THE UNIVERSITY OF MANITOBA

SOCIAL ORGANIZATION OF WAPITI AND WOODLAND CARIBOU (Mammalia:Cervidae)

BY

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A DISSERTATION SUBMITTED TO

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DOCTOR OF PHILOSOPHY

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ABSTRACT

The social organization of wapiti (Cervus elaphus nelsoni Bailey) and woodland caribou [Rangifer tarandus caribou (Gmelin)] was examined through field studies conducted in Yellowstone National Park, Wyoming, and Reed Lake, Manitoba, respectively.

At least 40 percent of individually marked Yellowstone wapiti were found to be habitual in their use of summer range. Specific areas within a seasonal range (summer range, spring range) were also used habitually by some wapiti. Tests for intraspecific associations revealed that individually marked wapiti normally occurred together about as frequently as expected by chance. Groups of wapiti, regardless of size or time of year, appeared to be temporary aggregations of individuals or basic social units (cow-calf) deriving the benefits of grouping but maintaining their individual pattern of movement and use of an area. Group composition as revealed through marked wapiti could not be predicted.

The basic social unit of woodland caribou also appeared to be the cow-calf pair, with the possible association of off spring of the previous year. The social units in caribou were largely solitary from the spring seasonal shift to calving areas to winter. Occasionally two social units found in the same general area joined together for several days. Evidence for habitual use of seasonal range by woodland caribou was obtained from four transmitter-equipped females.

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Dorothy Ball typed the manuscript several times. Thanks to Mrs. V. Patrick for typing the final draft. I accept full responsibility for any errors left within the text.

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I. INTRODUCTION

Numerous studies of social behaviour in ungulates and related forms have been conducted during the past 50 years. One of the earliest field studies in animal behaviour was the classic work on red deer (Cervus elaphus L.) in Scotland (Darling 1937). Until recently, however, most of the studies were descriptive and concentrated on basic behavioural acts (i.e. fixed action patterns) or specific aspects of social organization. Current attempts include the analysis of social organization at the family level. Most notable are studies of equids (Klingel 1974), bovids (Jarman 1974; Estes 1974), and suids (Frädrich 1974).

Altmann (1956b) was the first to compare social patterns of four ungulates which included two cervids, wapiti (Cervus elaphus nelsoni Bailey) and moose [Alces alces (L.)]. Pruitt (1960) added barren-ground caribou (Rangifer tarandus groenlandicus L.) to the list. Geist (1966) summarized his behavioural observations of four North American cervids and co-authored a review of cervid behaviour during the reproductive period (de Vos et al. 1967).

This study will examine aspects of social organization of two recent cervids, wapiti and woodland caribou [R. t. caribou (Gmelin)]. The hypothesis is that social organization is based at the family unit level and not at the group level even though some type of grouping may occur periodically. A group of wapiti or woodland caribou is thus a dynamic, temporary aggregation of individuals and family units in which associations of specific adult pairs cannot be predicted.

II. LITERATURE REVIEW

WAPITI

Social Behaviour

The social organization of wapiti and red deer has been studied largely by recording animal movements, group cohesion, mother-offspring relationships, and group size and structure as these relate to specific land areas. Animal to animal associations and movement patterns are basic parameters that must be measured and quantified in order to describe and understand social organization.

Darling (1937:74) related the movements of red deer to the "territory" of this species. His concept of a matriarchal system was, until recently, widely accepted and it was frequently assumed that wapiti had a similar social system. Darling described the social organization of red deer as follows:

> "The outstanding feature of the hind group is its cohesion which, doubtless, is derived from the stability of the family. Maternal care is protracted in the red deer, extending to the third year of life of the offspring. Thus each hind may have two or three followers, and some of the other adult hinds may be the earlier offspring of a hind still in the group.
>
> ". . . There are hind territories carrying varying numbers of hinds from five to over two hundred. When the whole group is together orderliness is most apparent, but the sociality of the hinds is not so simple as that. The whole number of hinds on a territory is one group, though they are not usually all together. . . Let us imagine the Carn na Carnach hind territory. . . The total of 95 deer of the Carn includes between 40 and 45 adult hinds. These are divided into three main families. . . Under conditions of good weather and in daylight, at times of little herd movement, these three family groups may split up still further into individual families, so that the whole of the Carn is dotted with its deer. Any one of the hinds may wander anywhere on the territory, and as a group they

> do so, but as families they have these preferences for particular parts of their territory. Each family group has its leader, but when the herd is together as one unit the family group leaders submit to the one leading hind of the herd.
>
> ". . . In the course of the year there is constant rearrangement of grouping within the main hind group, but it is no random affair. There is a good reason for every change, and the point I want to emphasize is that the hind group still remains one 'city' even when subgroups of its members may be two miles apart. Orderliness is apparent throughout, and when the whole group assembles, from time to time, family discipline and leadership give way to that exercised by the leading hind of the territory."

Eygenraam (1963) supported Darling's theory on maternal care by quantitatively showing that complete independence of young from mother was not reached before the fourth year of life.

However, workers studying red deer populations containing marked individuals have found no group constancy. Schloeth (1961; 1966) recognized that the composition and association of red deer hind groups were not stable. Female offspring tended to occupy their mother's home range, but they spent most of their adult life independent of the maternal group (Schloeth and Burkhardt 1961).

Lowe (1966:222) presented evidence of inconstancy of groups in red deer. He stated:

> "It is difficult to reconcile these observations with group territorial behaviour, postulated by Darling (1937, pp. 68-70), when the only relatively stable elements in each group appear to be the physically mature individuals with their established individual home ranges; and none of these has ever been observed to assume overall leadership.
>
> "The present data do not suggest that there is any social organization extending beyond the family and the mother's home range."

Murie (1951) discussed the social habits of wapiti in general