

Rapid Arctic warming drives shifts in marine mammals, new research shows

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Beluga whales could face increased competition as climate change affects the Arctic, researchers say. Credit: Laura Morse/Alaska Fisheries Science Center, NOAA Fisheries

New hydrophone surveys of migration gateways to the Arctic show that

recent extremes in sea ice loss has opened new waters to humpback and fin whales that once ranged through the far north only in summer. And as climate change drives the ice into further retreat, such "summer" species may begin competing with bowhead whales that once had the habitat to themselves, according to research presented at the [Society of Marine Mammalogy's Biennial Conference in San Francisco](#) this week.

The potential for increasing competition between species from whales to polar bears reflects just one of many examples of how [climate change](#) is affecting marine mammals globally, introducing new interactions, altering food sources and shifting habitat, researchers at the conference reported. More than 2,000 researchers are attending the conference, the world's largest gathering of scientists studying marine mammals, with climate change one of the leading themes.

Sue Moore, a senior scientist at NOAA Fisheries and plenary speaker at the conference, described marine mammals, especially in the Arctic, as sentinel species that reflect and provide insight into environmental changes in their surroundings.

"We see winners and losers as changes accelerate, and some of the winners are likely to be those that are most adaptable and resilient to change," she said. She stressed the importance of collaboration between [marine mammal](#) scientists, oceanographers and local residents to identify key relationships between the two.



A changing Arctic climate may bring more competition for bowhead whales.
Credit: Amelia Brower/Alaska Fisheries Science Center, NOAA Fisheries

Marine mammals can reflect climate change intrinsically, though changes in their diet and condition, as well as extrinsically, through shifts in their range and habitat, Moore said. Many research reports presented at the conference document the way climate change is affecting species from polar bears to sea otters. Depending on regional conditions, climate change is likely to present new opportunities for some species such as humpback whales that will have access to new habitat, even as it poses new problems for other species, such as walrus and [polar bears](#) that have less ice to haul out or hunt on.

Moore described novel research partnerships such as one that includes

subsistence hunters in tracking ecosystem changes and changes in [bowhead whales](#) to better understand their ecology and responses to climate change. For instance, the partnership found that contrary to popular belief bowhead whales often eat krill in the Pacific Arctic, changing researchers' understanding of the ecological factors affecting the whales. Researchers must also continue to track the combined effects of sound, ship strikes and other impacts of increased shipping through the Arctic, she said.

Some research is looking into the past for clues as to how climate change may affect marine mammals, as captured in the conference title, "Bridging the past toward the future." For instance, Casey Clark of the University of Alaska Fairbanks has examined stable isotopes in historic walrus bones for clues to how the diet of the giant marine mammals may have changed along with the environment during past warm and cold periods. His findings indicate that walrus diets have changed significantly during past changes in climate, likely reflecting shifting prey sources over thousands of years.

"Over 4,000 years they appear to have covered a whole gamut of different prey items and prey locations," Clark said. "They have changed their diet, very likely in response to [environmental changes](#). Maybe this kind of generalism will help them in being able to transition to different prey items, but that remains to be seen."

Jennifer Francis, a Rutgers University research professor and plenary speaker at the conference, sees potential connections between rapid Arctic warming and unusual weather patterns and climate extremes elsewhere on the globe. For instance, a so-called "warm blob" that turned the ocean off the West Coast of the United States unusually warm for more than a year may have been especially strong and persistent because of the atmospheric patterns taking hold over the Arctic, which is warming much faster than the planet as a whole.

"New research has revealed many mechanisms connecting rapid [sea-ice loss](#), Arctic warming, and weather tendencies," Francis said. "It's not simple, but as Mother Nature keeps dishing out these unusual events we can start to connect the dots between them to understand the larger picture of what's happening and how it's likely to affect animals within and beyond the Arctic, including humans."

Provided by NOAA Headquarters

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