



Range use, relationship to logging, and food habits of the elk in the Little Belt Mountains, Montana  
by John Ballard Kirsch

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

Montana State University

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**Abstract:**

An elk (*Cervus canadensis*) study was conducted in the Little Belt Mountains of central Montana during the summer of 1960 and the spring, summer and early fall of 1961 to investigate distribution, movement, range use, relationships to block clear cut logging of lodgepole, pine (*Pinus contorta*) and food habits. Elk movements and range use were discussed in relation to broadly designated plant communities and more specific vegetative types if heavily used by elk. Size, age and moisture conditions of the lodgepole clear cuts were correlated with elk usage. A vegetational analysis of two clear cuts and the adjoining uncut lodgepole was used to compare the changes resulting from logging. Food habits during spring, summer and early fall were determined from 95 feeding sites examined. Supplementing the feeding observations was the inclusion of data from 41 elk rumens, most of which were collected during the late fall and winter of 1955 and 1956.

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## TABLE OF CONTENTS

	Page
Abstract . . . . .	vii
Introduction . . . . .	1
Description of area . . . . .	3
Ponderosa pine woodland - grassland community . . . . .	4
Ponderosa pine community . . . . .	5
Douglas fir community . . . . .	7
Douglas fir forest type . . . . .	7
Lodgepole pine type . . . . .	7
Open conifer - park type . . . . .	7
Burn type . . . . .	8
Spruce - fir community . . . . .	8
Spruce forest type . . . . .	8
Lodgepole pine type . . . . .	9
Open conifer - park type . . . . .	9
Methods . . . . .	9
Range use and movements . . . . .	13
Elk relationships to block clear cutting of lodgepole pine . . . . .	20
Elk food habits . . . . .	29
Spring (April, May 1961) . . . . .	32
Summer (June, July, August 1961) . . . . .	33
Summer (June 15-July 31, 1960 and 1961) . . . . .	33
Fall (September) . . . . .	34
Ponderosa pine woodland - grassland community . . . . .	35
Douglas fir community (open conifer - park type) . . . . .	35
Spruce - fir community (open conifer - park type) . . . . .	35
Lodgepole pine block clear cuts . . . . .	35
Rumen analyses . . . . .	36
Discussion . . . . .	38
Summary . . . . .	40
Literature cited . . . . .	42

## LIST OF TABLES

Table	Page
I. Percentage distribution of observed elk on designated vegetative types by periods, 1960 and 1961 . . . . .	14
II. Physical characteristics of block clear cuts and a summary of elk observations in the Deadhorse Sale Area . . . . .	22
III. Elk use in relation to size of clear cuts . . . . .	24
IV. Elk and elk groups observed during 1960 and 1961 in block clear cuts of the Deadhorse Sale Area . . . . .	25
V. Physical, quadrant tree and canopy-coverage data for two clear cuts and three adjacent uncut lodgepole pine sites on the north slope west of Spring Creek road, Deadhorse Sale Area, September 15, 19 and 20, 1961 . . . . .	26
VI. Elk food habits as determined from 12,008 instances of plant use at 95 elk feeding sites . . . . .	30
VII. Analyses of 41 elk rumens collected in the Little Belt Mountains, 1955 and 1956 . . . . .	37
VIII. Per cent seasonal forage class use comparison of four Montana elk studies . . . . .	38

## LIST OF FIGURES

Figure	Page
1. Elk study area, Little Belt Mountains, Montana . . . . .	2
2. The ponderosa pine woodland-grassland community in the foreground with the Douglas fir forest and burn type (right) in background . . . . .	6
3. The open conifer - park type of the Douglas fir (background), with restocking lodgepole pine clear cut (foreground) . . . . .	6
4. Recent block clear cutting of dense lodgepole pine . . . . .	10
5. Block clear cutting within the lodgepole pine type of the spruce-fir community . . . . .	10
6. An open ridge top park at 8,150 feet elevation in the spruce-fir community . . . . .	11
7. The spruce-fir community with open conifer - park type in background (southern exposure) and dense spruce forest in foreground (northern exposure) . . . . .	11
8. Clear cut blocks of lodgepole pine in the Deadhorse Sale Area. (Location of vegetative measurements discussed in the text designated by X-symbols) . . . . .	21

## ABSTRACT

An elk (Cervus canadensis) study was conducted in the Little Belt Mountains of central Montana during the summer of 1960 and the spring, summer and early fall of 1961 to investigate distribution, movement, range use, relationships to block clear cut logging of lodgepole pine (Pinus contorta) and food habits. Elk movements and range use were discussed in relation to broadly designated plant communities and more specific vegetative types if heavily used by elk. Size, age and moisture conditions of the lodgepole clear cuts were correlated with elk usage. A vegetational analysis of two clear cuts and the adjoining uncut lodgepole was used to compare the changes resulting from logging. Food habits during spring, summer and early fall were determined from 95 feeding sites examined. Supplementing the feeding observations was the inclusion of data from 41 elk rumens, most of which were collected during the late fall and winter of 1955 and 1956.

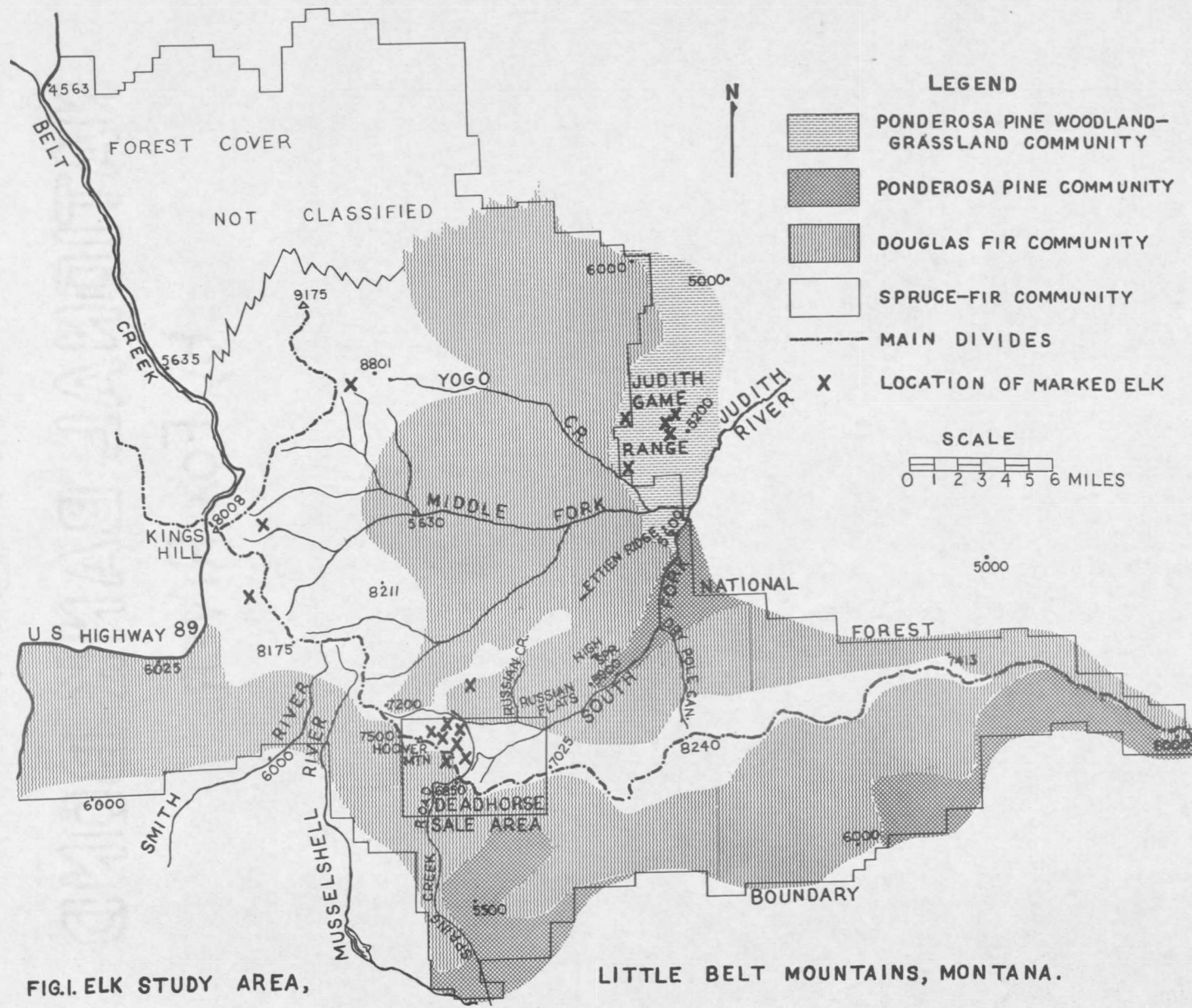
## INTRODUCTION

The abundance of game in central Montana before 1880 has been recorded by Worthen (1928). By 1885 this area had become one of the more important stock raising regions of the state (Phillips, 1925). The Little Belt Mountains, which are a prominent feature of the landscape, project plainsward into this region from the Rocky Mountain cordillera.

Elk (Cervus canadensis) were present (Smith, 1929; Rush, 1930) but not numerous in the Little Belts during the 1920's. According to West (1941), 86 elk were transplanted to this area from Yellowstone National Park in 1927-28. He gives the 1941 elk population in the Judith River drainage as 300 animals. Elk from an unconfined private herd may also have augmented the native animals in the region in 1929 (Rush, 1930). The present elk population of the Little Belts roughly numbers more than 1,000 animals.

A study in 1941-42 (McDowell, 1942) reported that 60 per cent of the winter range within the forest boundary was of little forage value. Elk began to winter on the privately controlled foothills which had long been over-used by sheep and cattle (Leiberg, 1904). To alleviate the resulting game-livestock conflicts in the foothills, the Montana Fish and Game Commission in the early 1940's began acquiring strategically located land for elk winter range. This relatively small tract, about 7,000 acres at present, becomes a winter concentration point for elk funneling out of the Judith River drainage from distances up to 20 airline miles. Varner (1962) reported 550 elk wintering on the Judith Game Range (Fig. 1) during the winter of 1961-62. A detailed study of mule deer (Odocoileus hemionus)





range use and food habits on this game range and the Judith River drainage was conducted by Lovaas (1958).

Information of a fragmentary nature has been accumulating on this elk herd since 1939. Picton (1961) published a population study of the Judith herd. A detailed study of the elk was needed to provide basic information to manage the herd in relation to other important land uses. The study, reported here, was concerned with elk distribution, movements, range use and food habits during spring and summer. The relationship between timber harvest and elk range-use was investigated. The expanded market, in recent years, for lodgepole pine (Pinus contorta) has increased logging in the area, resulting in marked changes in the vegetative cover.

#### DESCRIPTION OF AREA

The Little Belt Mountains, extending northwest-southeast for about 70 miles, are 30 to 40 miles wide in the western portion and draw to a point in the eastern extremity. The maximum elevation is 9,175 feet above mean sea level, while the adjoining plains are about 5,200 feet. Gieseke et al. (1953) gives their area as 1,648 square miles.

The study area of approximately 600,000 acres comprised all of Lewis and Clark National Forest within the Little Belts east of U. S. Highway 89, and certain foothills adjacent to the forest boundary (Fig. 1).

The topography of the study area can be described as a low plateau-like mountain range cut by deep narrow canyons. However, local regions, especially in the north, have rugged rocky crests with prominent cliffs and talus slopes. Relatively broad, flat, open ridges separate water

courses. According to Weed (1899) the deep trenched canyons are open and wide in soft shaly rock, and narrow in the hard limestone strata. Towards the bases of the mountains, canyons are narrow and straight-walled while the head waters flow in relatively open wide valleys.

Two main crests delimit areal drainage (Fig. 1). Yogo, Middle Fork and South Fork, major tributaries of the Judith River, head in deep open cuts in the divide and cross the study area west to east. The Judith system in its entirety carries all waters north and east of the main crests. The southern slope is mostly drained by short deep canyons to the Musselshell River. Smith River and Belt Creek are minor drainages of the study area.

The typing of vegetation used by elk was influenced by Daubenmire's (1943; 1946; 1952; 1953) work on zonation in the Rocky Mountains. Four areas designated as major plant communities (Fig. 1) were recognized by the presence or absence of certain conifer species, understory plants, elevation and exposure. Within two of these communities, the Douglas fir and spruce-fir, four and three "types" respectively, related to elk range use, were recognized and described. Scientific and common names of plants used in this paper follow Booth (1950) and Booth and Wright (1959).

Ponderosa pine woodland - grassland community: This community, which occurs at elevations of about 5,300 feet, does not circle the mountain base in a continuous belt, as does the adjacent grassland, but comprises local tracts, the most extensive being in the eastern section of the study area (Fig. 1). It has been described by Leiberg (1904) and Lovaas (1958).

This community is characterized by limber pine (Pinus flexilis) and ponderosa pine (Pinus ponderosa) growing as scattered trees, thin lines along ridge tops and patches of forest in a grassland matrix of bluebunch fescue (Festuca idahoensis) and bluebunch wheatgrass (Agropyron spicatum) in various stages of disturbance (Fig. 2). The trees are characteristically freely-branched, of low stature, often gnarled and wind-trained. Other plants of this community include creeping juniper (Juniperus horizontalis), shrubby cinquefoil (Potentilla fruticosa), fringed sagewort (Artemisia frigida), pussytoes (Antennaria spp.), Hood's phlox (Phlox hoodii), draba (Draba spp.), rough fescue (Festuca scabrella), needle-and-thread (Stipa comata), bluegrass (Poa spp.), Junegrass (Koeleria cristata), smooth brome (Bromus inermis) and crested wheatgrass (Agropyron desertorum). The two latter species were characteristic of abandoned cultivated fields. The writings of Weed (1899) and Leiberg (1904) imply an extensive ground cover of creeping juniper in the area during an earlier period. Observations of numerous dead branches of this plant substantiate their statements.

? see Table VI  
p. 30

Ponderosa pine community: This community is very limited and discontinuous in distribution. The only tracts of any size are on the Musselshell drainage and the lower South Fork of the Judith River (Fig. 1). It has an open canopy and an abundant understory including bluebunch wheatgrass, bluebunch fescue, big sagebrush (Artemisia tridentata) and arrowleaf balsamroot (Balsamorhiza sagittata). The absence of limber pine, the relatively high density of tall, clear-boled ponderosa pine, and the different ground level species distinguishes this from the ponderosa pine

























































































