RANGE ENHANCEMENT AND TROPHY PRODUCTION IN STONE SHEEP

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INTRODUCTION

Mountain sheep in British Columbia are, as a matter of policy, managed as a trophy species. Indeed, to assure that hunting does not unduly truncate the age distribution of the males, hunting harvest is to be restricted to two per cent of the total fall population. This increased emphasis towards the trophy aspect has highlighted a deteriorating supply/demand ratio. While the intention is not to stabilize this value indefinitely, it was recognized that the supply component was open to some increase. Thus, as part of regular wildlife management activities, information was gathered relative to range and mountain sheep dynamics with a view to identifying features which could facilitate increasing the number of trophy Stone sheep (Ovis dalli).

STUDY AREA

The data used in this analysis came from those Stone sheep on ranges in British Columbia primarily designated by the drainages of the Kechika-Turnagain, Trout, Toad, Dunedin, Muskwa-Prophet, Sikanni, Halfway, and Nabesche Rivers. This corresponds to about 75 per cent of British Columbia's Stone sheep.

Unaltered subalpine forest in the area is dominated by various ratios of white spruce (Picea glauca), black spruce (Picea mariana), and alpine fir (Abies lasiocarpa). Fire and other altered subalpine sites, where forested, are dominated by balsam poplar (Populus balsamifera), aspen (Populus tremuloides), and various willows (Salix spp.). The transition between forest and alpine is dominated by alpine fir and various willows. The alpine communities themselves vary considerably in composition.

A typical annual cycle for mountain sheep in an unaltered area would be wintering in the alpine, spending the spring in the transition alpine to forest brush zone (first to green), and then spending the summer and fall in the forest zone or the lusher alpine and transition areas. Mountain sheep in a location where the subalpine forest is suitably altered to open decidous forest (the location of these sites must, of course, be satisfactory relative to escape terrain, alpine areas, and so forth) typically spend winter and spring in the altered sites (at various elevations) and summer and fall in lusher sites - altered, unaltered forest, transition, or alpine.

METHODS

Sheep population sizes and recruitments were estimated on several ranges utilizing winter aerial surveys of ewes and young. Horn growth in male sheep was calculated from measurements (250 per year in the study area) of the horns of hunter-killed animals. Contact with hunter kill was achieved through a compulsory reporting system.

Sheep ranges were grossly evaluated in the course of regular work, plus site-specific forage abundance estimates were made in various areas. These forage estimates were restricted to the number of grass or sedge plants (plus the mean number of blades per plant) in rectangular plots (13.5 square feet).

It should be noted that the somewhat superficial procedures adopted were necessitated by the low financial and time budgets allotted to the project. The author realizes the shortcomings, but feels the major points are still valid.

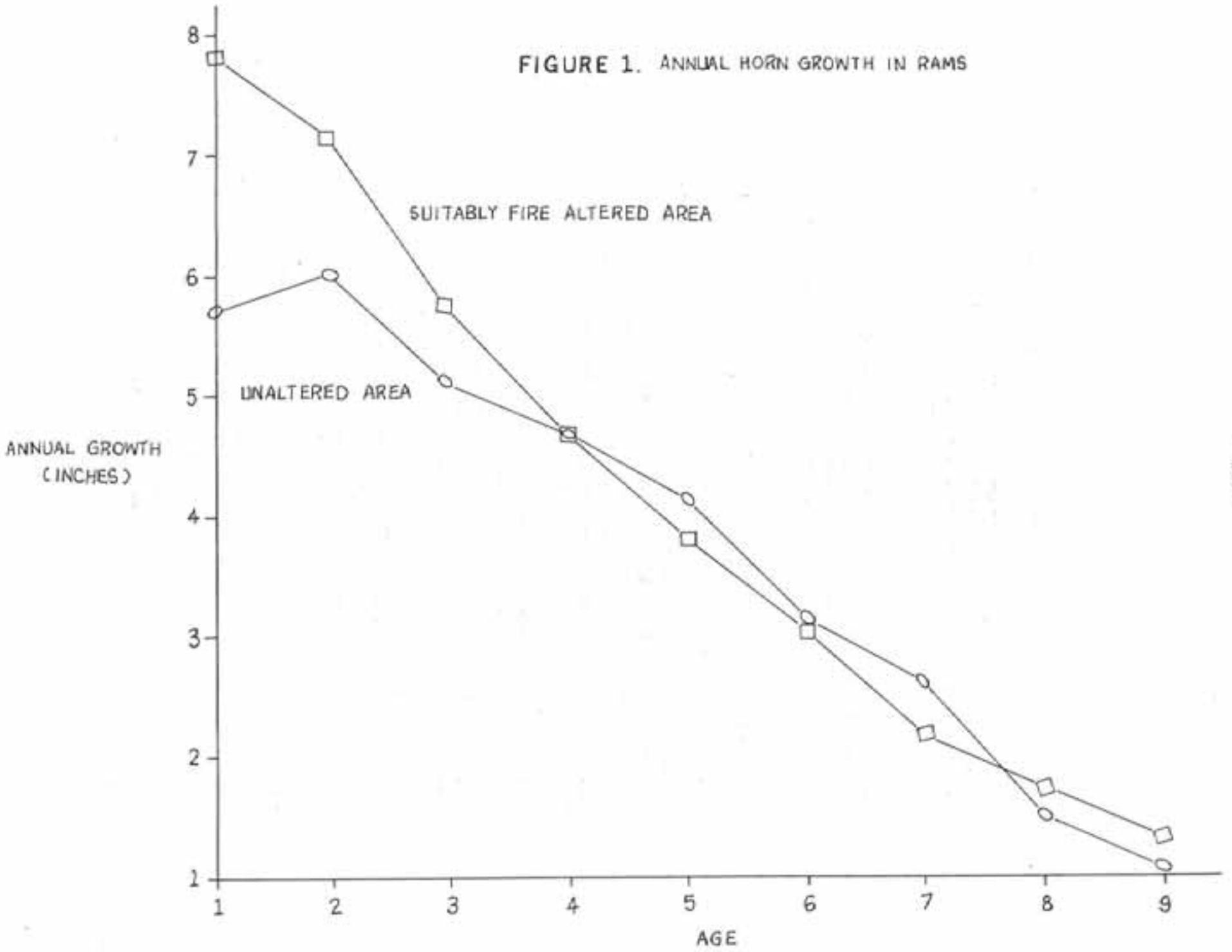
RESULTS

The first feature to emerge was the striking difference between ranges. While the abundance of available alpine vegetation was certainly a significant feature, it was also apparent that the presence of suitable subalpine altered vegetation had a marked enhancement effect. Indeed, for otherwise comparable ranges, those with suitably altered subalpine winter range achieved five times the density and absolute population size of sheep. Not only was the population size greater, but sheep on the suitably altered ranges averaged 75 per cent more lambs in late winter than those on unaltered ranges (although this recruitment lead at the equilibrium population size is lost by the second or third year).

It was also apparent that the main suitable alterer of range was fire. Mud slumping, snow sliding, and blowing down was less significant. While it may require a second or third burning to clear the litter associated with the initial fire, even a primary burn is effective. Although the burn sites may require a couple of years to stabilize (forb to grass and sedge ratio is higher initially than in later years), both primary and subsequently burned sites show a marked increase in available forage for sheep with transect plots indicating up to 10 times the amount of grass on fire-opened sites. The quality (such as protein) of the vegetation likely also changes on these sites but this has not been investigated to date. Certainly the lower elevation of these sites would tend to favour this feature and sheep do move into a burnt areas as soon as new grass pushes through the ashes suggesting a preference for this forage.

A further feature which varied between unaltered and suitably fire altered ranges was horn growth in rams (ewes were not examined). Figure 1 illustrates the average difference. It can be seen that rams on the fire-altered ranges show an average accelerated horn growth in the first three years of life. In subsequent years, rams on both range types show roughly similar growth (this differs from that found by Shackleton, 1973). The significance of this differential growth on trophy quality

FIGURE 1. ANNUAL HORN GROWTH IN RAMS



can be seen in Figure 2 which illustrates total horn length against age. It can be seen that rams on suitably fire-altered ranges have, for a given age, horns about three inches longer than those on unaltered ranges.

DISCUSSION

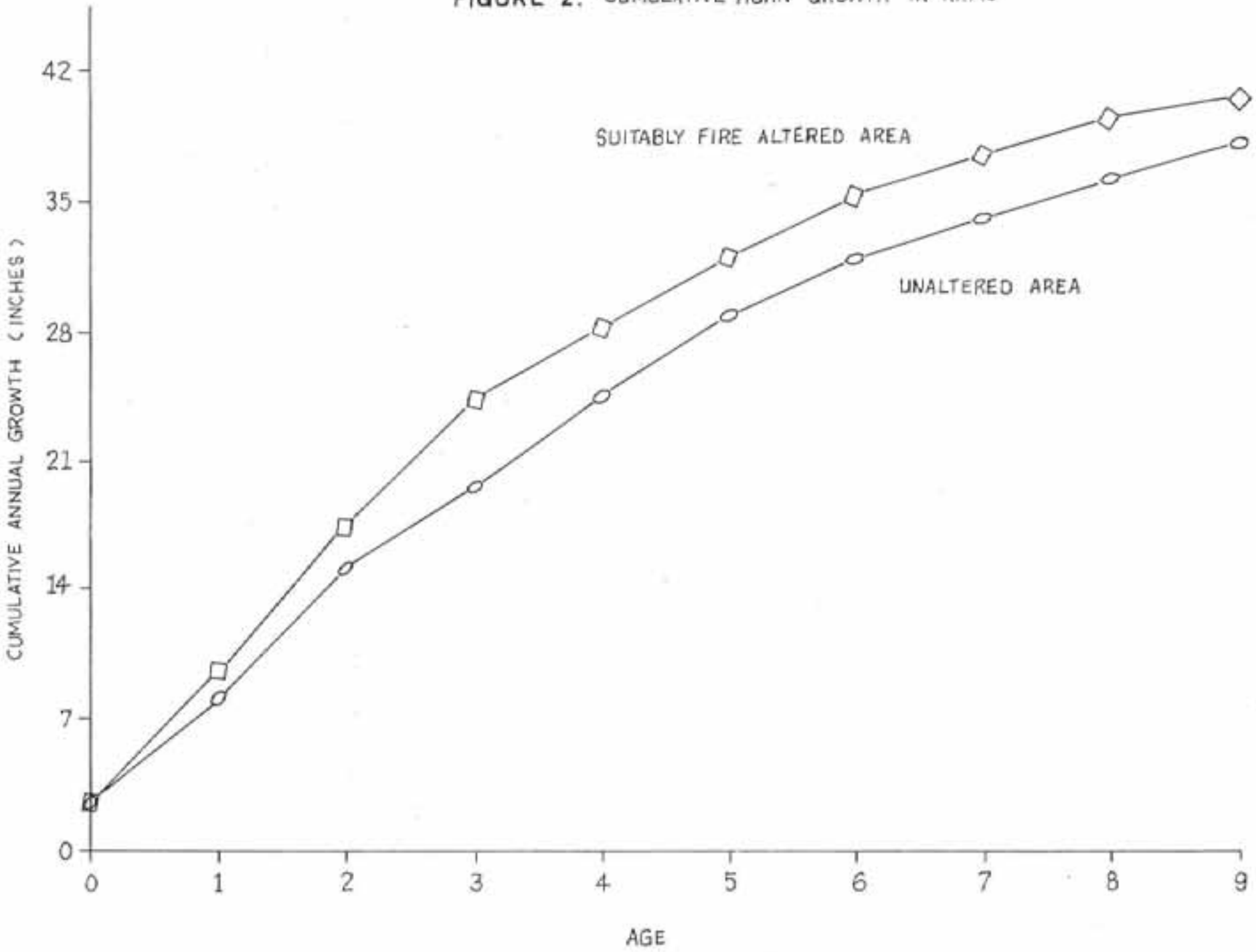
A number of studies have commented upon quality differences in sheep populations. Geist (1971) suggests nutrition to be the primary feature with there being two sheep types, one adapted to a higher plane of nutrition and the other to a low plane of nutrition. Hoefs (1975) and Erickson (1970) have noted a correlation (negative) between quality (horn growth) and latitude. Heimer and Smith (1975) found for Alaska that high-quality populations tended to be associated with low sheep densities. Shackleton (1973) corroborated Geist's (op. cit.) hypothesis on the role of nutrition, but did not elaborate upon the possible role of genetics.

The present work suggests that suitable alteration of sheep ranges by fire increases both sheep numbers and sheep quality (as evidenced by the proportion of late winter lambs and horn growth in rams). The improved forage on the fired sites is the probable factor responsible for the bettered status of the sheep. The improved forage does not, however, result simply from the increased supply which was observed; two other features are significant. First, the removal of tree cover allows winter winds to reach snow accumulated on the ground and disperse and/or sublimate it. The sheep are thus freer to move across the range and less pawing is necessary to expose forage. This openness may even have the secondary benefit of facilitating predator detection and maintaining herd contact. It is the feature of improved openness which makes it often desirable to reburn an area; clearing deadfall, stumps, and so forth. The second benefit of the fire alteration is the increased vertical displacement of year-round available range. The sheep are thus able to utilize forage of peak nutrient level (associated with "green-up") for a longer period each year.

Horn growth and lamb number responses are exhibited soon after a burn, suggesting that the genetic capability to respond exists in a large proportion of these sheep. Geist (1971) notes this is to be expected in such herds which are under the influence of predation, periodic severe winters, and so forth.

Considering the aesthetically pleasing effect of a fire-altered landscape (over heavy forest) and the benefits in species diversity and positive response by other ungulates, fire appears to be a viable tool in the enhancement of Stone sheep populations. Indeed, in 1978 a 10,000 acre controlled burn was instigated in this area with the aim of improving sheep numbers and production for one population.

FIGURE 2. CUMULATIVE HORN GROWTH IN RAMS



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