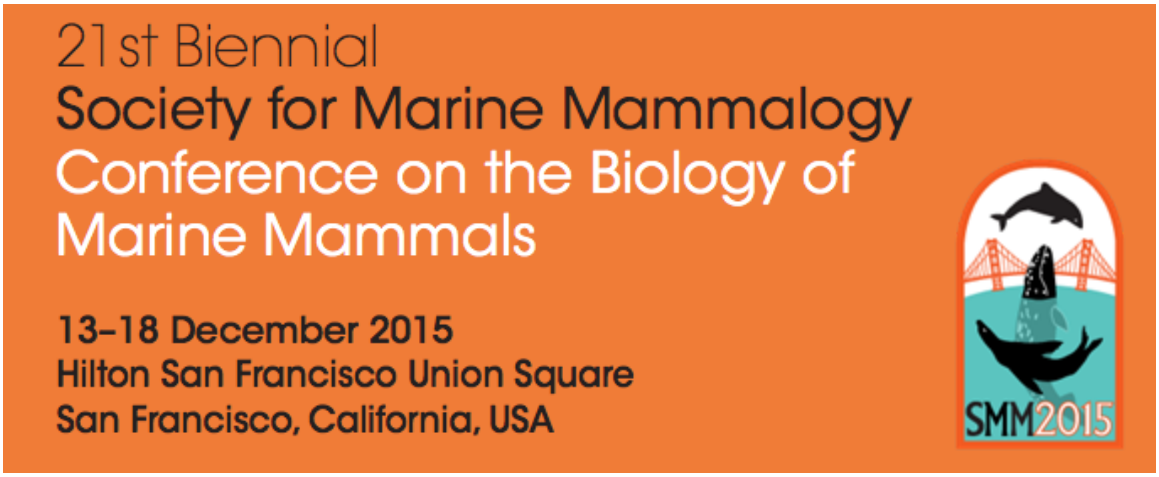

2015. Reichmuth, C., Beltran, R., Sills, J. M., Peterson, S., McHuron, E., and Lofstrom, J. What captive studies can tell us about the foraging ecology of free-ranging Arctic seals. *21st Biennial Conference on Marine Mammals,* San Francisco, United States, 13 December – 18 December. (Presentation abstract).

What captive studies can tell us about the foraging ecology of free-ranging Arctic seals

Rapid environmental change occurring in polar regions has energetic implications for top predators. Specifically, delayed sea ice formation or reduced ice extent can influence foraging success by altering prey abundance and distribution. Information about seasonal foraging habits is necessary to develop bioenergetic models, which in turn can be used to predict how ice seals will respond to climate change in Arctic and sub-Arctic ecosystems. However, foundational knowledge to inform such models is limited. To optimize the potential knowledge gain from currently captive spotted, ringed, and bearded seals, we describe changes in prey intake, body mass, and growth during development, and report stable isotope trophic enrichment factors for whiskers and blood. Daily food consumption varied predictably with age, season, and species. Food intake peaked prior to molt in the spring and was lowest in the fall, with caloric consumption declining by up to 35% over this period. In addition to using dynamic energy consumption values to parameterize or validate bioenergetic models, the dietary components of free-ranging seals are required to predict the energetic implications of environmental change. To enable the use of mixing models to quantify diet composition in free-ranging ice seals, we combined the known diet of the captive seals with isotopic analyses of their tissues (blood plasma, red blood cells, whiskers) and prey items to calculate trophic enrichment factors (TEFs). TEFs ranged from 1.73 to 4.62 permil for δ13C and 2.74 to 4.14 permil for δ15N and varied more by tissue than by species. With baseline data to quantify longitudinal changes in energy intake and the TEFs associated with incorporating prey energy into animal tissues, dynamic bioenergetic models can now be populated with data that would be impossible to obtain in wild seals.