

Status of ringed, bearded, spotted, and ribbon seals in Alaska using harvest-based monitoring by decade: 1960s, 1970s, 2000s, and 2010s



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Why is this important?

- Declining sea ice is predicted to negatively affect Alaskan ice seals.
- Less sea ice means less time for the seals to rest, pup, nurse, and molt on ice.

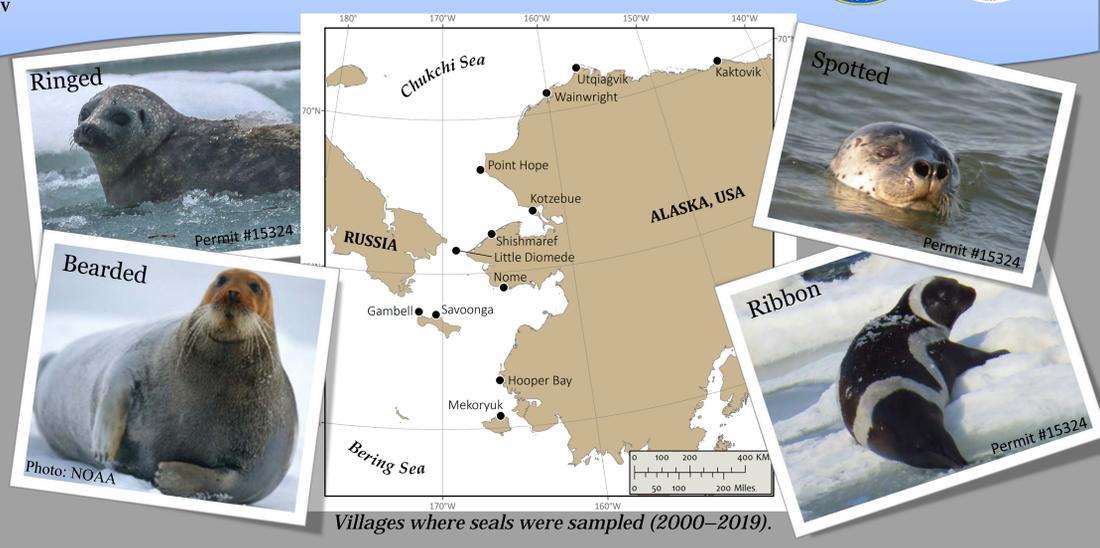
What did we do?

- We compared seal blubber thickness, length, productivity, and proportion of pups harvested during the 2000s and 2010s (years of sea ice decline) to the 1960s and 1970s (before sea ice decline)^a.

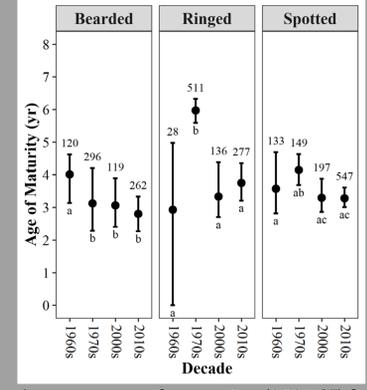
^aRibbon seals were not included in all analyzes due to small sample sizes.

What did we find?

- As of 2019, no sustained negative response to ongoing environmental changes were detected.
- Productivity and pup survival remain high in the 2010s.
 - Ringed, bearded, and spotted seals are currently maturing at younger ages than in the 1970s.
 - Pregnancy rates remain high in the 2010s at >80% for all species.
 - Proportion of pups in the sampled harvest is currently higher than the 1970s.
- Several indices suggest a decrease in health in 2010 and 2011 during the Unusual Mortality Event (UME) years, especially for ringed seals; followed by a return to average in 2012.

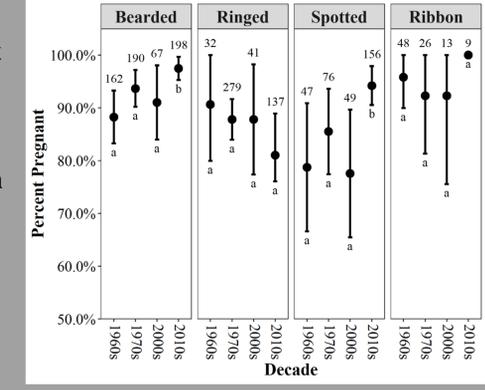


Female age of maturity



Average age of maturity (95% CI) by decade.

Pregnancy rate

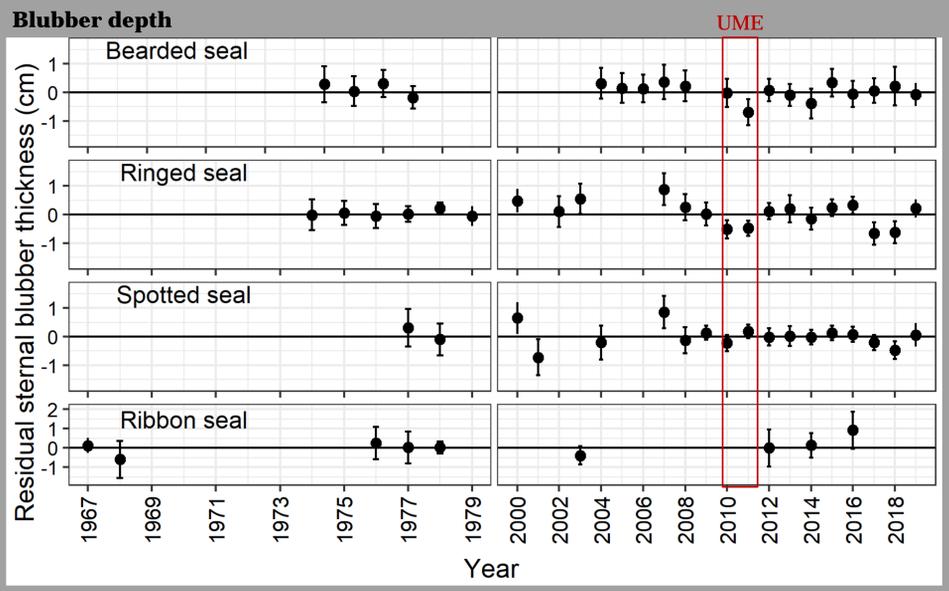


Average pregnancy rate (95% CI) by decade.

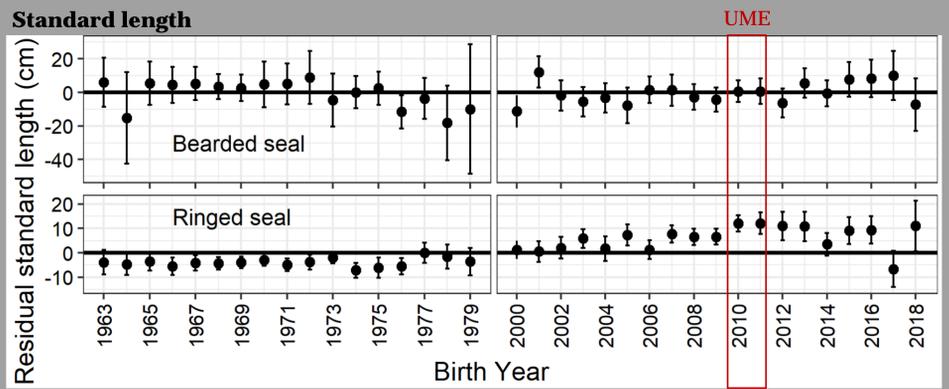
Pregnancy rate for all species, except ringed, were higher in the 2010s than other decades.

Body condition- blubber depth and growth (length at age)

Body condition varied annually but no sustained negative trends were detected.

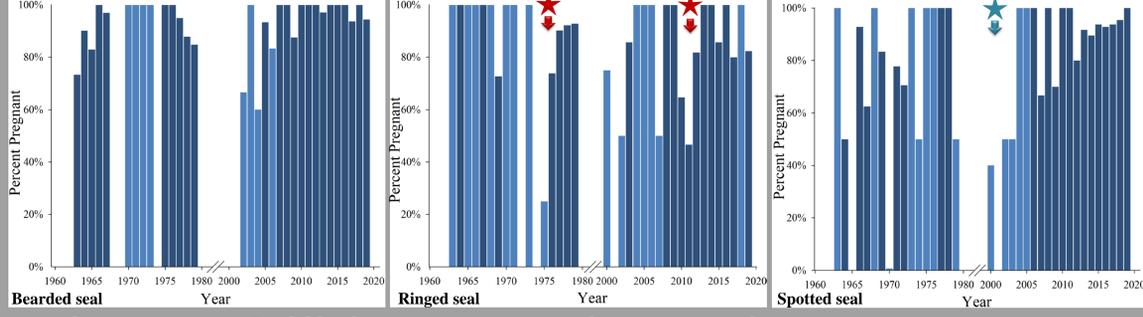


Average blubber depth is represented by the horizontal line at zero. In years with residuals above the line, harvested seals were fatter than average "good years" and in years with residuals below the line, seals were skinnier than average "poor years" (95% CI).



Seal length is standardized to birth year when seals grow the fastest. Average standard length by birth year is represented by the horizontal line at zero. In years with residuals above the line, seals were longer than average "good years" and in years with residuals below the line, seals were shorter than average "poor years" (95% CI).

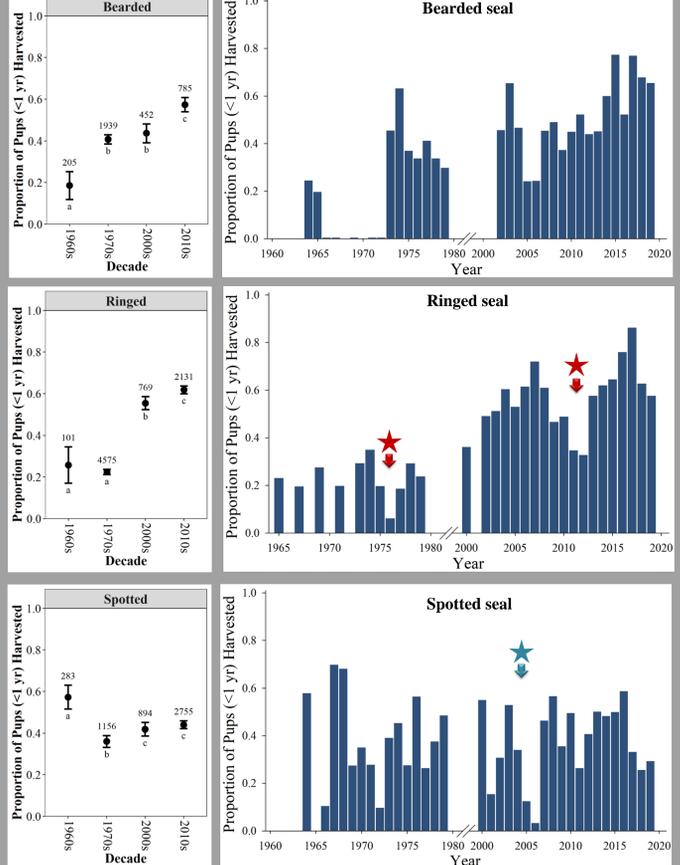
Annual pregnancy rate



Annual pregnancy rate. Dark blue bars represent years with ≥ 7 mature seals.

- ★ Ringed seal pregnancy rate was lowest in the 1970s prior to the 1976-77 regime shift and in 2010-11 during the UME.
- ★ Spotted seal pregnancy rate was low in the early 2000s.

Proportion of pups (indicative of pup survival to weaning)



Proportion of pups (<1 yr) harvested by decade (95% CI). Annual proportion of pups in the sampled harvest. Years with <10 seals are not included.

The proportion of pups in the sampled harvest remains high for bearded, ringed and spotted seals the 2010s, indicating pups survive weaning.

Lower pup proportions often follow years with low pregnancy rate. For example:

- ★ Ringed seals had low pup proportions in 1976, 2011, and 2012.
- ★ Spotted seals had low pup proportions in the early 2000s.

Acknowledgements

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For more information:

