

HERD COMPOSITION AND EFFECTIVE REPRODUCTION OF WAPITI (*CERVUS CANADENSIS*) OF EASTERN FIORDLAND

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Wapiti were released at George Sound in 1905 (Donne 1924) and are now common from Bligh Sound and Clinton River in the north to Charles Sound and Doon River in the south. They were the main object of study of the New Zealand-American Fiordland Expedition of 1949 (Poole 1951) but neither herd composition nor reproduction were reported on. In the course of a browsing animal survey of Eastern Fiordland in 1954 some data on these aspects were collected that prompted follow-up visits in 1955 and 1956. Each visit lasted about three weeks in late March and early April. The salient features of the first two years' data were reported to the National Parks Authority in 1955.

Most of the wapiti classified were in the Lugar, Mid and Loch Burn Valleys, but some were on ridges immediately adjacent and undoubtedly lived part of the time in other catchments such as Wapiti River or Henderson Burn. Although wapiti have been present in the Lugar Burn since at least 1937, they have only recently penetrated into the Mid and Loch Burns. In 1945 no wapiti were seen in the Mid Burn but in 1947 two were seen on the ridge above the head basin (K. Sutherland pers. comm.). By 1954 their occupation of the Mid Burn was fairly complete and their entry into the Loch Burn was progressing, but distribution was still decidedly patchy.

The Stuart Mountains wapiti population appeared to be increasing from 1954 to 1956 but is now probably stable.

METHODS AND TERMINOLOGY

As too few wapiti could be shot to obtain

precise data on herd composition, less precise techniques had to be used whereby the animals were examined with binoculars or telescope and classified into the sex and age classes given below. The mean date of birth was assumed to be 1 December of each year and the mean date of classification 1 April.

Calves: aged about four months, not sexed.

Cows: so-called "adult" females, but includes yearling (16 month) and two-year (28 month) females which generally will not have produced any of the calves classified. (Red deer, *C. elaphus*, breed one year earlier.)

Spikers: spike-antlered yearling (16 month) males; these are readily identified even at considerable distances.

Bulls: all males other than calves and spikers.

These classes, used in most North American studies on wapiti, are the only ones which can be reliably recognised, although some workers (e.g. Murie 1951:275) can recognise 2½-year bulls at close quarters.

HERD COMPOSITION

Table 1 shows that approximately the same number of wapiti were classified each year. This should not be construed as indicating the total number resident in the Stuart Mountains area. For example, weather conditions, direction of approach and prior disturbance all influence the numbers classified and were not constant from year to year.

Considering the 399 animals older than calves, females were more numerous (58%) than males (42%). This agrees with North American findings (Schwartz & Mitchell

TABLE 1. *Numbers and percentage composition of wapiti classified on Stuart Mountains.*

Year	Bulls		Cows		Spikers		Calves		Total
	No.	%	No.	%	No.	%	No.	%	
1954	47	29	72	44	13	8	31	19	163
1955	34	20	87	51	12	7	37	22	170
1956	44	26	74	44	16	9	35	21	169
Totals & mean %	125	25	233	46	41	8	103	21	502

1945, Murie 1951, Anderson 1958) where females may constitute 70% to 80% of the populations. Murie thought that the low proportion of males was not because they lived in more remote places, nor because they were more heavily shot, but probably because of heavy natural mortality among breeding males. Anderson showed that although cows outnumbered bulls by three to one, many more bulls were found dead from causes other than shooting. In North America males slightly outnumber females at birth and the sexes are about equally numerous for the first two years (Cowan 1950, Johnson 1951, Kittams 1953). The preponderance of females is characteristic only of the breeding age classes, presumably because of a heavy mortality among breeding males (Murie 1951:274-6).

As wapiti hunting in New Zealand is essentially a head-hunting pastime, more bulls than cows might be reported as being seen, but this is not so. A total of 659 wapiti reported by some hunters during the same years as this study included 190 bulls, 61 spikers, 300 cows and 108 calves. Although the proportion of bulls is rather higher than in Table 1 the difference is not statistically significant. The proportion of spikers indicates an anomaly as it implies that the yearling age group is stronger than that of the calves.

EFFECTIVE REPRODUCTION

Practically no data on reproduction of wapiti are available for the New Zealand population. The information presented here refers to the proportion of young surviving to yearling or older age classes; the "effective reproduction" of Cowan (1950).

North American workers indicate that

normally a wapiti cow mates for the first time in the third rutting season after birth when about 28 months old and calves at three years. Yearling wapiti very rarely breed. Generally one calf is carried but twins have been recorded.

Table 2 gives the effective reproduction of the New Zealand population. The data, derived from Table 1, have been adjusted to eliminate non-breeding yearling females from the number of cows counted. This was done by assuming that the number of yearling females equals the number of spikers counted (supported from North America). The differences between years are not statistically significant and therefore need not be considered separately. Over the three-year period, 54 calves and 43 yearlings were counted per 100 cows. The 54 calves per 100 cows reported here agrees with North Ameri-

TABLE 2. *Effective reproduction of wapiti.*

Year	Number counted			No. per 100 cows	
	Cows	Calves	Yearlings	Calves	Yearlings
1954	59	31	26	52	44
1955	75	37	24	49	32
1956	58	35	32	60	55
Totals and means	192	103	82	54	43

can studies where counts have been made before winter. Young and Robinette (1939:14) report 74 calves per 100 adult cows (calves at about 3 months of age) which is the highest recorded pre-winter assessment. Rasmussen and Doman (1947:207) discuss two populations, both heavily shot, with autumn ratios of 53 and 56 calves per 100 cows of breeding age; the calves comprised just over 25% of the population. Their study suggested that about 25% of calves died in the 12 months prior to classification as yearlings of about 16 months, compared with only 20% in New Zealand and about 40% recorded by Murie (1951:141) and others.

CONCLUSIONS

Wapiti are well established in New Zealand and occupy a large part of Fiordland National Park west of Lake Te Anau. Until recently they were still spreading into parts of Eastern Fiordland.

Of about 400 yearling and older animals counted, 42% were males. Effective reproduction in Eastern Fiordland is about 54 calves of 4 months age to 100 females 2½ years or older. Probably about 20% of calves die in the following 12 months. Survival to the yearling age class is higher than in North American populations and probably indicates an expanding population during the study period.

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