

“The sea ice, which is like land to us Inuit, has started to change...”

Sea ice is essential to the survival of many Arctic animals, and people in northern communities depend on it for hunting and fishing. It protects sensitive coastlines from wave erosion, and it influences local air and water temperatures and the changing of the seasons. It is also a danger to offshore oil rigs and an obstacle and hazard to shipping. Sea ice occurs along more than 90% of Canada’s coastline. Only the Pacific coast is ice-free all year.

Canadian Arctic waters are almost completely ice covered in winter, but the ice normally begins to melt in July and doesn’t refreeze until October. Some more southerly areas, like Hudson Bay and the Beaufort coast, become almost completely ice free in August and September. Other areas retain some or even quite a bit of ice cover throughout the year.

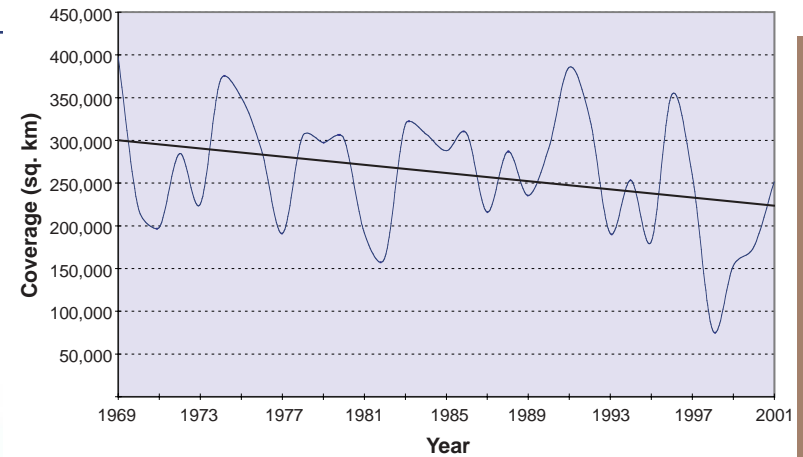
Sea ice is affected not only by air temperature but also by wind, snow cover, sunshine, the temperature and saltness of the sea, and ocean currents. Changes in any of these factors can cause large year-to-year variations in the extent and thickness of sea ice and in the length of the ice season. Over the longer term, though, changes in air temperature are one of the most important influences on the amount of sea ice.

FOCUS: The Western Arctic

The western Arctic warmed considerably during the latter half of the twentieth century. It is therefore an area where we might expect to see a decrease in the amount of sea ice as a result of more melting in summer. That, in fact, appears to be happening. Over the past three decades, the area covered by sea ice throughout the year has shrunk by an average of about 80,000 square kilometres. That’s an area slightly larger than New Brunswick and about a quarter of the area covered at the end of the 1960s.

The ice may also be getting thinner, but estimates of how much thinner are difficult to obtain. American scientists, using data collected by submarines, concluded that the average ice thickness in the Beaufort Sea at the end of September had decreased by about 45% between 1958–1976 and 1993–1997. Those results, however, were based on only a small number of submarine tracks. A more recent Canadian Ice Service study suggests that the ice may have thinned by only a quarter of that amount. Ongoing research suggests that the answer may lie somewhere between these estimates.

Permanent Ice Coverage – Western Arctic



Source: Environment Canada

Permanent sea ice is ice that doesn’t melt in the summer but remains throughout the year. In the western Arctic, the area covered by permanent sea ice has decreased by about 25% since 1969. Because these records cover only a few decades, however, we can’t be completely sure whether this trend is the result of natural variations in the Arctic climate or longer-term climate change.

An ice road crosses the frozen Beaufort Sea.

THE BIGGER PICTURE

Sea ice coverage has decreased in the eastern Arctic as well and at about the same rate as in the west. In Hudson Bay, the ice-free season is now more than a week longer than it was 30 years ago. Along the Atlantic coast and in the Gulf of St. Lawrence, however, no clear trend has developed. In 2002, ice coverage in the Gulf hit its lowest level in more than 30 years, but ice accumulations in the area have varied considerably from one decade to another.

Changes in Arctic sea ice are now making it harder for some polar bear and seal populations to survive. For many Northerners, travel over the ice has also become more dangerous and less reliable, and hunting on the ice has become more difficult. In addition, sensitive coastal areas along the Beaufort coast and in the Gulf of St. Lawrence face a higher risk of erosion as longer ice-free periods increase the exposure of shorelines to high waves from storms.



Seal pups are born on the ice and must stay there until they can swim. In early 2002, many harp seal pups were lost in the Gulf of St. Lawrence when a mild winter resulted in a lack of sea ice.

In the Arctic, the season open to shipping is becoming longer, promising easier access to northern resources and renewing interest in trans-Arctic shipping routes. As other nations become more interested in these routes, however, Canada's sovereignty over its Arctic waters may be challenged.

Less sea ice can also mean more climate change. Ice, like snow, reflects much of the sun's energy back to space. When less ice covers the oceans, more of the sun's energy is able to warm the Earth's surface and temperatures rise higher and faster, particularly in polar regions in the spring.

SEA ICE AND THE INUIT

The Inuit, who rely on the ice for hunting and fishing, have an extensive knowledge of past and present ice conditions. The changes reported by the Inuit observers below not only provide further evidence of sea ice loss but also show how Inuit life is being affected.

"We used to go on the sea ice with dog sleds to hunt seals - now we have to use boats....We used to go a long way out - now we hunt close to shore."

Andy Carpenter (Sachs Harbour, Northwest Territories)
Sea Ice Variability and Climate Change Workshop, University of Winnipeg, 2002

"The sea ice, which is like land to us Inuit, has started to change its characteristics. The sea ice now shears off, and once it starts to melt there is no stopping it."

Larry Audlaluk (Grise Fiord, Nunavut)
Elders' Conference on Climate Change, Cambridge Bay, 2001

"Thin ice is now the norm in Frobisher Bay....Even in what we used to call early spring, the sea ice is now precarious and downright unnavigable by snowmobile in some areas."

Pauloosie Kilabuk (Iqaluit, Nunavut)
Elders' Conference on Climate Change, Cambridge Bay, 2001

"Now, even before the end of May, the sea ice has broken away. We have had a few cases where Inuit had to be rescued by boat, as a whole coastline had become ice-free. We may no longer be able to harvest seals or polar bears."

Zach Novalinga (Sanikiluaq, Nunavut)
Elders' Conference on Climate Change, Cambridge Bay, 2001