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Title: Morphometrics and Body Condition Indices and their Health Implications in Captive, Captive-release and Wild Vancouver Island Marmots (*Marmota vancouverensis*)

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Abstract

Vancouver Island marmots (VIM) are one of the most endangered species in North America. In 1997, an intensive captive breeding and reintroduction effort was initiated in response to precipitous population declines in the wild. During the course of this conservation project, extensive morphological, clinical, physiological, demographic and pathological data have been collected from wild, captive, and captive-release marmots. This thesis is using these "health" data to (i) define health as a measurable condition in VIM, (ii) establish baseline measurements of VIM health, (iii) identify factors which influence or limit health, (iv) evaluate the health status of VIM populations and (v) determine how future health should be monitored and promoted. This poster presents the results from analysis of VIM morphology data.

Measurements of body mass, girth and structural size were opportunistically collected whenever VIM were routinely handled for management purposes. This resulted in 3,754 records from clinically normal, non-hibernating VIM. Measurements, and several standard body condition indices which related body length to mass and girth, were characterized and compared with respect to gender, age, seasonality, and population.

Male marmots were consistently larger and heavier than females. Bone growth occurred in a sequential, staggered pattern, until structural maturity was attained at three years of age. The skeletons of captive VIM demonstrated an accelerated "tempo of growth" compared to their wild counterparts, but this did not result in greater structural size at maturity.

Body mass continued to increase beyond 3 years of age and peaked at 8 years, with senescence occurring beyond ten years. Monthly patterns of mass gain varied according to marmot age, but not to wild or captive status. In captivity, with free choice food availability, body mass still did not increase beyond September. In most instances, captive VIM exhibited higher body condition indices than wild marmots, indicating higher fat reserves and adiposity. Although increased adipose tissue may facilitate survival of wild and post-release marmots it may be adversely affecting the health of captive individuals. Obesity has been correlated with many health problems, including cardiovascular disease and neoplasia, which represent significant causes of mortality in captive VIM.

Body measures and condition indices of surviving captive-release animals compared favorably with wild VIM, suggesting that captivity has not intrinsically altered captive VIM and that they retain sufficient plasticity to re-establish normal morphologies following release.