

VALKENBURG

WOLF PREDATION AND GROWTH OF THE FORTY MILE CARIBOU HERD

Patrick Valkenburg, Alaska Department of Fish and Game, 1300 College Road, Fairbanks, AK 99701

James L. Davis, Alaska Department of Fish and Game, 1300 College Road, Fairbanks, AK 99701

Daniel V. Grangaard, Alaska Department of Fish and Game, P.O. Box 355, Tok, AK 99780

Abstract: The Fortymile Caribou Herd declined from about 60,000 in 1961 to about 4,000-6,000 by 1975. The available data suggest that hunting and wolf predation were involved in various stages of the decline. Data are unavailable to assess the role of weather and food limitation. After 1975, the caribou population began to recover even though the wolf:caribou ratio was about 1:23 and the wolf:prey ratio was about 1:73 caribou equivalents. There is mounting evidence that caribou herds frequently escape the "predator pit" without man's intervention.

INTRODUCTION

The Fortymile Caribou Herd (FCH), possibly numbering over 500,000 at its peak in the mid-1930s, was the largest caribou (Rangifer tarandus granti) herd in Alaska and one of the largest in the world during the early 1900s (Murie 1935). Herd size declined to perhaps 10,000-20,000 by the early 1940s (Skoog 1956). The federal government initiated wolf (Canis lupus) control in 1947 and by the early 1950s it was evident that the herd had grown. Data available

are insufficient to determine herd size at the low point and to ascertain if herd growth preceded wolf control. However, Kelly (1951) reported that in 1950 calves were abundant in fall compared with few seen in 1947.

During the early 1970s, moose (Alces alces) and caribou, including the FCH, declined throughout much of Alaska. In response, the Alaska Department of Fish and Game intensified research on the population dynamics of moose and caribou, and in some cases initiated wolf population control (Davis et al. 1978, Gasaway et al. 1983, Davis and Valkenburg 1985). In 1981, after the success of the wolf control program in the Fairbanks area became apparent (Gasaway et al. 1983), a similar program was initiated in a portion of the FCH's range to aid recovery of the moose population. Because the recovery of the FCH was also in doubt and because we wanted to be able to document the effect of the wolf control program on the FCH, we initiated a study of the factors limiting herd growth. Timing of herd recovery and the influence of wolf control are discussed in this paper.

METHODS

We determined population size, trend, and rate of increase for the FCH by censusing the herd with large format aerial photography in 1981, 1983, 1984, 1986, and 1988 (Davis et al. 1979). Recruitment was estimated from sex and age composition counts conducted from a helicopter or from the ground in late September or early October. Mortality rates of adult male and female caribou were calculated

from 50 females and 18 males equipped with radio collars (Trent and Rongstad 1974). Mortality rates of calves were calculated by the change-in-ratio method comparing late May (birth) and September/October ratios.

We estimated the relative size of the wolf population within the range of the FCH in the early and mid-1970s through informal interviews with trappers and from the observations made by coauthor, D. Grangaard, while trapping wolves in the area during that time. A corresponding estimate was made in late winter 1986-87 by flying about 70 hours of track count surveys. Additional and corroborating data on wolves were obtained from sealing certificates, interviews with trappers, and incidental observations by other biologists and pilots in the area.

RESULTS AND DISCUSSION

The FCH grew from about 5,740-8,610 caribou in summer 1975 (Valkenburg and Davis 1989) to at least 10,192 in summer 1981 (mean annual finite rate of increase, $\lambda = 1.10-1.03$), and from 12,400 in summer 1983 to about 20,000 in summer 1988 ($\lambda = 1.10$) (Table 1). The wolf population declined from a relatively high level in the early 1970s to a relatively low level from the mid-1970s through 1986. In fall 1986 we estimated that there were about 265 wolves (38 packs and 24 singles) within the range of the FCH. We believe there were at least 3 times as many wolves present during the early 1970s. The 1986 wolf:caribou ratio was about 1:53 and the wolf:prey

(including moose and Dall sheep (Ovis dalli)) ratio was about 1:103. In 1976, near the caribou population low and after the initial decline in wolves, comparable ratios were probably about 1:25 and 1:75, respectively.

Table 1. Population size and recruitment in the Fortymile Caribou Herd, 1973-88.

<u>Year</u>	<u>Population Size</u>	<u>Recruitment (calves:100 cows in fall)</u>
1973	6,624	
1974	4,869	20
1975	5,740-8,610	
1976		34
1977		45
1978		26
1979		
1980		61 ^a
1981	10,192 ^b	31
1982		27
1983	12,350	30
1984	13,073-13,731	
1985		36
1986	15,303	28
1987		37
1988	19,975	30

^a Composition count was probably biased.

^b Extrapolated figure; during this census only 7,914 caribou counted.

Causes for the decline in wolf numbers during the early to mid-1970s are unknown, but many wolves were caught by trappers and we believe there was a considerable amount of illegal aerial hunting. The drastic decline of moose and caribou probably caused wolves to

become more vulnerable to trapping, hunting, and intraspecific strife as they dispersed to find other sources of food. Despite the 400% increase in caribou numbers since 1975 and the cessation of wolf control in 1983, the wolf population has not recovered to the very high levels of the late 1960s and early 1970s.

Accurately determining how the 1981-83 wolf control program influenced the growth rate of the FCH was not possible because the 1973-75 and 1981 caribou censuses were flawed. However, it is clear that the caribou herd began increasing before wolf control began in 1981, but not prior to the large wolf population decline in the mid-1970s. It is also clear from the data on causes and rates of mortality of radio-collared caribou that wolf predation was likely the most important cause of death of adult female caribou during the 1980s; 7-9% of the radio-collared females died annually and virtually all were killed by wolves. The annual mortality rate of males was 19-35%, but most died of unknown causes. From 1981-82 through 1984-85 most of the FCH wintered in the area in which wolves had been reduced by at least 50%. It therefore seems likely that adult female mortality would have been somewhat reduced in those years.

Recruitment of caribou calves to 5 months of age was apparently unchanged by the wolf control program (Table 1). The FCH did not calve or summer within the wolf control area. Recruitment improved somewhat in about 1975 and has remained relatively stable since then, but relatively low recruitment continues to be the major

factor restricting herd growth.

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