

RINGED SEALS AND CLIMATE CHANGE

Arctic ice loss seals the deal



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Summary

- Ringed Seals live primarily in the high Arctic and are heavily dependent on Arctic ice, almost never coming onto land.
- Warming spring temperatures and early ice breakup are causing nursing young to be prematurely separated from their mothers and to be exposed both the elements and to predators.
- To cope with global warming, Ringed Seals will need to shift their territories to track suitable ice conditions.

Increases in disease and disturbance by humans are also likely challenges.

- Marked decreases in Ringed Seal abundance are likely to have cascading effects in Arctic food webs. They are the most important species in the diet of Polar Bears.
- Ringed Seals highlight the direct impacts of climate change on polar habitats, including the effects ice loss has on other ice-adapted species.

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What do we know about Ringed Seals?

Ringed Seals are known for the characteristic light-coloured ring marks on the dark grey pelt of adult animals. They are the smallest of all living seal species. Male Ringed Seals reach 1.5 m in length and females remain slightly smaller. Newborn pups are just 60 cm in length and weigh about 4.5 kg.

There are five sub-species of Ringed Seals and all live primarily in the Arctic Ocean, but are also found in more southern regions such as the Baltic and Bering Seas. They have a unique ability to create and maintain breathing holes in the sea ice by using sharp claws on their fore-flippers. This allows them to live in areas where even other ice-associated seals cannot reside.

The Ringed Seals are regarded as heavily ice-associated; they use ice year-round, for mating, birthing and pup rearing, moulting and even haul-out resting. Ringed Seal adults excavate lairs or snow dens on the surface of sea ice for giving birth to and rearing their young, as well as for protection from predators and their own shelter. The dens provide a warm micro-climate, reducing the energy required for keeping warm. The construction of such lairs is highly dependent on sufficient annual snowfall.

Ringed Seals are opportunistic feeders, but adults show a preference for small fish that tend to form dense shoals. Invertebrates such as krill and shrimp also form an important part of their diet. The Ringed Seal's diet overlaps considerably with the other higher predators (especially other seals) residing in the region.

Ringed Seals pup at low densities in March-April. The females lactate for about six weeks after birth and the pups are then weaned prior to the spring ice breakup in June. During lactation, both the mother and the pup are active, and spend considerable time making short feeding dives. Mating takes place a month after the pup is born, in preferred breeding habitats of land-fast ice or stable pack ice. After the breeding season ends in May, the seals haul out on the ice to moult until the ice breakup.

Polar Bears are Ringed Seals' most important predator, and they prey on little else. They are most successful at killing pups and sub-adult seals, though adults are also preyed upon. Other Ringed Seal predators include Walrus and Killer Whales which hunt both adults and pups, and Arctic Foxes, gulls and ravens, which predominantly hunt pups.

Humans hunt Ringed Seals in the Arctic, and have been doing so for millennia. Ringed Seals have traditionally formed a fundamental subsistence food item for most coast-dwelling northern peoples, and they are a source of cash income. Ringed Seals have never been the subject of large-scale commercial hunting but many tens of thousands of Ringed Seals are harvested annually by Inuit and other peoples of the Arctic Basin.

Population sizes of Ringed Seals are generally unknown because the seals and their pups spend a lot of their time under the snow in their lairs, and are practically invisible. Estimates of abundance from some areas have been derived by calculating the number of seals required to support known populations of Polar Bears and humans.

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How is climate change affecting Ringed Seals?

Many aspects of the Ringed Seal's life cycle are dependent upon their ice habitat, and many of their activities are governed by the timing of the formation and break-up of ice sheets. As a result, the most significant impact of climate change on Ringed Seals is the loss of the Arctic ice upon which they depend, although other less direct impacts have also been predicted.

Loss of ice habitat:

Ringed Seal breeding is dependent on the availability of sufficient ice, at the correct time of year in areas with sufficient food nearby. As the Arctic ice continues to melt earlier each year, more and more pups may be separated prematurely from their mothers. Both ice and snow must be stable enough in the spring season to successfully complete the six week period of lactation. If the land-fast ice breaks up too soon, pups may be separated prematurely from their mothers, resulting in high pup mortality.

Spring rains or warm spring temperatures can cause the roofs of lairs to prematurely collapse leaving Ringed Seals unsheltered and exposed to predators. Insufficient snow at the beginning of the breeding season can have the same effect.

Ringed Seals in some areas are already showing relatively long-term declines in reproductive rates and pup survival.

Kovacs and Lydersen report: "During 2006 and 2007 many of the fjords on the west coast of Svalbard did not freeze for the first time in recorded history. Ringed Seal reproduction was virtually non-existent in areas where many hundreds of pups are normally born. It is not known if the seals that normally pup in this region established themselves elsewhere early enough to set up territories and build lairs, etc., but it seems highly unlikely."

Increases in disease:

Warmer ocean temperatures are likely to make conditions more favourable for Ringed Seal parasites and pathogens. Spread of these organisms is likely to be facilitated by the migration of seals as they are forced to seek more stable ice habitats. It is also possible that the added stresses from a changing climate will reduce the immunity of Ringed Seals, making them more susceptible to these natural threats.

Increases in human presence:

As Arctic conditions warm, a greatly increased presence of humans in previously inaccessible areas is anticipated. Activities such as shipping, agriculture and oil exploration are predicted to disturb and further degrade habitats and increased fishing in the area may reduce food availability.

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Can Ringed Seals adapt to climate change?

To cope with global warming, Ringed Seals will need to shift their territories to track suitable ice conditions. Ringed Seals are known to have the capacity to move to new areas when required, although this can be restricted by geographical barriers and is ultimately dependent on the availability of sufficient new habitat. Their already high-latitude distribution range limits their potential for pole-ward migration.

According to some predictions, in the near future there could be very little summer sea ice in the Arctic. Ringed Seals do not normally haul out on land and performing this behaviour would be a rather dramatic change to the species' behavioural patterns. While closely related seals do perform this behaviour on islands and have survived at low population densities over an extended period of time, they face few or no predation risks in their ranges.

Other threats

Ringed Seals also face non-climate related threats. Subsistence hunting of Ringed Seals by indigenous peoples is unrestricted in most areas but the levels are thought to be sustainable. Pollutants have been shown to cause direct mortality to Ringed Seals, as well as increasing susceptibility to diseases. Accidental capture by commercial fisheries is a problem in some small lake populations. But the largest threat by far to Ringed Seals is climate change.

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Ringed seal geographic distribution – © IUCN Red List

"If the extremes predicted for losses of sea ice do occur, it is difficult to envisage how this ice-breeding seal will survive beyond the small refugia-areas where ice-cover will remain, despite its currently broad range and high abundances."

"Marked decreases in Ringed Seal abundance are likely to have cascading effects in Arctic food webs. They are the most important species in the diet of Polar Bears and are themselves top trophic consumers of significant magnitude."

- Kit Kovacs and Christian Lydersen (2008)