

Longitudinal Change in Seller Sea Lion Diving and Physiology

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Air-breathing marine predators such as Steller sea lions (*Eumetopias jubatus*) can maximize their limited foraging time at depth (“bottom time”) by descending and ascending quickly. As part of a longitudinal study of foraging ontogeny, we monitored the diving behavior of 9 young-of-year (“pup”) sea lions through their first winter (2005 - 2006) in Prince William Sound. Descent rate, ascent rate and bottom time of dives increased between November and April (repeated measures ANOVA: $F_{4,3} = 34.20$, $P = 0.008$; $F_{4,3} = 18.59$, $P = 0.019$; $F_{4,3} = 11.76$, $P = 0.035$, respectively). Weaned pups descended and ascended more quickly than dependent pups ($F_{1,6} = 16.32$, $P = 0.007$; $F_{1,6} = 9.23$, $P = 0.023$), but weaning status had no effect on bottom time ($F_{1,6} = 0.03$, $P = 0.861$). To investigate the possible physiological basis for these differences, we examined these dive measures with respect to the percent of total body fat (TBF, as a percentage of total body mass) measured during initial capture (November) and recapture (April) of 7 animals having complete data. Descent speed was significantly, negatively related to TBF (linear regression: $r^2 = 0.415$, $P = 0.021$), and ascent speed was also significantly, negatively related to TBF ($r^2 = 0.497$, $P = 0.008$). Bottom time was not related to TBF ($r^2 = 0.095$, $P = 0.345$). While previous work has demonstrated that seals with higher TBF tend to descend more slowly and ascend more quickly due to the buoyant effect of fat, the reduced ascent speed observed in this study suggests other influences upon behavior. The second and final year of this project is currently underway with 38 young-of-year TDR-equipped sea lions deployed between November 2007 – April 2008 in Prince William Sound.



Alaska Marine Science SYMPOSIUM 2008

Book of Abstracts for Oral Presentations and Posters

January 20-23, 2008

Hotel Captain Cook, Anchorage, Alaska

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