



Photo: Staffan Widstrand

¹ ACIA. 2004. *Impacts of a Warming Arctic: Arctic Climate Impact Assessment*. Cambridge University Press. 140 pp.

Despite being increasingly linked to global markets, the culture and economy of the Inuit, particularly smaller communities, remain intimately tied to Arctic wildlife. In a part of the world where paid jobs are scarce and prepared foods expensive, hunting is key to nutrition. Local foods are shared among family and friends and epitomize what it means to be Inuit. But global warming is

threatening this tradition. A recent international assessment of climate change in the Arctic concluded that “warming is likely to disrupt or even destroy [the Inuit’s] hunting and food-sharing culture as reduced sea ice causes the animals on which they depend to decline, become less accessible and possibly ... extinct.”¹

Mild winters and warm summers are remaking the

Arctic, and will continue to wreak havoc on traditional ways of life unless emissions are reduced. International agreements like the Kyoto Protocol are a first step to slowing emissions growth, but much deeper cuts are required.



Photo: Staffan Widstrand

International obligations

Nearly 200 countries, including the United States and Australia, have ratified the United Nations Framework Convention on Climate Change. The objective of the convention states that the concentration of heat-trapping gases in the atmosphere should be kept

“at a level that would prevent dangerous anthropogenic interference with the climate system”, and that “such a level should be achieved within a time frame sufficient to allow ecosystems to adapt”. But what level exactly is it that implies such dangerous interference?



for a living planet



Photo: Staffan Widstrand

2° is too much!

At first glance, a 2°C increase in temperature does not seem very threatening; the difference between winter and summer temperatures is often

much greater than that. But when air temperatures are averaged across the entire globe for extended periods of time, it turns out that the temperature of the planet is remarkably stable, very much like our body temperature. When your

body temperature rises because of an infection at what point do you consider taking action? When your fever reaches 38°C? 39°C?

WWF believes that in order to avert dangerous climate change, the global average temperature increase since pre-industrial times must be kept below 2°C (3.6°F). Increases of 1°–2°C will still cause severe damage, but the option of avoiding an increase greater than 2°C will disappear within

the next few decades unless immediate action is taken.

Solving the climate problem requires a big shift away from fossil fuels in favour of carbon-free sources of energy such as wind, biomass, geothermal, and solar electricity. The technologies and policies for putting these into place are

available and affordable. In fact, many would even save consumers money. What is needed is the political leadership to grasp these opportunities and ensure unique ecosystems like the Arctic are not lost. For more information visit www.panda.org/powerswitch.

The WWF report on which this leaflet is based, *Evidence and Implications of Dangerous Climate Change in the Arctic*, is available at www.panda.org/arctic. All figures are found and explained in the contributing papers to the report.

Published by WWF International Arctic Programme P.O. Box 6784 St. Olavs plass N – 0130 Oslo, Norway T: (+47) 22 03 65 00 <http://www.panda.org/arctic> January 2005

Design: dEDesign/Keitli Berger. Printing: Per Oltesen



for a living planet



Photo: Staffan Widstrand

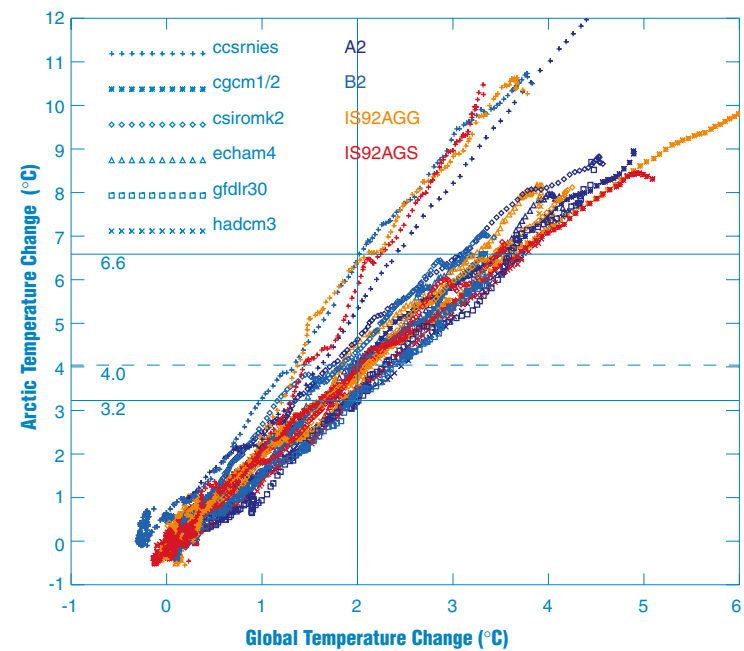
2° IS TOO MUCH!

A snapshot of global warming in the Arctic

The Arctic is changing. For millennia, Inuit and other Arctic indigenous peoples have used their traditional knowledge of the weather, climate, animals and the natural environment to survive. But now that traditional

knowledge is less reliable. Weather is more difficult to predict; sea ice is less stable; permafrost is melting; southern species of birds and insects are found farther north than ever before.

Scientists blame global warming, and they expect it to get worse. Our power plants and use of energy are at the heart of the problem.



Warming in the Arctic is accelerated compared to the rest of the world. If global temperature rises 2°C, the Arctic will experience a warming between 3.2° and 6.6°C. Six computer models show that if global temperature rises 2°C (3.6°F), the Arctic will experience a warming between 3.2° and 6.6°C.

Chart: Mark New

Photo: Brent Humphreys



Since the mid-1800s humans have been increasing the concentration of heat-trapping gases in the atmosphere. Coal-fired power plants, factories, and automobiles spew a seemingly endless stream of carbon dioxide into the air, sending temperatures soaring. New research commissioned by WWF indicates that unless strong measures are taken to

reduce carbon emissions, the Earth's temperature will continue to climb rapidly. Between 2026 and 2060 the global temperature increase is expected to reach a level 2°C (3.6°F) higher than before the industrial revolution.

Unfortunately, the Arctic is warming faster than the rest of the world – two to three times faster – and it can expect an increase of 3.2°–6.6°C by

mid-century. This is because sea water and exposed ground absorb more heat from the sun than ice and snow, which reflect its rays. When Arctic ice and snow melt this amplifies the original temperature increase, creating a vicious circle.



Photo: WWF-Peter Prokosch

Emissions can be reduced economically by using current technologies. Unless we act now, higher temperatures will dramatically alter polar ecosystems, leaving a natural world that is nearly unrecognizable to today's Arctic residents. Many Arctic plants will find themselves in warmer environments where they cannot compete with more aggressive species from the

south. Boreal forests will move northward and replace the tundra which is the habitat of lemmings, ptarmigans, arctic foxes, caribou, and musk oxen, as well as an important staging area for migratory birds. Vegetation changes of this magnitude have not been seen since the last ice age 11,000 years ago.

Photo: Stefan Witterbach

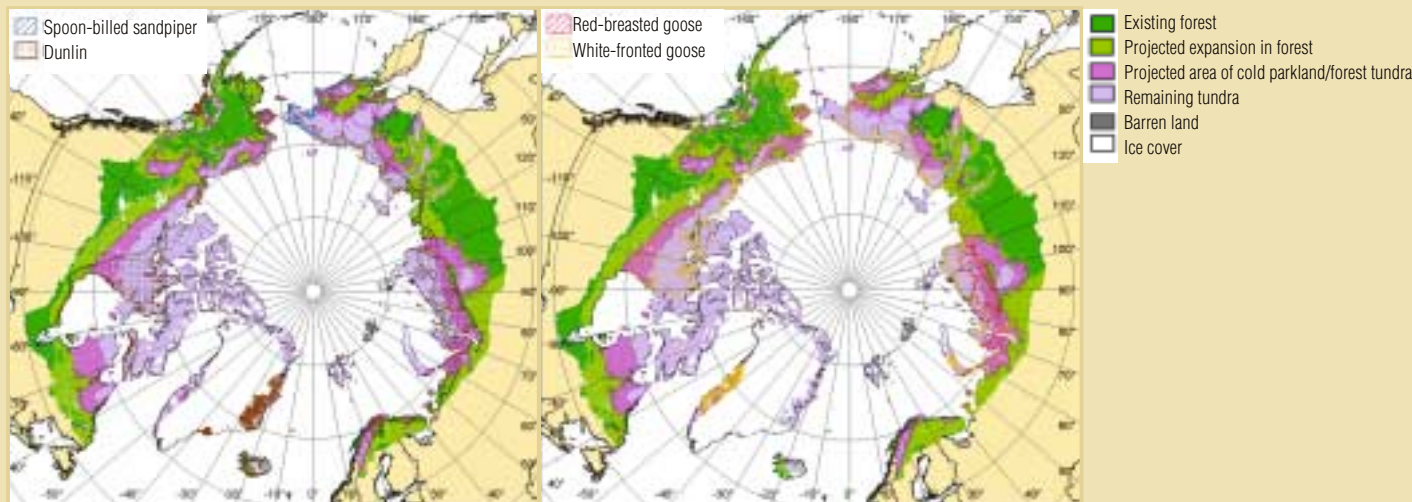


Habitat loss for migratory birds

Arctic tundra is the main breeding habitat for more than 20 million individual geese and waders that winter in the mid-latitudes of Europe, Asia, and

North America. These maps show the current distributions and potential habitat loss for (a) waders and (b) geese. Species like the dunlin (*Calidris alpina*) and the spoon-billed sandpiper (*Eurynorhynchus pygmeus*) may lose up to 45% of their breeding habitat if global temperature increases by 2°C; the red-breasted goose (*Branta*

ruficollis) and the white-fronted goose (*Anser albifrons*) could lose up to 50%. The vulnerabilities occur in the light green areas which illustrate the expansion of forests into taiga, and in the pink areas showing the disappearance of tundra. (Analysis courtesy of Christoph Zöckler, UNEP/World Conservation Monitoring Centre).

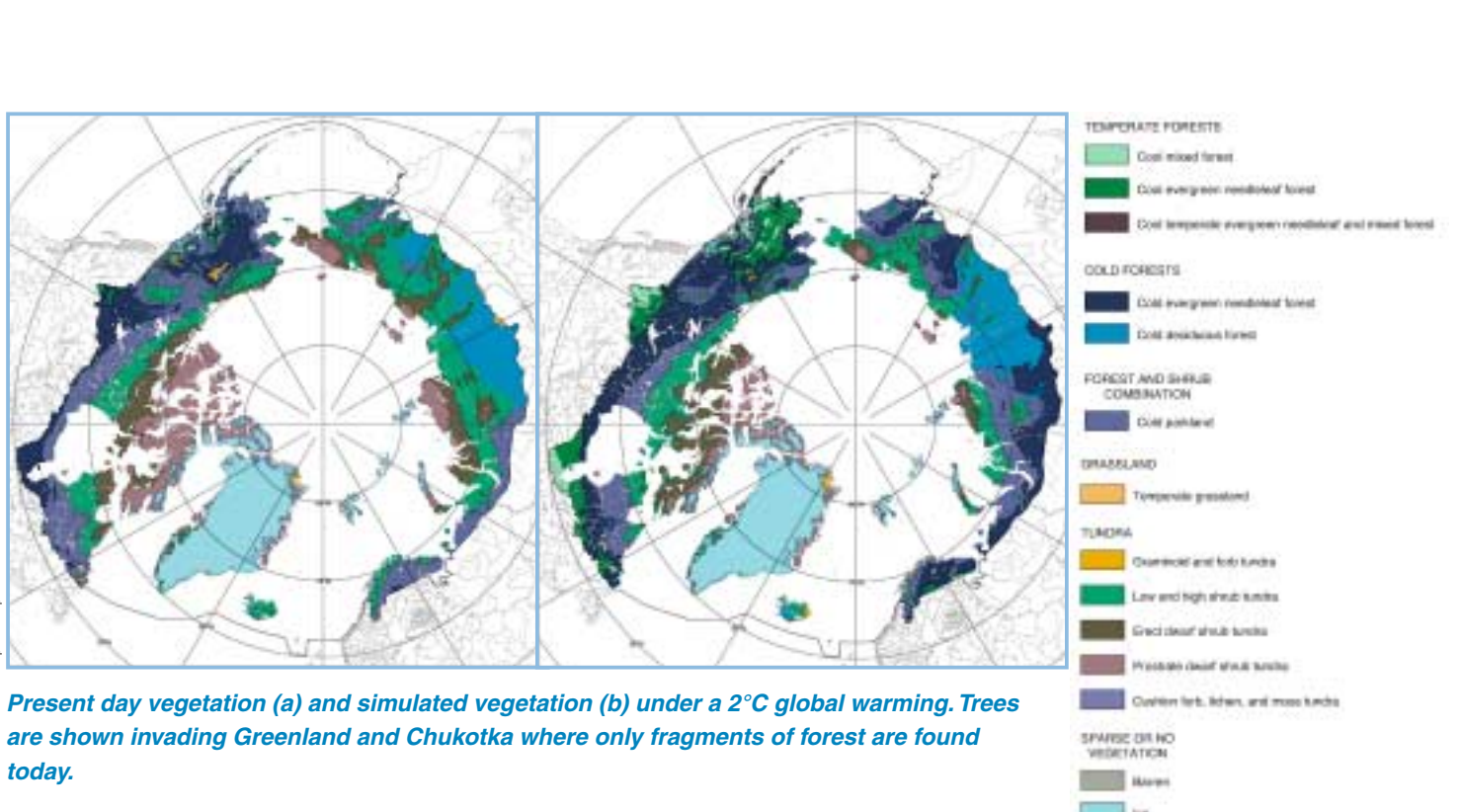


A snapshot of global warming in the Arctic:

- An average global warming of 2°C will cause temperature in the Arctic to rise 3.2°–6.6°C; the planet will hit this threshold between 2026 and 2060.

- Boreal forests will spread north and overwhelm up to 60% of dwarf shrub tundra, a critical habitat for birds like ravens, snow buntings, falcons, loons, sandpipers, and terns.
- Migratory birds will lose vital breeding grounds in the Arctic, affecting biodiversity around the globe.
- For every 1°C increase in Arctic temperature, an area of sea ice the size of Alaska melts and causes even more warming.
- Indigenous peoples face major cultural and economic impacts.
- Preventing dangerous climate change requires an immediate commitment to reduce global carbon emissions sharply.

Photo: WWF-Peter Prokosch



Present day vegetation (a) and simulated vegetation (b) under a 2°C global warming. Trees are shown invading Greenland and Chukotka where only fragments of forest are found today.



On thin ice

The loss of ice cover could make life nearly impossible for polar bears and the ringed and bearded

seals the bears feed on. Shorter and warmer winters have led to thinner and more fragmented ice. Long-term monitoring programmes indicate that polar bear populations do not thrive under such conditions. The polar bear is considered a species of

concern under many national conservation plans because the health of the population as a whole could decline substantially if climate and sea ice conditions shift rapidly.

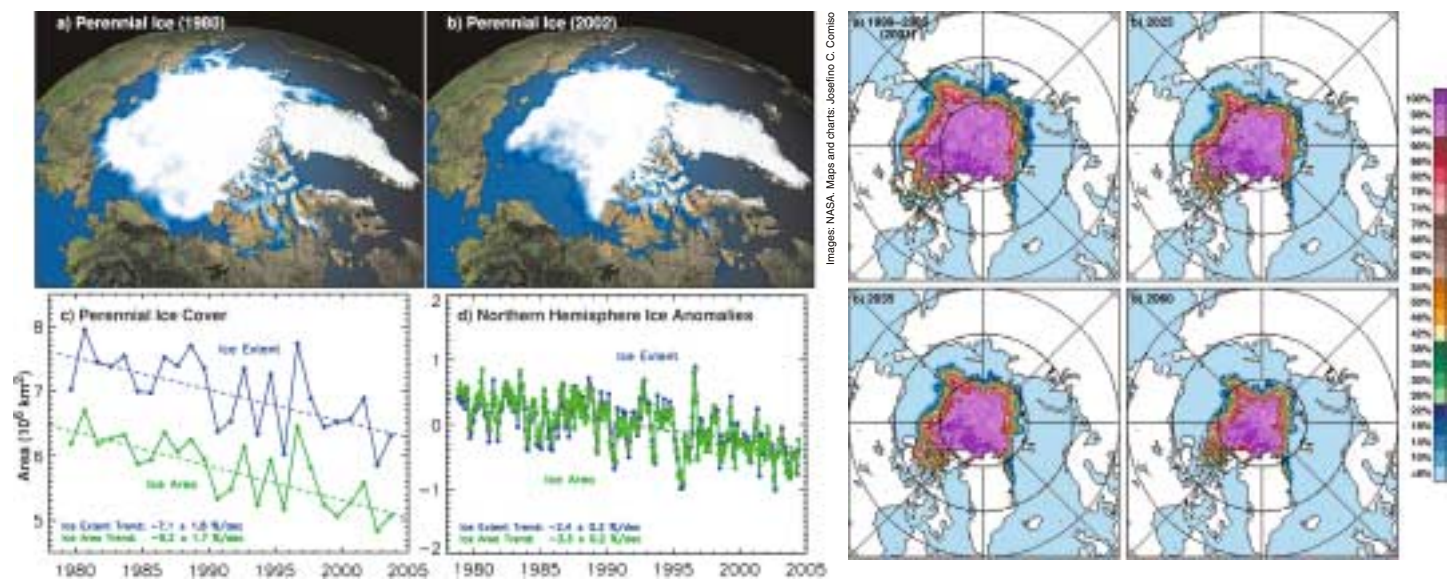
Photo: WWF-Peter Prokosch

In the Arctic, food chains are short so when a species is displaced it can have negative consequences for others. For example, fluctuations in the populations of lemmings can severely limit the number of owls and jaegers. In Canada, changes in snow cover have been linked to a nutritional decline in the hare and musk ox populations, which has driven wolves out of the dens

they have occupied for centuries.

The WWF study also shows that so-called summer sea ice is shrinking at a rate of 9.6% per decade. If this continues for more than a few decades, this perennial ice will disappear entirely by the end of the century. Since ice is an important habitat for many forms of life, from micro-organisms to large mammals, the impact of

retreating ice on the marine ecosystem can be devastating. Of particular concern are the effects on polar bears, walrus and ice-dwelling seals and birds. Changes in the abundance and distribution of these species will lead to profound cultural and economic impacts for the Inuit and other northern indigenous peoples.



Since the 1980s satellites have allowed us to monitor changes in sea ice closely. These images show a dramatic decrease in the permanent ice pack between 1980 (a) and 2002 (b).

This series of maps shows the rapid decrease of the permanent ice in the Arctic Ocean. Scientists predict that summers will be ice-free by the end of the century.