

How is Climate Change Affecting Marine Mammals in the Arctic?

Emily Kane and Adriana Roscigno
 BIO208, Environmental Problems, Professor David Tapley

Climate Change in the Arctic

- Climate change refers to unusual weather that is happening in a place where it is usually not found.
- The Arctic is facing a climate challenge of it warming, and in 2020 it was the second warmest year on record.
- Due to the warming of the Arctic, sea ice is declining at a rate of 13.1 percent per decade. Even during the coldest temperatures, the sea ice is noticeably thinner than normal.
- The frozen ground on the ice, known as permafrost, is also starting to warm which is causing it to thaw. As permafrost thaws, plants and animals that were frozen in the ground start to decay. They release carbon dioxide and methane back to the atmosphere that can also contribute to further warming.
- The snow that covers the ground of the ice has also decreased, especially in the spring and the summer, and the glaciers are starting to retreat.
- In the picture below, in 2020 the sea ice averaged at 7.28 million square kilometers, which was 2.19 million square kilometers below the average that it was in the years between 2000 and 2010.

Organizations Striving for Change and Research

- The Marine Mammal Commission started the The Marine Mammal Protection Act (MMPA) which is a legislation that protects the marine mammals species from declining.
- The World Wildlife Fund works with government agencies and business in order to help reduce the impact of climate change on these mammals.
- Right now, there is research being done on how to help solve the decline of sea ice. An engineer devised a plan of using millions of glass microspheres as a protective layer that will ultimately reflect the sunlight and insulate the melting ice. Researchers found that these beads did work in the pre trials of a lake in Minnesota, and now they are devising a way to bring this to the Arctic.



Marine Mammal Commission logo
<https://www.nfwf.org/partnerships/federal-state-partners/marine-mammal-commission>



World Wildlife Fund logo
https://en.wikipedia.org/wiki/World_Wide_Fund_for_Nature

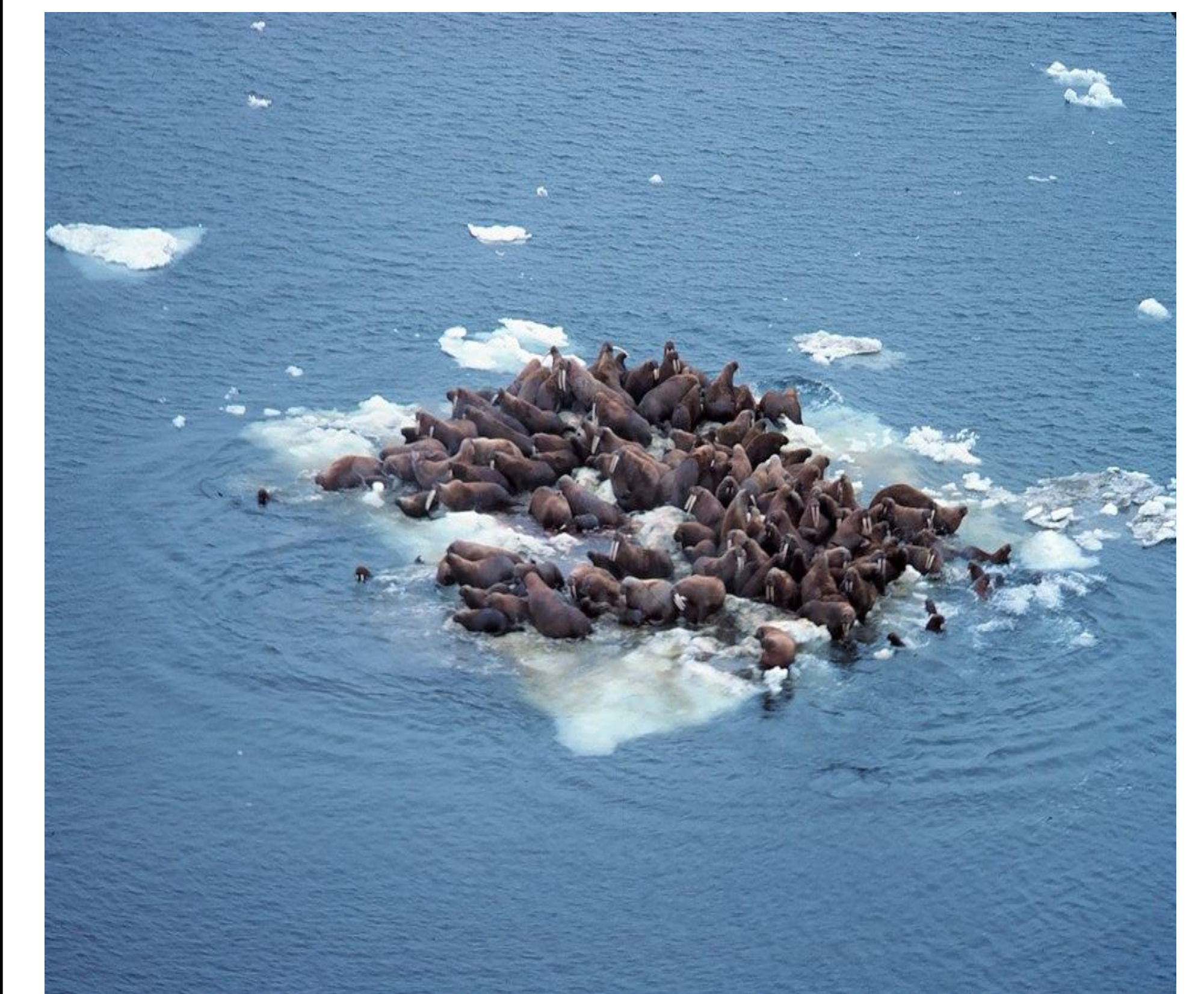
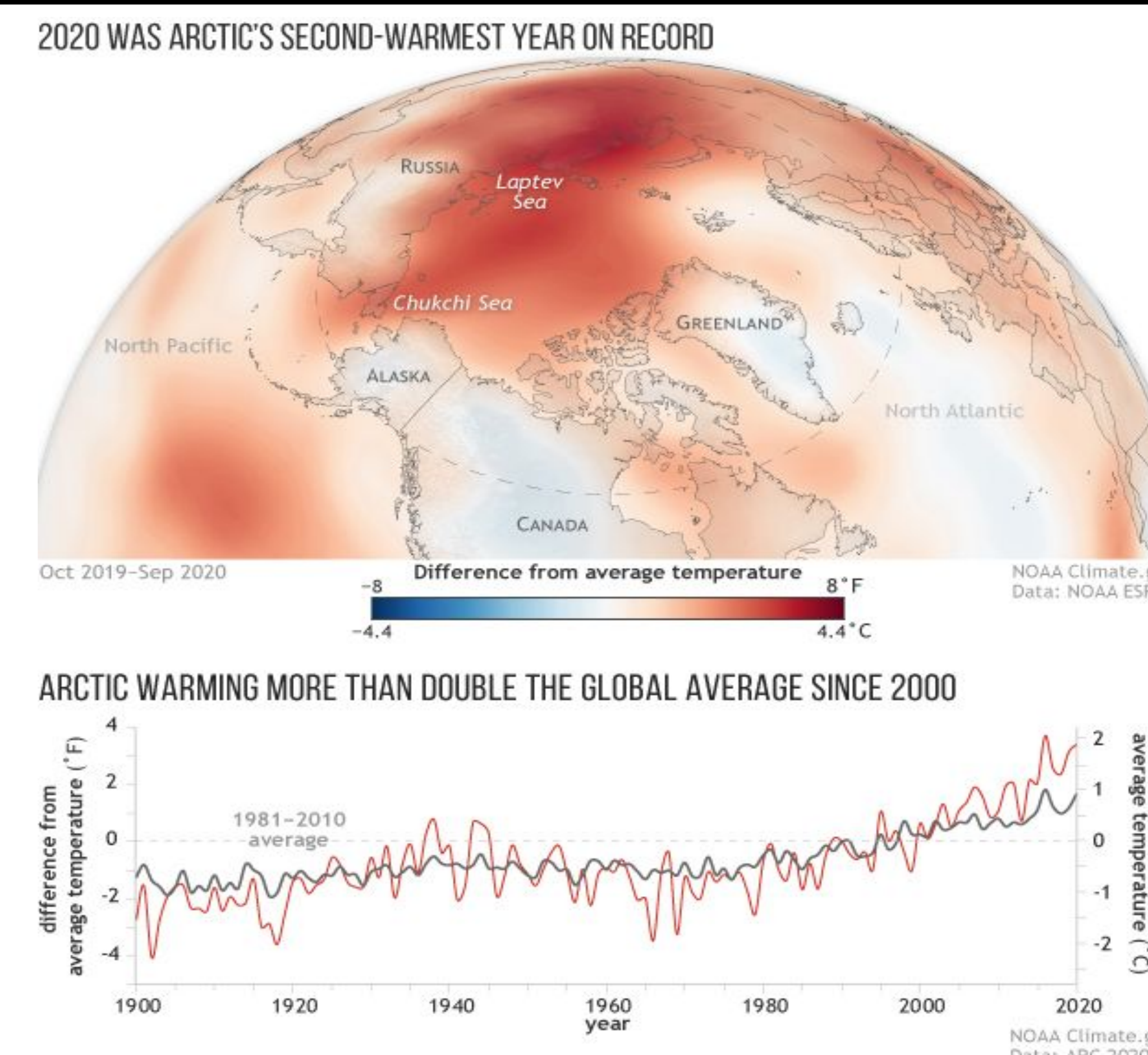
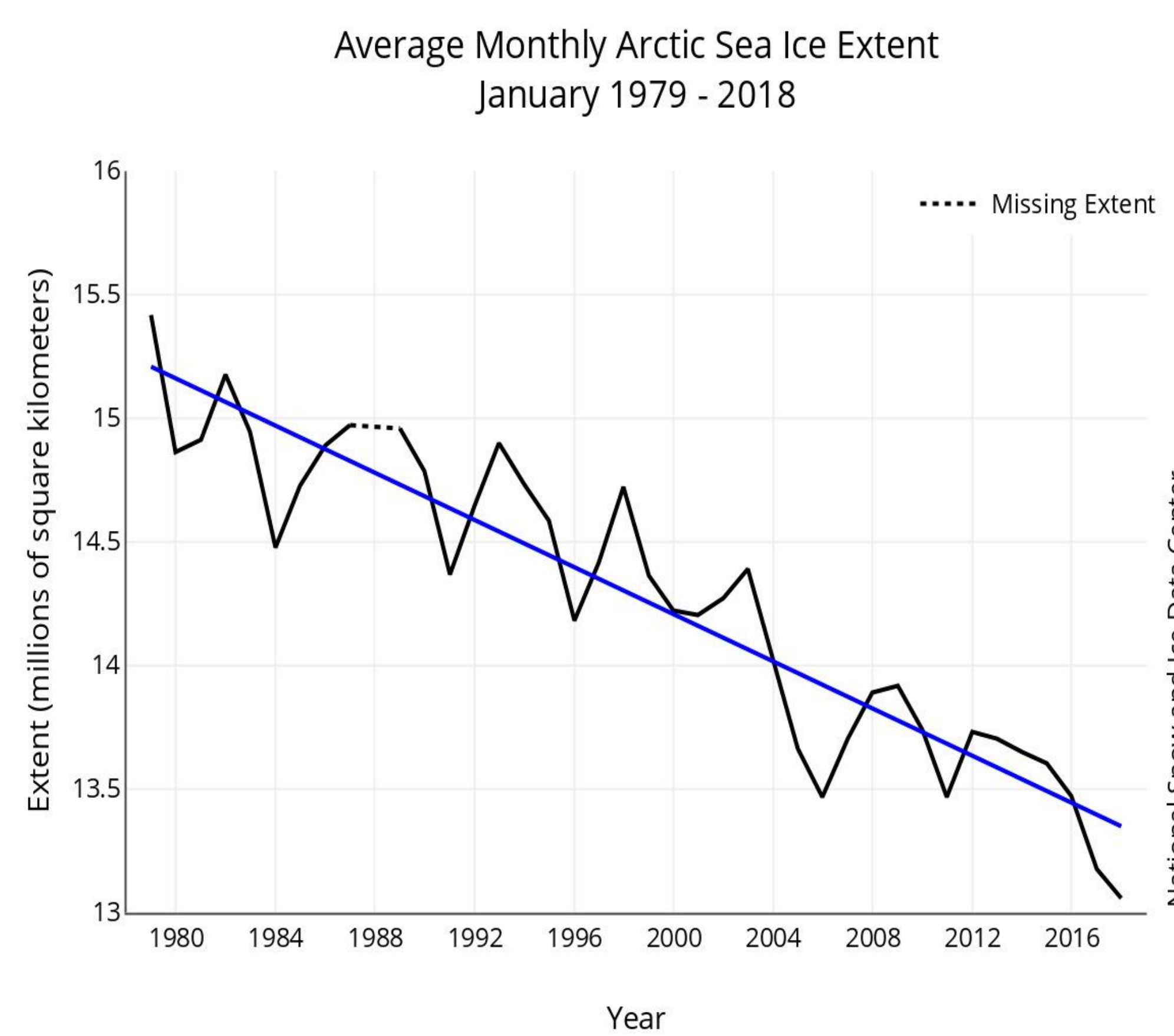
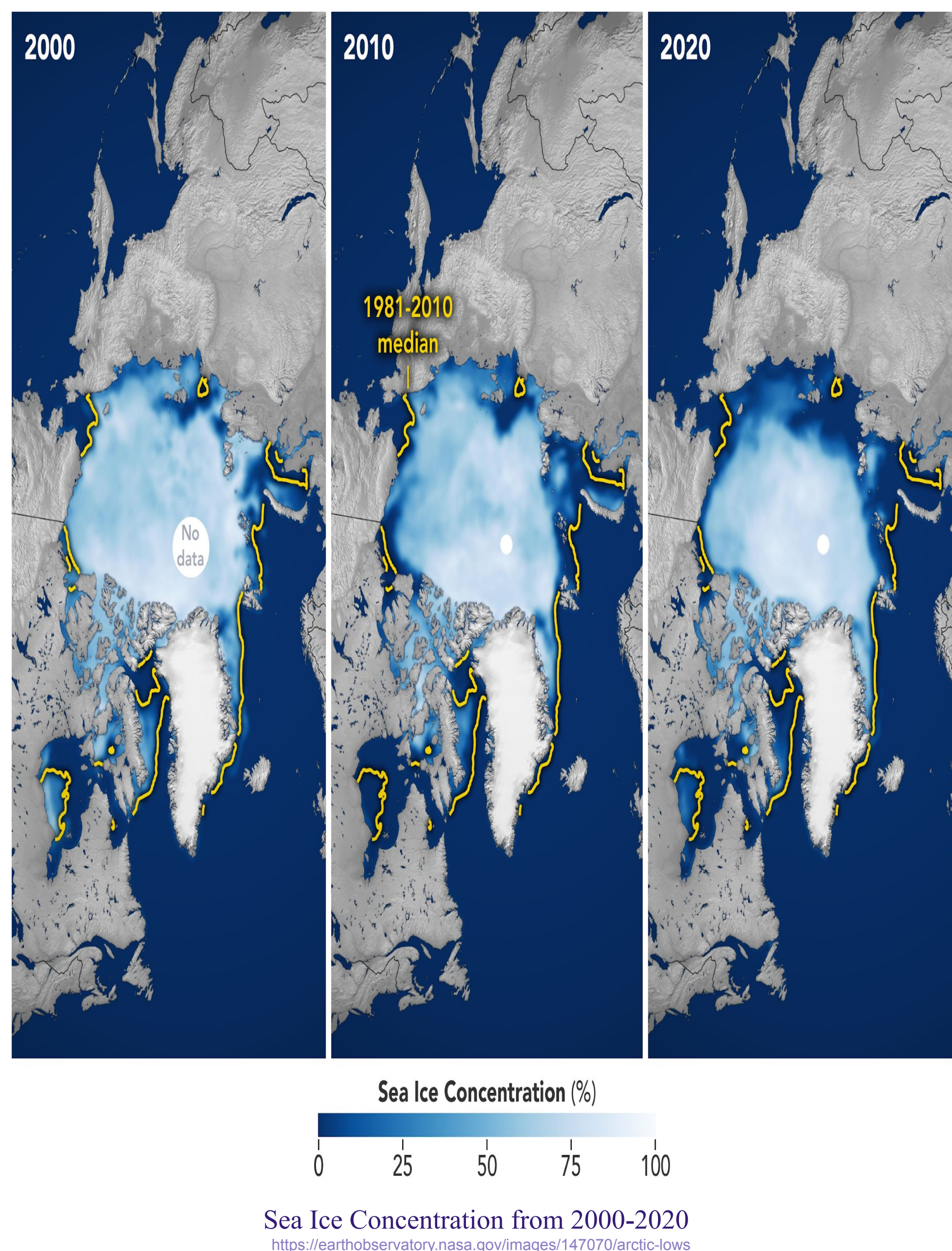
Marine Mammals in the Arctic

Seven species of marine mammals live in the Arctic year-round.

- **Polar Bear:**
 - Conservation status: Vulnerable, population decreasing
 - Estimated Population: 21,000-33,000.
- **Walrus:**
 - Conservation status: Vulnerable
 - Estimated Population: 230,000
- **Narwhal:**
 - Conservation status: Least Concern
 - Estimated Population: 120,000
- **Beluga Whale:**
 - Conservation status: Least concern
 - Estimated Population: 200,000
- **Bowhead Whale:**
 - Conservation status: Least concern, but variation among populations
 - Estimated Population: 12,505
- **Bearded Seal:**
 - Conservation status: Least concern, population stable
 - Estimated Population: 500,000
- **Ringed Seal:**
 - Conservation status: Least concern
 - Estimated Population: 2 million

Impact of Climate Change on these Species

- Polar bears depend on sea ice to travel, hunt seals, and find mates. As sea-ice decreases, many will be forced to travel further for food and spend more time on land.
- A projection of sea ice in the archipelago, supported by WWF, shows that much of the region is facing significant ice loss in the next few decades - with severe consequences for polar bears.
- Global polar bear numbers are projected to decline by 30% by 2050.
- As Arctic ice cover declines, humans will have easier access to areas that have always been home to Belugas and Bowhead whales. This melting of sea ice opens up Arctic waters to shipping, fishing, seismic surveys and military activity for a larger proportion of the year.
- Amongst other impacts, these activities make the oceans noisier, potentially affecting whales' ability to communicate, navigate, find food and search for mates.
- Walrus depend on sea ice for feeding and resting. In the last ten years, melting of sea ice has forced large numbers of walrus ashore, which can be deadly for walrus calves that can be crushed in stampedes provoked by disturbances.



Walrus on one small piece of sea ice
<https://www.gazette.net/Earth-Matters-25915581>

- The graph on the left shows how much on average the sea ice is declining. Since 1980 the ice has went from almost 15.5 square kilometers to about 13 square kilometers. The graph on the right shows how much the Arctic has warmed since 1900. The graph also shows the average temperature going slightly up and down from 1900 to 2000, and then from 2000 to 2020, the Arctic warmed more than double the global average.

Literature Cited:

Arctic Sea Ice Minimum
 Climate Change and the Arctic
 What is Climate Change?
 An Engineer Has Devised a Way to Stop Arctic Ice from Melting by Scattering Millions of Tiny Glass Beads to Reflect Sunlight Away
 11 Arctic Species Affected by Climate Change
 Polar Bear Status and Population
 Walrus
 Narwhal
 Beluga
 Bowhead Whale
 Bowhead Whale
 Ringed Seal
 Climate Change in the Arctic
 Bearded Seal