WHEN AND WHY IT IS GOOD MANAGEMENT TO SHOOT BIGHORN EWES AND LAMBS

by

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When to shoot ewes and lambs is when your neighbouring province or state has a major die-off of bighorns due to the same mismanagement principles that you have been using; i.e., males only seasons on overstocked bighorn pastures.

In 1966, Alberta was able to capitalize on the bighorn die-off in British Columbia by introducing a long advocated permit season on "ewes". Since that time, the average provincial "ewe" or non-trophy kill has been 126 animals in 23 management units. Our first two non-trophy seasons allowed the shooting of any bighorn with horns 12 inches in length or less. In 1967, it became apparent that hunters were starting to select yearling rams. That year, yearling rams comprised over 20% of the kill.

In 1968, the non-trophy regulations were changed to legalize the shooting of ewes and lambs only. Lambs presently comprise about 15% to 20% of the total kill. A few problems have developed from harvesting ewes and lambs and these will be discussed later.

The question of why it is good management to shoot ewes and lambs is based on the very simple but difficult to define concept of carrying capacity. Game populations are like bacteria on agar. Their populations quickly reflect the suitability of the medium that they are raised on. One does not have to search the big game literature very far to discover that the survival of game, particularly the young in the northern and mountain climates is dependent on winter carrying capacity. The direct correlation of winter conditions on the mother and survival of the young has been well documented in several studies, particularly in deer (Severinghaus, 1951, Verme, 1962, Ransom, 1964). Malnutrition in pregnant femals is synonymous with resorbtion, abortion, stillborn and early mortality of the young. Even for the surviving young the battle is not over. Other studies on caribou, antelope, and bighorns have shown that survival of young during the winter is influenced by the rank heirarchy at feeding sties (Henshaw, 1969, Bruns, 1969, Geist, 1969). Under severe winter conditions, the young are invariably displaced from feeding craters or bedding areas by older animals with larger antlers or horns. It follows then, that the number of young surviving the northern and mountain game herds becomes the indicator of

carrying capacity. In the case of bighorns, the number of yearlings surviving is a good indicator of population response to carrying capacity (Buechner, 1960). Thus, mountain sheep managers should strive continuously to maintain high production of young in their herds.

Let us suppose that we have three areas, each with a winter carrying capacity of 100 bighorns, and we are faced with having to maintain each herd at that number under the following separate conditions;

(1) maximum sustained yield,
(2) 3/4 curl law,
(3) Boone and Crockett standards.

Using a simple hypothetical age structure with no mortality other than hunting each case will develop as indicated in Table 1.

Table 1. Three bighorn management conditions using a hypothetical age structure with no natural mortality (--indicates annual removal necessary to maintain a winter herd of 100 animals)

	AGE	RAMS	EWES	LAMBS
Condition I (maximum	1	20	20	
sustained yeild)	2		20	
	3		20	20
	4		20	20
Wintering *Biomass = 5 tons				
Annual Biomass Removed = 2 3/4 tons				
Condition II	1	10	10	
	2	10	10	
(3/4 curl law)	3	10	10	10
	4	10	10	10
	5	10	10	10
Wintering Biomass = 6 1/2 tons				
Annual Biomass Removed = 2 1/4 tons				

* Biomass determined from weights given in Blood et al, 1970

	AGE	RAMS	EWES	LAMBS
Condition III	1	5	5	
	2	5	5	
(Boone & Crockett	3	5	5	5
standards)	4	5	5	5
	5	5	5	5
	6	5	5	5
	7	5	5	5
	8	5	5	5
	9	5	5	5
	10	5	5	5
Wintering Biomass = 8 tons				
Annual Biomass Removed = 2 tons				

Condition I is very similar to a situation that existed in the Sheep River herd in Alberta prior to the 3/4 curl law; i.e. high hunting mortality of yearling rams and some hunting mortality of ewes due to mistaken identify (Wishart, 1958). Lamb production and their survival to yearlings was also very high.

Not that under this condition that it is not necessary to remove any lambs to maintain the herd. Assuming that yearling rams are sexually mature at eighteen months, their removal would have to take place after the rut. Condition I is probably the least desirable form of management at the present time because of the trophy fixation of mountain sheep hunters.

Condition II approximates an optimum situation where 30" to 35" bighorn rams are harvested equally along with adult ewes and lambs each year to maintain a stable population. At present, bighorn management in Alberta is generally tending towards this end.

Condition III is a luxurious form of sheep management where a few very large rams can be produced at a cost of removing most of the very young. This latter condition no doubt existed naturally in wild sheep under pristine conditions without competition from other ungulates. Sheep numbers would have waxed and waned with winter conditions always

tending towards stability and equilibrium with their environment. Management of this type would certainly provide record-book rams.

At this point it should be noted that the wintering bighorn biomass in condition III is 60% greater than the wintering biomass in condition I. Conversely, a 35% greater biomass can be annually removed in condition I compared to condition III.

From the standpoint of maintaining a bighorn herd at a fixed population the three examples demonstrate two facts clearly:

(1) As the number of rams harvested is reduced the number of lambs harvested must be increased.

(2) As the age of the herd is increased the amount of range required must be increased.

Thus, a range with a winter carrying capacity of eight tons of mountain sheep could theoretically produce harvestable sheep over a period of ten years as follows.

RAMS	EWES	LAMBS
320 yearlings	320	0
or 125 five-year-olds	125	125
or 50 ten-year olds	50	300

Therein lies a sheep management dilemma.

As mentioned earlier, the choice in Alberta has been towards the middle of the road; e.g., Condition II. As a result, the immediate problems that developed were local burn-outs of accessible herds. Also it became apparent that we lacked precise information on population numbers, distribution and age structure. We are now asking ourselves about the survival rate of orphaned lambs and the importance of barren ewes that "babysit" yearlings. In other words, more dilemmas.

But more important and overriding all of the foregoing is the insidious decline of mountain sheep ranges due to (1) mis-management of wild and domestic ungulates, (2) destruction from mining and exploration and (3) the loss of grassland to forest succession from many years of fire protection. It becomes obvious that unless the resource base is secure, "ewe" seasons are of little significance in the management of mountain sheep.

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