

Harbor Seal Percent Body Fat as a Tool to Examine the Contrasting Population Trends in Glacier Bay and Prince William Sound, Alaska

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Percent body fat relative to population trends was examined for harbor seals (*Phoca vitulina*) from two areas of Alaska: Glacier Bay (GLBA), a rapidly declining population, and Prince William Sound (PWS), a population that after a long period of decline is relatively stable. We hypothesized that GLBA seals would have lower percent body fat than PWS animals. Harbor seals were live-captured in PWS during 2003-2005 in February, April, June, and July, and in GLBA during 2004-2006 in April, May, September and October. Percent body fat was estimated via deuterium oxide administration (GLBA n=147, PWS n=93). Harbor seals undergo dramatic seasonal changes in fat content associated with gestation, lactation, molt, and forage availability. The live-capture samples were collected in PWS and GLBA during different months of the season and as a result, are not directly comparable. So, seasonal variation in body fat was modeled, calculated using sternal blubber depth, for harbor seals harvested throughout Alaska from 1968-2006 (n=874). This model was then used to remove the affect of season from the PWS and GLBA data by adjusting the average percent body fat from all months to April. Comparing the two populations, GLBA pups had significantly less body fat and adult males had significantly more body fat than PWS animals (90% CI for difference in means). A higher percent body fat for GLBA adult males and no difference females suggests that adults are not suffering from a low nutritional plane or poor health. Consequently, if the population decline is being driven by adults, sudden factors such as predation or emigration are likely. However, this is not the case with pups; significantly less body fat in pups suggests that factors are acting on pups that do not affect other age classes. Because pups undergo a naïve forging period, preying upon crustaceans and small fishes before they learn to feed upon large fishes, one possibility is that availability of early prey species has declined for GLBA harbor seal pups. Alternatively, there may be diseases or contaminants that are affecting pups more than adults and reducing pup recruitment into the GLBA adult population.



Alaska Marine Science SYMPOSIUM 2008

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January 20-23, 2008

Hotel Captain Cook, Anchorage, Alaska

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