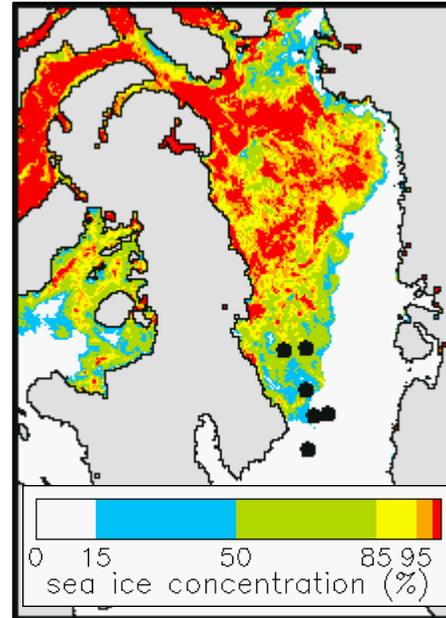
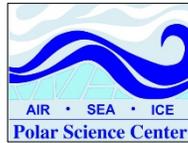


The Timing of Arctic Sea Ice Advance and Retreat as an Indicator of Ice-Dependent Marine Mammal Habitat



Harry Stern, Mathematician
Polar Science Center
Applied Physics Laboratory
University of Washington, Seattle



Arctic marine mammals such as polar bears, seals, walruses, belugas, narwhals, and bowhead whales depend on the sea-ice cover as an integral part of their existence.



Kristin Laidre, Biologist
Polar Science Center
Applied Physics Laboratory
University of Washington, Seattle



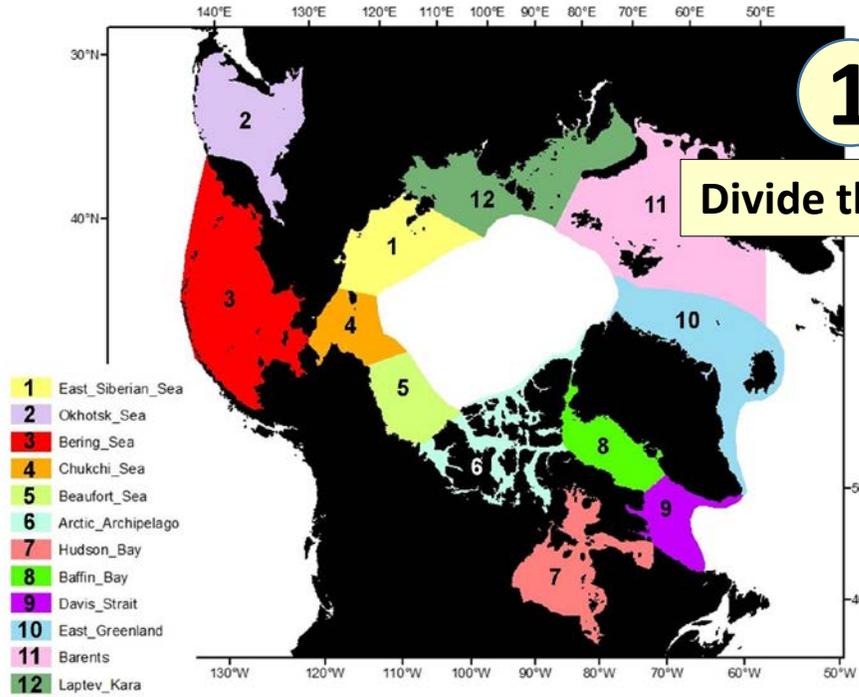
Photo credit: Kristin Laidre



Photo credit: Kristin Laidre

The dates of spring sea-ice retreat and fall sea-ice advance are key indicators of climate change for ice-dependent marine mammals.

Method

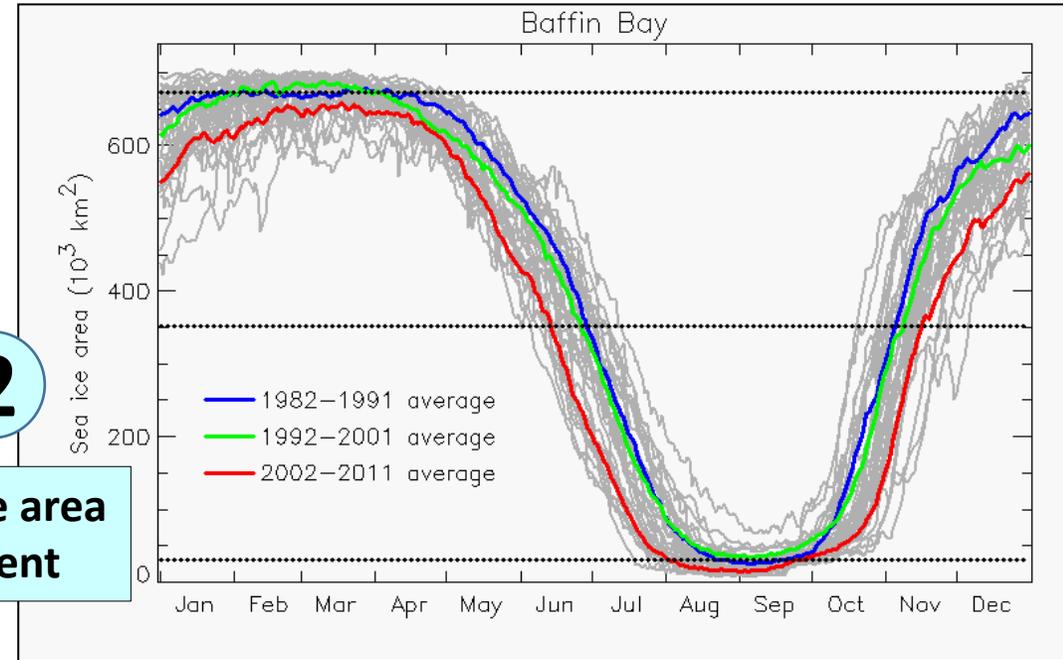


1

Divide the Arctic into regions

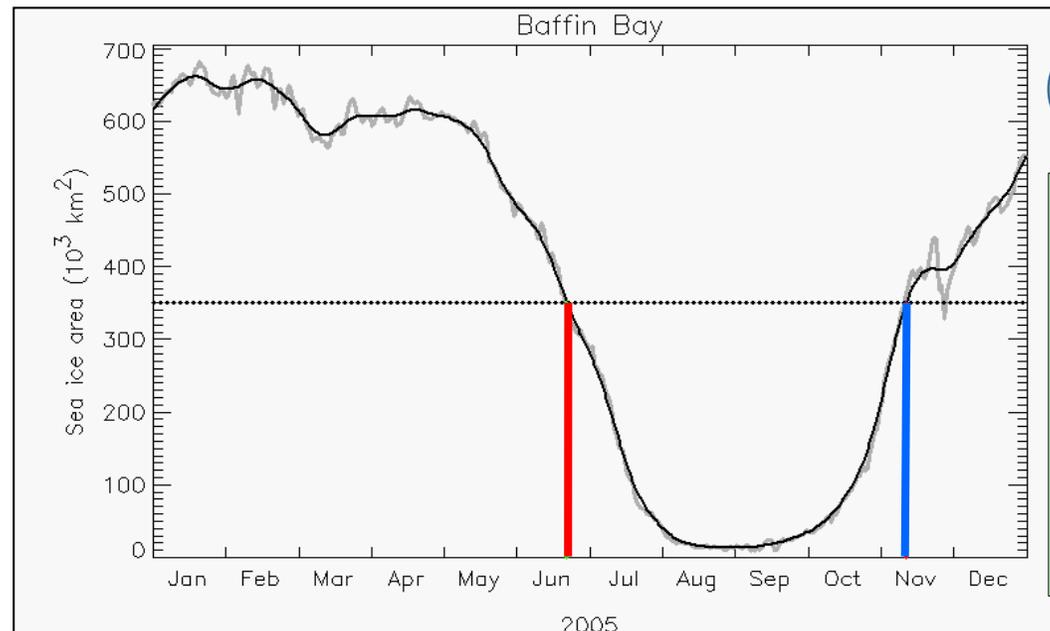
2

Calculate the daily sea-ice area in each region, 1979-present



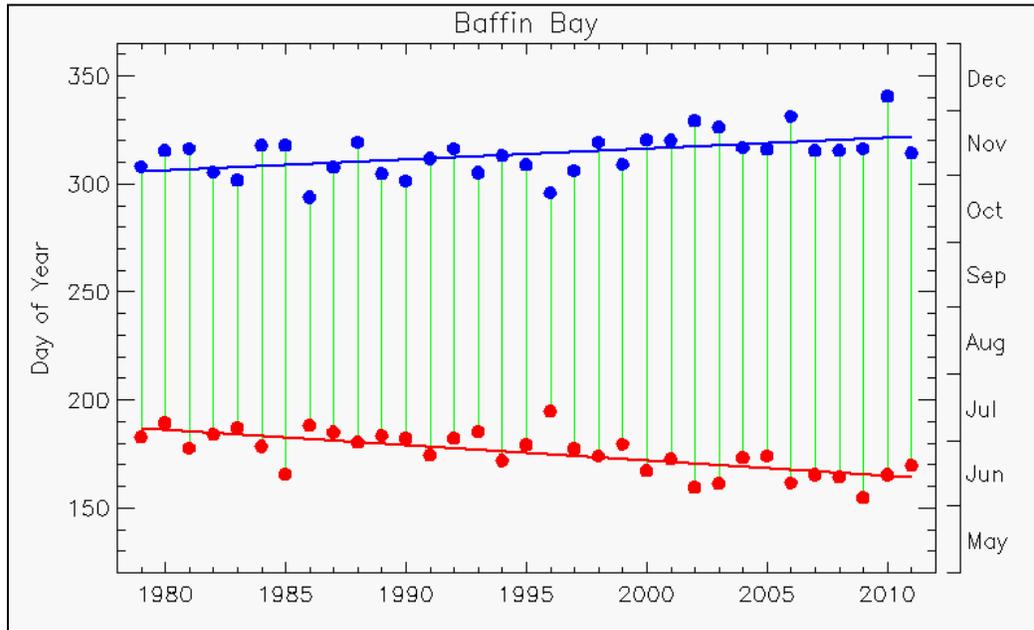
3

For each year, find the day in spring when sea-ice area drops below a threshold, and the day in fall when sea-ice area rises above the threshold



Results

Time Series

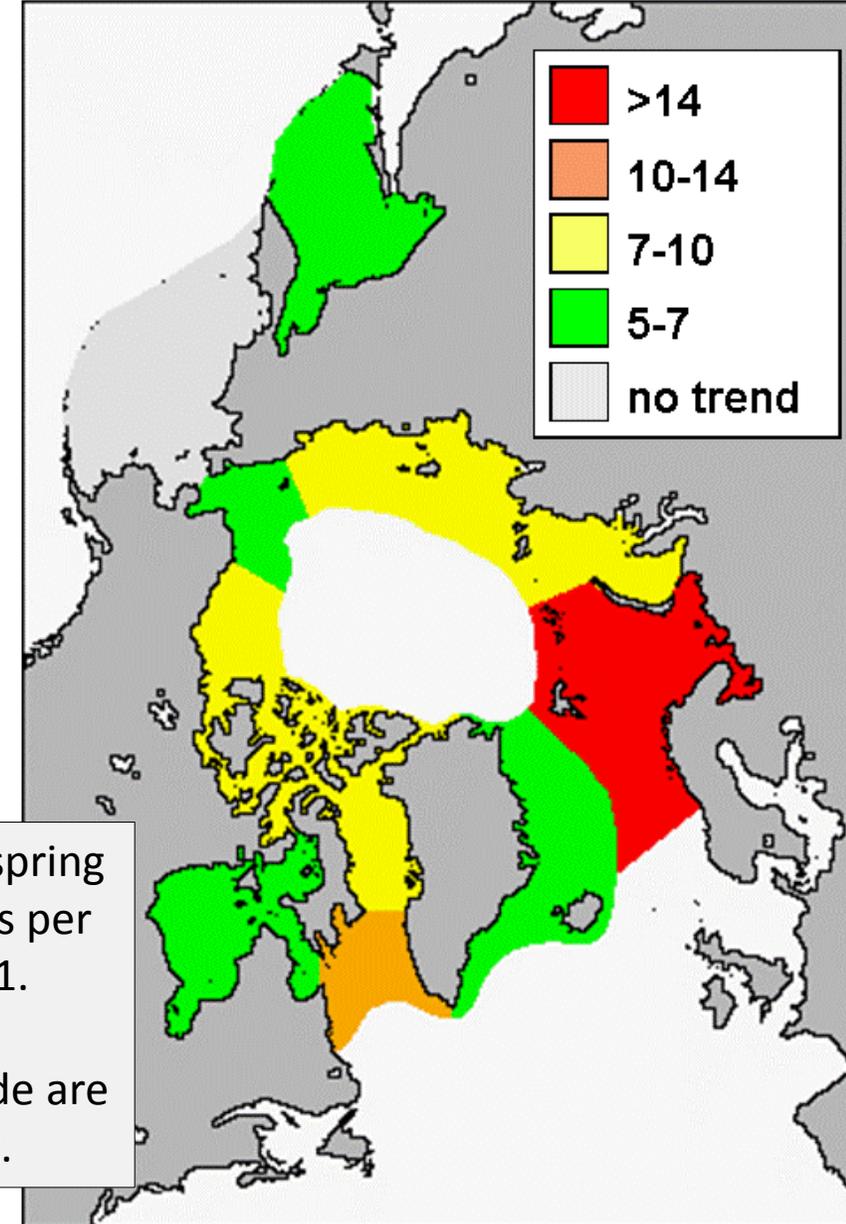


Dates of fall
sea-ice advance

Duration of low
sea-ice season

Dates of spring
sea-ice retreat

Trend Maps



Trend toward earlier spring
sea-ice retreat, in days per
decade, for 1979-2011.

Trends > 5 days/decade are
statistically significant.



Look for our poster or talk at the
AGU Fall Meeting, December 9-13



Session IN030. Remote-sensing the
Impact of Climate Change on Wildlife