

Influence of Trophy Hunting and Habitat Degradation on Horn Growth of Bighorn Sheep

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Abstract: Knowing the length of each horn increment helps us gain insight into the main factors influencing growth and condition of bighorn (*Ovis canadensis*) rams. Trophy hunting management requiring a minimum horn size for animals to be harvested may select against the desired trophy phenotype if it increases the mortality of individuals with large horns. I analyzed a 25-yr data set on horn growth and age of harvested bighorn sheep rams in two populations in the southern interior of British Columbia to investigate temporal trends in horn size. I assessed the effects of population density, weather, and trophy hunting on horn growth in two populations, one (Ashnola) managed on a limited-entry draw and one (south Okanagan) managed as unlimited-entry for B.C. residents. The yearling horn increment in harvested rams decreased by 10% over 25 yr in the south Okanagan but was unchanged in the nearby Ashnola population over the same time period. Habitat deterioration and selective hunting may have driven the decline in yearling increment in the south Okanagan. Intense hunting may have selected for smaller-horned rams in the south Okanagan, although habitat deterioration also may have contributed to a temporal decline in horn growth. Rams shot at a younger age had greater early horn growth than rams shot at an older age. Rams with the fastest growing horns were removed as early as 3 yr, before they had the opportunity to reach high dominance status and achieve many paternities. Rams with fast-growing horns may be selected against under $\frac{3}{4}$ curl, unlimited-entry regulations. Long-term data on biological indicators such as horn annuli length, along with genetic information are useful tools for wildlife managers to monitor wildlife habitat and population quality, and can aid in the management and conservation of wild sheep and other terrestrial mammals.

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Key words: bighorn sheep, biological indicator, British Columbia, conservation, habitat degradation, horn growth, *Ovis canadensis*, population quality, trophy hunting.

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