
**Comparative Energetics of Ringed, Bearded, and Spotted Seals**

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Intense environmental shifts are occurring throughout the Arctic as a result of global climate change. These changes may be too rapid for long-lived, highly-derived species such as marine mammals to adequately respond. Empirical data on seasonal and life-stage specific energy demands are needed to determine population-level prey resource needs, as well as to make robust and meaningful predictions as to the resilience or sensitivity of Arctic marine mammals to anticipated environmental change. We conducted a longitudinal and comparative energetic study with trained individuals representing three Arctic seal species [ringed seals (*Pusa hispida*; n=2), bearded seals (*Erignathus barbatus*; n=1), and spotted seals (*Phoca largha*; n=4)]. We tracked daily caloric intake and examined seasonal and ontogenetic changes in in-water resting metabolic rates (RMR) under controlled conditions using open-flow respirometry. The mean RMR of sexually mature male spotted seals was 5-6 ml O2 min-1 kg-1, except during the annual molt when RMR was elevated (6-8 ml O2 min-1 kg-1) for 1-2 months. A single one-year-old male bearded seal exhibited a mean RMR (approximately 5.5 ml O2 min-1 kg-1) that was comparable to other large polar and temperate seals. In contrast, we found that ringed seals have the highest RMR of any phocid species measured to date (9-10 ml O2 min-1 kg-1), which is likely a consequence of their small size and pagophilic nature. Cycles of energy intake did not mirror the changes in energy demands revealed by species-specific RMR data; this often resulted in negative energy balance during key life-stages (e.g. molt) despite access to food. We believe these data are an important first step in quantifying population-level resource needs, identifying physiologically sensitive life-stages, and assessing the ability of each species to respond to changing environmental conditions; specifically, changes in the distribution and abundance of preferred prey.