

*Gulf of Alaska – Marine Mammals*

**Isotopic Sampling of Young Steller Sea Lions Provides Evidence of Changes in the Diet of their Lactating Mothers.**

**Lorrie D. Rea**, Alaska Department of Fish and Game, [lorrie.rea@alaska.gov](mailto:lorrie.rea@alaska.gov)

Carrie A. Eischens, Alaska Department of Fish and Game, [carrie.eischens@nprb.org](mailto:carrie.eischens@nprb.org)

Although it is critical to understand the dietary patterns of adult female Steller sea lions for the development of sound fisheries management policy, the capture of adult female Steller sea lions for research remains logistically difficult and is currently prohibited under US Marine Mammal Protection Act permits. Fortunately, underwater capture techniques have significantly improved our ability to capture young Steller sea lions up to the age of 3 years. While young sea lions are maternally dependent, vibrissae carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) signatures directly reflect the milk diet that is ingested (with a 2.0‰ and 2.5‰ enrichment in  $^{13}\text{C}$  and  $^{15}\text{N}$  respectively; Stegall *et al.* in press), and thus can be used to infer the diet of the lactating female at the time of milk production. Steller sea lion pups are born with developed vibrissae, thus the tip of the vibrissae represents tissue grown in-utero, and reflects the maternal diet during this period of fetal development. Strong seasonal changes in the  $^{13}\text{C}$  and  $^{15}\text{N}$  profiles of pup vibrissae in Southeast Alaska (SEA; n=25) and Prince William Sound (PWS; n=15) suggest that adult females switch to a higher trophic level diet (with a resulting 1.8 to 4.3 ‰ enrichment of  $^{15}\text{N}$ , mean  $2.6 \pm 0.6$ ‰  $^{15}\text{N}$ ) after they leave the breeding rookeries on the outer coast to continue raising pups at more inshore haulout locations. This pattern closely reflected changes in the C/N profile of ingested milk samples collected from pups and juveniles 2 to 17 months of age (SEA n=27; PWS n=19). Fatty acid signature analysis performed on ingested milk samples collected in SEA (n=49) and PWS (n=16) also support that lactating females changed diet seasonally in both PWS and SEA. These results suggest that stable isotope analysis of vibrissae collected from young sea lions can provide a timeline that will allow us to evaluate changes in diet for reproductively active adults in regions and times of the year for which scat diet analysis is not available.



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