed 3 other penguin colonies as control sites. Locations were chosen based on similar population sizes of the colonies. Environmental parameters were monitored at the sites, temperature, wind speed, wind direction, oxygen, soil pH, soil moisture, nutrients were measured every 3 days by an in-situ profiler. We counted penguins and split them into adults and chicks to look for differences of polar bear related mortality on different life stages. We monitored penguin populations from a distance as not to disturb them, as well as ingestion rate by polar bears. This was done for each of the 3 colonies with polar bears and the other 3 without polar bears to calculate averages with standard deviations. We conducted all of our statistical analyses using Microsoft Excel.

Results

We show that ingestion rate on penguins is higher (48±23) when polar bears were present compared to control sites (0±0). Mortality was higher on adult penguins as they were observed to defend chicks when attacked. Polar bears ate on average 2 penguins a day to satisfy energy demands, due to the plentiful supply of food they did not appear to store any.



Discussion and future work

Polar bears have been shown to be able to live on penguins as a food source. Mortality is higher when polar bears are present, however the impact this may have on long term penguin populations is not currently known. We hope for further funding to continue this work.



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