



## Age Structure of Harvested Mountain Goats as a Metric for Assessing Sustainable Harvest

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**ABSTRACT:** Mountain goat (*Oreamnos americanus*) populations can be challenging to manage because of difficulties in effectively monitoring population trends and assessing demographic structure of populations. Population trends include irruptive dynamics in some introduced populations and declining trends in many native populations, resulting in wide variation in sustainable harvest rates among populations. Impacts of harvest can be difficult to detect in a timely manner, with potentially negative consequences for population management. We used a 28-year dataset of over 3,000 harvested goats to compare age at harvest from incisor cementum analysis and horn annuli across populations with varying harvest rates and population trends in southwest Montana. Horn morphology, sex ratio of harvested goats, and hunter success and effort were also compared. We found high error in horn annuli aging when compared with paired cementum aging results from the same animals, especially among young (<4 years) and older age goats (>7 years), with implications for estimation of trends in age structure. Horn length and cementum age were not correlated beyond 2 years of age; therefore, hunters were unable to select by age, and age structure of harvested goats likely reflected the population age structure. Average cementum age of harvested goats was higher among declining populations as compared to increasing populations ( $p < 0.001$ ) with increasing trends in age associated with declining abundance, likely due to lower recruitment in declining populations. Average ages were 4.6 for increasing populations and 6.3 for decreasing populations. Trends in the proportion of females in the harvest, hunter success and hunter effort were best explained by harvest rate, with increased harvest rate correlated with increased proportion of female harvest ( $p < 0.001$ ), increased hunter effort ( $p < 0.001$ ), and decreased hunter success ( $p < 0.001$ ). In the absence of increased harvest these trends may be indicators of declining goat abundance.

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**KEYWORDS** Mountain goat; *Oreamnos americanus*; harvest; age structure; demographics; population trends; Montana.