



Ecology of the Rock Creek bighorn sheep herd, Beartooth Mountains, Montana
by Steve Alan Martin

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Fish and Wildlife Management
Montana State University
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Abstract:

Movements, population characteristics, range use, and food habits of a Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) herd were examined in southcentral Montana and northwestern Wyoming during 1978 and 1979. From November to July this nearly 95 member herd occupies an 88 sq km area surrounding the headwaters of the Main Rock Creek and Line Creek drainages of the Beartooth Mountains. During both autumn and spring sheep ranged from lower subalpine canyon bottoms to alpine plateaus. Winter use was generally restricted to alpine plateaus southeast of Rock Creek. Ewes lambled on steep rocky northwest facing canyon walls from late May to mid-June. Winter range pooled standard diameter and polygon home range size of marked bighorns was 4.17 km and 17.9 sq km, respectively. Spring migration ran from May to mid-July. Rams and barren ewe-juvenile groups left the winter range before ewes with lambs. A migration route of 57 km was documented.

The mean distance between summer and winter centers of activity for marked rams and ewes was 45 km and 37 km, respectively. Early migrants required over a week to travel the route, while those leaving in late June and July required as little as 84 hours. The summer ranges were located in the Absaroka Mountains east of Yellowstone National Park. Rock Creek ewe-juvenile groups restricted summer movements to a 34 sq km area around Pilot and Index Peaks. Ram groups ranged widely in the Wyoming Absarokas from the Montana border south to the Crandall Creek drainage and in the Wolverine peak area of the Montana Absarokas. Ram summer ranges overlapped the ewe-juvenile and ram ranges of at least five other bighorn herds. The population of the entire Absaroka summer range was estimated at 375 bighorns. Marked ewes gave a summer range pooled standard diameter and polygon home range size of 2.1 km and 2.0 sq km, respectively, values for one adult ram were 13.6 km and 15.8 sq km. Early summer range use was primarily centered on alpine turf vegetation. During mid-summer and autumn use of timberline dirt-scrub dominated habitats increased markedly. Autumn migration coincided with the arrival of permanent snow on the summer range in October or early November. Rock Creek herd lamb production and survival to yearling age averaged 54 per 100 mature ewes and 57 %, respectively, over a five year period. Use of graminoids, forbs, and browse was 74, 16, and 10 percent, respectively during late summer and 40, 50, and 10 percent, respectively during fall. Sedge and fescues were the most important items in the diet during late summer, while fringed sage, fescues, lupine, and sedge were important in the fall. The Rock Creek herd showed a light to moderate level of lungworm infection. Mean larval output was significantly higher on the winter range than on the Pilot-Index summer range (272 versus 128 larvae per gram, respectively).

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MONTANA STATE UNIVERSITY
Bozeman, Montana

June 1985

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Steve Alan Martin

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ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to the following for their contributions to this study: Dr. Harold Picton, Montana State University, for aid in directing the study, preparation of the manuscript, and his endless patience; Dr. Robert Eng and Dr. William Gould, Montana State University, for reviewing the manuscript; Mr. Charles Eustace, Regional Wildlife Manager, Montana Fish, Wildlife and Parks Department, for support and cooperation in supplying equipment; Mr. Shawn Stewart, Wildlife Biologist, Montana Fish, Wildlife and Parks Department, for assistance in directing the study and with field work; Mr. Lawrence Holm, Mr. Doug Getz, and Mr. Cliff Higgins for providing aviation services; Mr. Dave Ritter for his help during capture operations; the U. S. Forest Service for use of facilities in Cooke City and Red Lodge; Dr. John Rumley, Montana State University Herbarium, for verification of plant specimens; and to Dr. David Worley for use of the Veterinary Research Lab. This project was supported by the Montana Fish, Wildlife and Parks Department and the Montana Agricultural Experiment Station.

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ABSTRACT

Movements, population characteristics, range use, and food habits of a Rocky Mountain bighorn sheep (Ovis canadensis canadensis) herd were examined in southcentral Montana and northwestern Wyoming during 1978 and 1979. From November to July this nearly 95 member herd occupies an 88 sq km area surrounding the headwaters of the Main Rock Creek and Line Creek drainages of the Beartooth Mountains. During both autumn and spring sheep ranged from lower subalpine canyon bottoms to alpine plateaus. Winter use was generally restricted to alpine plateaus southeast of Rock Creek. Ewes lambled on steep rocky northwest facing canyon walls from late May to mid-June. Winter range pooled standard diameter and polygon home range size of marked bighorns was 4.17 km and 17.9 sq km, respectively. Spring migration ran from May to mid-July. Rams and barren ewe-juvenile groups left the winter range before ewes with lambs. A migration route of 57 km was documented. The mean distance between summer and winter centers of activity for marked rams and ewes was 45 km and 37 km, respectively. Early migrants required over a week to travel the route, while those leaving in late June and July required as little as 84 hours. The summer ranges were located in the Absaroka Mountains east of Yellowstone National Park. Rock Creek ewe-juvenile groups restricted summer movements to a 34 sq km area around Pilot and Index Peaks. Ram groups ranged widely in the Wyoming Absarokas from the Montana border south to the Crandall Creek drainage and in the Wolverine Peak area of the Montana Absarokas. Ram summer ranges overlapped the ewe-juvenile and ram ranges of at least five other bighorn herds. The population of the entire Absaroka summer range was estimated at 375 bighorns. Marked ewes gave a summer range pooled standard diameter and polygon home range size of 2.1 km and 2.0 sq km, respectively. Values for one adult ram were 13.6 km and 15.8 sq km. Early summer range use was primarily centered on alpine turf vegetation. During mid-summer and autumn use of timberline dirt-scrub dominated habitats increased markedly. Autumn migration coincided with the arrival of permanent snow on the summer range in October or early November. Rock Creek herd lamb production and survival to yearling age averaged 54 per 100 mature ewes and 57 %, respectively, over a five year period. Use of graminoids, forbs, and browse was 74, 16, and 10 percent, respectively during late summer and 40, 50, and 10 percent, respectively during fall. Sedge and fescues were the most important items in the diet during late summer, while fringed sage, fescues, lupine, and sedge were important in the fall. The Rock Creek herd showed a light to moderate level of lungworm infection. Mean larval output was significantly higher on the winter range than on the Pilot-Index summer range (272 versus 128 larvae per gram, respectively).

INTRODUCTION

Rocky Mountain bighorn sheep (Ovis canadensis canadensis Shaw) are indigenous to the Beartooth Mountains of southcentral Montana. Several distinct bighorn herds occupy this mountain range. The principal wintering areas are located along the Stillwater River, West Rosebud Creek, and the upper reaches of Rock Creek. Coordinated studies of the bighorns wintering in the Stillwater and West Rosebud drainages were initiated in 1971. Stoneberg (1973, 1974) studied bighorn reproduction and lungworm incidence as well as grass utilization on these winter ranges from 1971 to 1974. Pallister (1974) studied population composition, movements, range use and food habits of the West Rosebud and Stillwater herds during the summer and fall of 1973. Stewart (1975) extended the latter investigation through the summer of 1974 and the winter and spring of 1975, also studying total standing crop of forage and protein content of principal forage species on West Rosebud and Stillwater winter ranges.

Prior to 1977, knowledge of the bighorns wintering along the upper Rock Creek drainage was limited to occasional winter and spring counts. In 1977 a study dealing with the movements, population composition, range use and food habits of the Rock Creek herd was initiated by the Montana Department of Fish, Wildlife and Parks (MDFWP). I conducted field work between early June and mid-September of 1978, from May through mid-December of 1979 and in July of 1980.

STUDY AREA

The study area is located in the Beartooth and Absaroka mountain ranges of southcentral Montana and northwestern Wyoming approximately 120 km southwest of Billings, Montana (Figure 1). Two thirds of this approximately 1970 sq km area lies within the Absaroka-Beartooth Wilderness Area of the Gallatin and Custer National Forests, the North Absaroka Wilderness Area of the Shoshone National Forest, and Yellowstone National Park.

Intensive field work was conducted on the winter and summer ranges of the Rock Creek bighorn sheep herd (Figure 1). Late spring, early summer and late autumn field work was conducted in the Beartooth Mountains along the upper reaches of Rock and Line creeks at the border between Montana and Wyoming. Summer and early autumn work was distributed along the northern portion of the Wyoming Absaroka Mountains just east of Yellowstone Park and in a small portion of the Montana Absarokas bordering the northeast corner of the Park.

The differing geological history of the Beartooth and Absaroka ranges has resulted in distinctly contrasting landforms. The Beartooths, dominated by Precambrian Era granitics, are characterized by barren rocky peaks, deep glaciated canyons, and high alpine plateaus. Elevations vary from 3,901 m (12,799 ft) on Granite Peak to about 2012 m (6,600 ft) in the Rock Creek canyon. The Absarokas, on the other hand, are dominated by Tertiary volcanics of the Cenozoic Era and consist of steep scree mountains and ridges above broad glaciated

