



Range use, food habits and agricultural relationships of the mule deer, Bridger Mountains, Montana
by Bruce T Wilkins

A THESIS Submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree
of Master of Science in Fish and Wildlife Management at Montana State College

Montana State University

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Abstract:

A study of the range use and food habits of the Rocky Mountain mule deer (*Odocoileus h. hemionus*) was carried out in 1955 and 1956 on a 6.5 square mile study area on the Bridger Mountains, Montana. A description of the area's general vegetative types is given. Observations of deer provided information on intraseasonal and interseasonal differences in use of the vegetative types. Food habits were determined by rumen analysis, direct observations of feeding deer, and examination of specific areas for evidence of plant use by deer. Deer damage to alfalfa haystacks and the occurrence of deer in alfalfa fields was noted. Characteristics of the haystacks and fields which seemingly affected the degree of use are discussed. Recent hunting seasons and their apparent results are presented and discussed. Recommendations for future seasons are included.

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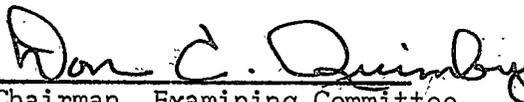
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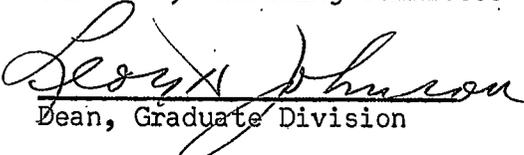
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ABSTRACT

A study of the range use and food habits of the Rocky Mountain mule deer (Odocoileus h. hemionus) was carried out in 1955 and 1956 on a 6.5 square mile study area on the Bridger Mountains, Montana. A description of the area's general vegetative types is given. Observations of deer provided information on intraseasonal and interseasonal differences in use of the vegetative types. Food habits were determined by rumen analysis, direct observations of feeding deer, and examination of specific areas for evidence of plant use by deer. Deer damage to alfalfa haystacks and the occurrence of deer in alfalfa fields was noted. Characteristics of the haystacks and fields which seemingly affected the degree of use are discussed. Recent hunting seasons and their apparent results are presented and discussed. Recommendations for future seasons are included.

INTRODUCTION

A pronounced increase in Rocky Mountain mule deer (Odocoileus h. hemionus) numbers has occurred in recent years in the Bridger Mountains, Gallatin County, Montana. Residents report that as late as 1948 deer were quite scarce and were not frequently seen. Today deer are commonly seen and a high population is evidenced by over-used browse plants as well as by damage to agricultural products. Predator control, buck only seasons (until 1952), and a scarcity of hunters, due to the precipitousness of the terrain, have undoubtedly been contributing factors to this increase.

Except for casual observations, no attempt had been made to secure basic ecological information necessary for proper management of this herd. Specific information on food habits and range use was lacking not only for this area but for much of the state. To help clarify the intricate problems associated with the management of this game animal, a study was carried out on a full time basis during the summer and winter months, and periodically in the fall and spring from June 16, 1955, to May 7, 1956. Food habits, range use and agricultural relationships were emphasized. Although the study was conducted primarily to aid in the future management of the mule deer in the Bridger Mountains, it was felt that the results would have definite application to the management of this animal in similar situations throughout the state.

Appreciation for aid during the study is extended to the following: Dr. Don C. Quimby for technical supervision and guidance in the writing of the manuscript; Joseph Townsend, District Game Biologist, for direction and assistance in the field; Drs. J. C. Wright and W. E. Booth for

aid in identifying plant materials. Further thanks are extended to the ranchers in the area, and particularly to Mr. and Mrs. Ralph Armstrong for their close cooperation. During the course of the study the author was employed by the Montana Fish and Game Department under Federal Aid Project W-73-R-1.

DESCRIPTION OF THE AREA

The Bridger Mountains are situated in southwest Montana, north and east of Bozeman. Their west slope is composed primarily of shale and limestone formations. The mountains are quite steep at the base (elevation 5,600 feet) and peaks (maximum elevation 9,669 feet). The numerous canyons in the range generally extend in an east-west direction. That part of the range involved in the food habits study was restricted to 6.5 square miles on the western slope (Fig. 1). This area was vegetatively typical of that slope with the foothills area devoted to agriculture.

Vegetative Types

Four distinct vegetative types were recognized on the study area.

Mountain Meadow

This type occurred at the base of the steep peaks (Fig. 2). The vegetation was characterized by grass and grasslike plants. Purple oniongrass (Melica spectabilis), Idaho fescue (Festuca idahoensis), and sedges (Carex spp.) were the principle species. The remainder of the vegetation was composed of various forbs with some intermittent patches of Douglas fir (Pseudotsuga taxifolia) and alpine fir (Abies lasiocarpa). This type occurs from 8,600 to 7,800 feet, extending further downward in the creek bottoms. The high altitude together with abundant springs kept the area moist and the vegetation succulent approximately a month

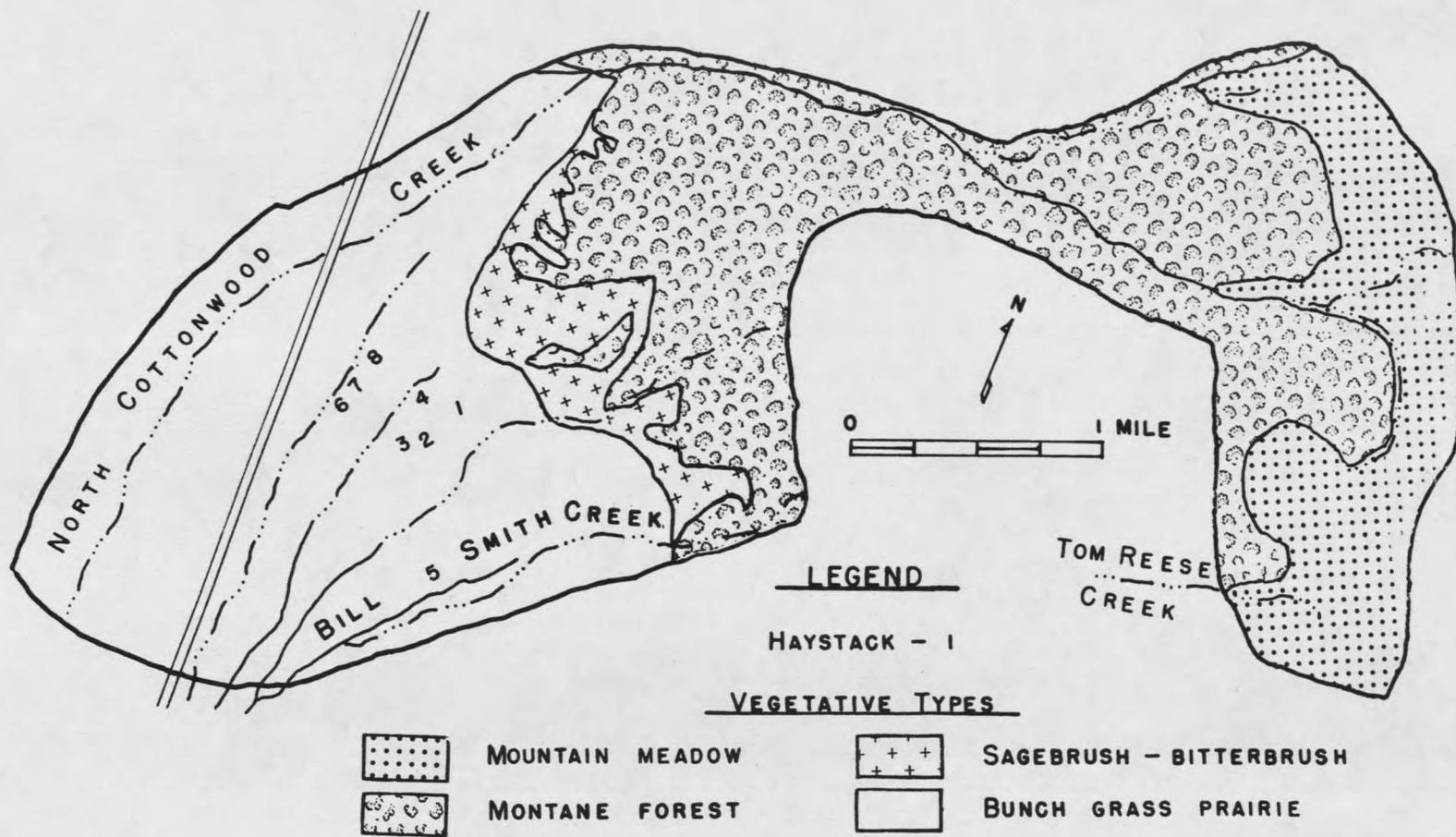


FIG. 1. MAP OF THE STUDY AREA



Fig. 2. Vegetative types at high elevations. Foreground, mountain meadow; right rear, upper montane forest; left rear shows steep mountain peaks.

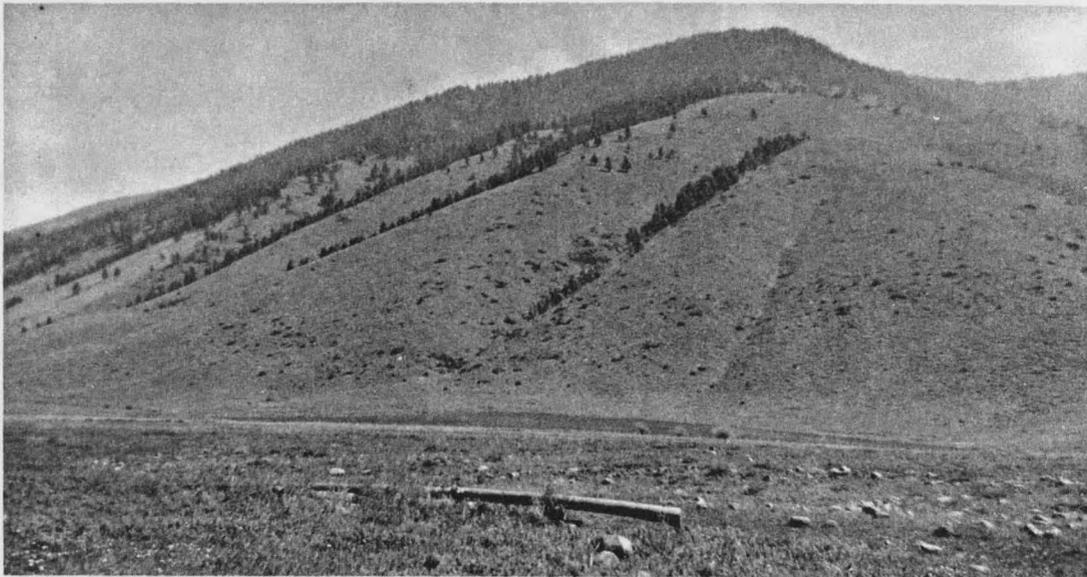


Fig. 3. Vegetative types at lower elevations. Foreground, bunch grass prairie; mid-section, sagebrush-bitterbrush; rear, lower montane forest.

after the vegetation at the base of the mountain had dried up.

Montane Forest

This type is characterized by a Douglas fir forest (Figs. 2 and 3) which has not been logged commercially since approximately 1900. The understory is composed primarily of browse species and elk sedge (Carex geyeri). The principle browse species are common juniper (Juniperus communis) and common snowberry (Symphoricarpus albus). This type occurs from 8,600 to 6,000 feet. It extends downward in elevation another 200 feet on the northern exposures (Fig. 3).

Sagebrush-bitterbrush

This type occurs on the steep mountain base from approximately 6,400 to 5,600 feet (Fig. 3). Big sagebrush (Artemisia tridentata), bitterbrush (Purshia tridentata) and Rocky Mountain juniper (Juniperus scopulorum) are the characteristic plants. Grasses are next in abundance with cheatgrass (Bromus tectorum) and bluebunch wheatgrass (Agropyron spicatum) predominant. Balsam-Root (Balsamorhiza sagittata) and field chickweed (Cerastium arvense) appear to be the most common forbs.

Bunch Grass Prairie

This type is located on the alluvial fan at the base of the mountain (below 5,600 feet) and is used extensively for agricultural purposes (Fig. 3). The untilled portion is grazed. Here the principle grasses are Idaho fescue, bluebunch wheatgrass and needle-and-thread (Stipa comata). Balsam-Root, yarrow (Achillea lanulosa) and arnica (Arnica spp.) are abundant forbs. Some big sagebrush also occurs on this type. In the more moist situations other woody plants occur, the most common

species being black poplar (Populus trichocarpa) and black hawthorn (Crataegus douglasii). That portion which is tilled is devoted primarily to growing wheat, or alfalfa and smooth brome (Bromus inermis) hay.

USE OF VEGETATIVE TYPES

Deer use of vegetative types was determined by morning and evening observations with a 7 x 35 binocular and a 20 power spotting scope. Approximately 3,500 observations of deer were recorded during the study. Observations were made on the bunch grass prairie and sagebrush-bitterbrush types throughout the study and from July 15 to September 12 on the mountain meadow type. One aerial flight over the entire study area was made on November 25.

Sagebrush-bitterbrush was the most heavily utilized type. From June 16 to August 14, an average of 4.9 deer per observation (41 observations) were seen here. The number of young fawns observed (including four that were caught and tagged) suggest that parturition occurs on this type. From August 15 to October 31, the number of deer dropped to an average of 1.7 per observation (25 observations). This was probably related to the arid conditions present at this lower elevation during that time. On November 7 when 45 deer were observed, and continuing throughout the remainder of the study, large numbers of deer were present here. From November 7 to March 19 this concentration averaged 24.6 deer per observation (71 observations). Over 90 percent of these deer were observed on southern exposures. These slopes seldom remained snow covered for periods exceeding one or two days, and provided the principle wintering areas for the herd (Fig. 4). The slopes not receiving the direct rays of the sun remained snow covered throughout the winter. Use



Fig. 4. Lower study area showing difference in snow on northern and southern exposures of sagebrush-bitterbrush type.

of the sagebrush-bitterbrush type continued through the remainder of the study, averaging 46.0 deer per observation (11 observations). This increase over the average number of deer seen in the November to March 19 observations is believed to be due to the earlier and later time of day at which observations could be carried out.

The bunch grass prairie was moderately used from June 16 to October 31 (an average of 3.9 deer per observation for 90 observations). From August to October most of these deer were in close proximity to Cottonwood Creek or Bill Smith Creek, the two main creeks in the area. From December through March 19 this type was continually covered by one to two feet of snow, and few deer were seen (0.6 deer per observation for 75 observations). Deer at haystacks were not considered in these counts. By March 20 much of this area was clear of snow and on that date 18 deer were seen feeding on this type. From that date until the conclusion of the study (May 7) there was an increase in use, indicated by an average

of 13.0 deer per observation for 13 observations.

In the montane forest, trees restricted vision so few observations were carried out here. The absence of deer from other areas during most days makes it apparent this area was used for shelter and rest. The lower portion was used as escape cover for the deer on the sagebrush-bitterbrush type and the upper portion was visited by the deer using the mountain meadows. No tracks or deer were seen in the upper half of this type on the November 25 flight, but deer and tracks were present on the lower half.

Deer used the mountain meadows extensively in the summer. This is indicated by an average of 11.1 deer seen per observation in the 23 observations made here. The only other observation on this type was the November 25 flight, when no deer or tracks were seen on this area.

FOOD HABITS

The techniques used to determine food habits were similar to those used by Saunders (1955) and Cole (1956). This consists of rumen analysis together with the recording of feeding observations. Feeding observations were made by examination of areas where deer were seen to feed for signs of recent plant use. Direct observation of use was recorded when possible. During the winter it was possible to follow deer tracks and determine use of certain plants.

Twenty-seven deer were collected from June 22, 1955 to May 6, 1956, and a one-quart rumen sample was obtained from each. A minimum of two deer per month was obtained with the exception of May and June. Only one deer was taken in each of these months. Three were collected in both October and January. Five were obtained in December. Collections

were generally made at approximately 15-day intervals. The rumen samples were preserved in a 10 percent formalin solution. In the laboratory, the sample was washed with water on consecutive 3 mm. and 2 mm. screens. The material retained on the 3 mm. screen was then placed in a pan of water and the identifiable portions removed. Identification to species, genus, family or general group was then made by comparison with a reference plant collection. After drying on paper toweling to remove excess moisture, the volumes (to the nearest 0.5 cc.) of the segregated portions were determined by water displacement. The same material was then air dried and weighed to 0.01 grams. Material with a volume less than 0.5 cc. was recorded as "trace". The unidentifiable material on the 3 mm. screen was included with that on the 2 mm. screen. Volume and weight were taken. A total of 4,403 cc. of material from the 27 rumen samples was obtained, of which 31.8 percent was identified. The percent of the stomach contents that any one item constituted for a season or other period was computed by the aggregate percent method (Martin, et al., 1946). This involves a determination of the percent of the total identifiable material in each rumen sample that the item in question constituted. The percentages for all stomachs for any period are then averaged (Table 1).

Summer (June, July, August, to mid-September)

Six rumen samples were included in this season (1 June, 2 July, 2 August and 1 early September). Three were from deer collected on the mountain meadow, one was from a deer on an alfalfa field and two were from deer on the sagebrush-bitterbrush type. One of the latter was seen to feed earlier on the bunch grass prairie. Forbs (19 items) constituted

