# What do bearded seals really eat– A methods comparison

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Stomach contents, stable isotopes, fatty acids, and more recently, fecal DNA are commonly used to infer the diet of marine mammals. How complimentary or contradictory these methods are, especially when considering individual diet variability, remains poorly understood. Differences in dietary information from stomach contents, stable isotopes, and fatty acids were evaluated for 76 adult bearded seals (*Erignathus barbatus*) harvested in Alaska for subsistence uses. Fishes were investigated using stomach contents and fecal DNA from a subset of 22 seals. As expected, stomach contents and fecal DNA provided information on recently consumed prey, while $\delta^{13}C$ and $\delta^{15}N$ of muscle and fatty acid profiles of full-thickness blubber provided information on prey consumed and integrated over a longer time frame. Taxonomic resolution of prey was highest for stomach contents. We identified at least 60 prey taxa in the stomachs; with sculpins (Cottidae) occurring most often at 66% frequency of occurrence (FO), followed by shrimp (64% FO), crab (63% FO), and cod (Gadidae) (55% FO). Proportions of indicator fatty acids from blubber were similar to other fatty acid studies of bearded seals in Alaska and suggest a benthic diet. Specific prey identification using fatty acids was not possible, because fatty acid prey libraries do not exist for the Alaskan Arctic. Some taxonomic resolution was achieved for stable isotopes using a Bayesian stable isotope mixing model (SIAR), but prey had to be combined into isotopically (i.e., not taxonomically) similar prey source groups due to model restrictions. Despite the differences in dietary time frames, the relative occurrence (RO) of prey from stomach contents and the mean proportions of prey source groups from the stable isotope mixing model were similar, except for octopus. Octopus occurred at a higher proportion using estimates from stable isotopes (13%) compared with the RO of stomach contents (3%). Using denaturing gradient gel electrophoresis (DGGE) of 16S gene fragments, only two fishes (shorthorn sculpin, *Myoxocephalus scorpius* and an unknown snailfish species, Liparidae) could be positively identified. Overall, the methods yielded different, but not contradictory results, and none provided a complete description of diet.