

Effect of Hibernation on Body Mass and Composition of Coastal Brown Bears

G.V. Hilderbrand (Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage, AK 99518; 907-267-2883; e-mail: Grant_Hilderbrand@fishgame.state.ak.us)

S.D. Farley (Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage, AK 99518; 907-267-2203; e-mail: sfarley@fishgame.state.ak.us)

C.T. Robbins (Departments of Natural Resource Sciences and Zoology, Washington State University, Pullman, WA 99164; 509-335-1119; e-mail: ctrobbins@wsu.edu)

We investigated the effect of hibernation on changes in body mass and composition of adult female brown bears (*Ursus arctos*) on the Kenai Peninsula, Alaska. Six adult females handled in the fall and following spring (paired samples) lost 73 ± 22 kg ($x \pm SD$; $32 \pm 10\%$) of fall body mass over 208 ± 19 days. Of this mass loss, $56 \pm 22\%$ (55 ± 22 kg) was lipid and $44 \pm 22\%$ (43 ± 21 kg) was lean body mass. Catabolism of lipid stores accounted for $88.4 \pm 8.1\%$ of the body energy used to meet maintenance demands. Relative fatness of bears entering the den was 0.49 ± 0.15 kg of fat/kg of lean mass and was positively related to the contribution of fat (%) to body mass ($p < 0.01$) and body energy ($p < 0.01$) losses during hibernation. Thus, relative fatness at the onset of fasting is likely a critical factor impacting the relative proportion of lipid stores and lean body mass catabolized to meet protein and energy demands during hibernation. Overwinter differences in body composition of adult females assessed only once in either the fall ($n=21$) or spring ($n=32$) were similar to those of paired samples. Mean body mass of these females was 84 kg greater in the fall than the spring with lipids and lean body mass accounting for 62% (52 kg) and 38% (32 kg) of the mass difference, respectively. It is important to consider the costs incurred during hibernation as components of resource management strategies, particularly in ecosystems in which nutritional resources are limited.



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