



Habitat use, distribution, movement, and associated behavior of elk, Little Belt Mountains, Montana
by Kenneth Joe Coop

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:

A study was conducted during two summers and one fall on an area of 125,000 acres in the eastern Little Belt Mountains of central Montana to obtain data on use of habitat, distribution, movements, and associated behavior of elk prior to logging within this area. Three major habitat types; open park, broken park, and timber were delineated on the basis of tree crown densities of 0-15, 16-75, 76-100 percent, respectively.

The open park type was further separated into natural openings, burns, powerline strips, and clearcuts. Ground vegetation was determined for these types and subtypes from measurements within 2 x 5 dm plots spaced along linear transects. Habitat use in both the Douglas-fir and spruce-fir zones was determined by 5,720 observations of elk. During summer, use of open park types predominated over all others. Average size of 50 natural parks used by elk was 57 acres. Decreased use of these areas was noted in late summer through fall. The natural opening sub-type received the highest recorded use of all subtypes in both vegetation zones. Elk when disturbed in open parks ran an average distance of 374 feet to utilize escape timber. Escape cover timber stands were fully stocked with an average crown density of 85 percent. Use of timber types and zones varied in fall as related to hunting pressure and other factors. In summer 'elk distributed themselves across the heads of three major drainages from about 7,500-8,000 feet elevation, with distribution occurring at slightly lower elevations during fall.

Elk moved off the winter range through the transition range and onto summer range by the first week in July. This appeared to be correlated with green-up of vegetation and recession of snow. Movements of a radio-equipped cow indicated a summer home range of 3 square miles to be twice that of her late winter-early spring range. One radio-equipped male indicated more extensive movement by bulls than by cows.

A shift was noted in this animal's summer home range involving a movement of some 14 miles. Movements of up to 25 miles were noted for banded animals in one summer. Four yearlings banded on one winter range were observed to spend the next winter on a different range some 20 miles from the first. More than 36 percent of 84 elk banded in the winter of 1968-69 returned to the same winter range the following winter. One area was found to serve as summer range for elk wintering on two distinct and separate ranges, Clearcuts receiving greatest use were approximately 30 acres in size and 8-10 years of age. Observations of rutting behavior by bulls with harems indicated defense of a moving parameter type area around the harem instead of a fixed land area defense. Elk and cattle were observed to be generally compatible while elk were noted to avoid areas used currently or previously by sheep.

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HABITAT USE, DISTRIBUTION, MOVEMENT, AND ASSOCIATED
BEHAVIOR OF ELK, LITTLE BELT MOUNTAINS, MONTANA

by

KENNETH JOE COOP

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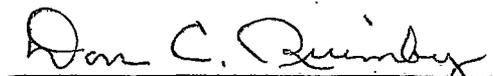
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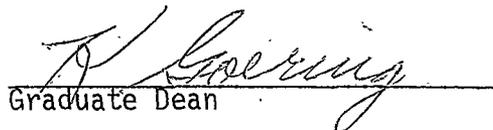
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ABSTRACT

A study was conducted during two summers and one fall on an area of 125,000 acres in the eastern Little Belt Mountains of central Montana to obtain data on use of habitat, distribution, movements, and associated behavior of elk prior to logging within this area. Three major habitat types; open park, broken park, and timber were delineated on the basis of tree crown densities of 0-15, 16-75, 76-100 percent, respectively. The open park type was further separated into natural openings, burns, powerline strips, and clearcuts. Ground vegetation was determined for these types and subtypes from measurements within 2 x 5 dm plots spaced along linear transects. Habitat use in both the Douglas-fir and spruce-fir zones was determined by 5,720 observations of elk. During summer, use of open park types predominated over all others. Average size of 50 natural parks used by elk was 57 acres. Decreased use of these areas was noted in late summer through fall. The natural opening subtype received the highest recorded use of all subtypes in both vegetation zones. Elk when disturbed in open parks ran an average distance of 374 feet to utilize escape timber. Escape cover timber stands were fully stocked with an average crown density of 85 percent. Use of timber types and zones varied in fall as related to hunting pressure and other factors. In summer elk distributed themselves across the heads of three major drainages from about 7,500-8,000 feet elevation, with distribution occurring at slightly lower elevations during fall. Elk moved off the winter range through the transition range and onto summer range by the first week in July. This appeared to be correlated with green-up of vegetation and recession of snow. Movements of a radio-equipped cow indicated a summer home range of 3 square miles to be twice that of her late winter-early spring range. One radio-equipped male indicated more extensive movement by bulls than by cows. A shift was noted in this animal's summer home range involving a movement of some 14 miles. Movements of up to 25 miles were noted for banded animals in one summer. Four yearlings banded on one winter range were observed to spend the next winter on a different range some 20 miles from the first. More than 36 percent of 84 elk banded in the winter of 1968-69 returned to the same winter range the following winter. One area was found to serve as summer range for elk wintering on two distinct and separate ranges. Clearcuts receiving greatest use were approximately 30 acres in size and 8-10 years of age. Observations of rutting behavior by bulls with harems indicated defense of a moving parameter type area around the harem instead of a fixed land area defense. Elk and cattle were observed to be generally compatible while elk were noted to avoid areas used currently or previously by sheep.

INTRODUCTION

During recent years logging in Montana has increased greatly. This has caused concern among wildlife managers because of the possible effects on wildlife habitats and various wildlife species. The Little Belt Mountains of central Montana, where extensive block clearcut logging of lodgepole pine (*Pinus contorta*) has occurred at least since 1951 and is continuing, are representative of areas in which concern has focused on the possible effects of logging on the habitats of elk. There is a paucity of published data pertaining to this subject. Most studies, such as those of Kirsch (1962) and Harper (1966), have reported on responses of elk during and after logging. Quantitative data on elk and elk use of a specific area prior to, as well as during, and following logging are apparently lacking. Possible effects of logging and related activities on the welfare of elk remain conjectural.

Logging in the eastern Little Belts has been confined mainly to the South Fork of the Judith River, adjacent areas to the south and west, and drainages between U. S. Highway 89 and the main divide from King's Hill north to the Big Baldy region (Figure 1). The Middle and Lost Fork drainages of the Judith River have remained in a relatively undisturbed condition, but logging operations are planned for these areas.

The purpose of this study, conducted from June-September, 1969 and June-December, 1970, was to obtain data pertaining to elk movements, distribution, habitat use, and associated behavior in the Middle

and Lost Fork drainages prior to logging. These data should prove valuable for comparison with data secured after logging has occurred. Work was also done in adjacent areas including the Judith Game Range which serves as a wintering area for elk in this region.

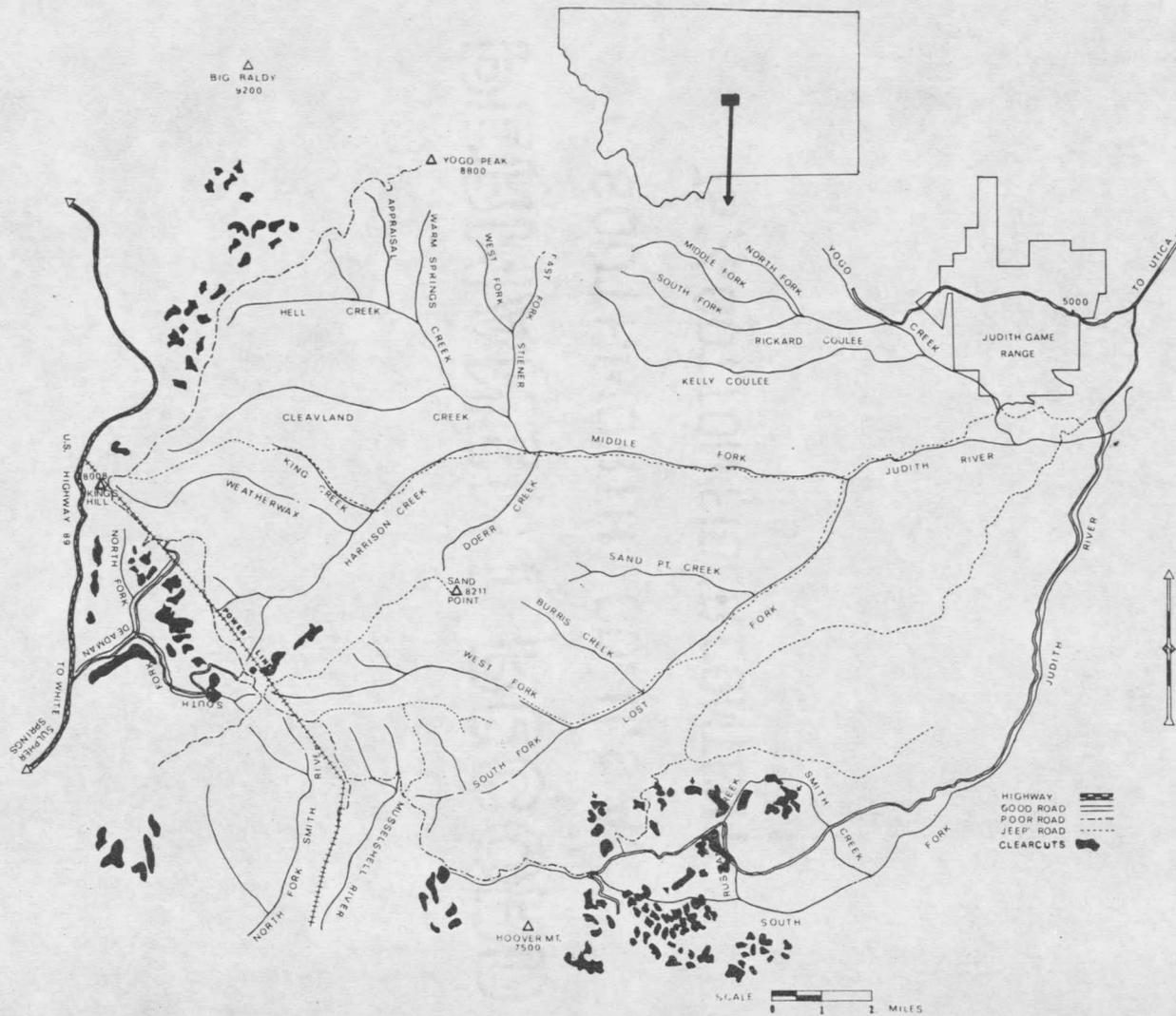


Figure 1. Map of study area and associated clearcuts. Arrows indicate three most used clearcuts within study area.

DESCRIPTION OF STUDY AREA

The study area (Figure 1), located in the eastern Little Belt Mountains of central Montana, encompasses approximately 125,000 acres and includes all of the headwaters of the Middle and Lost Forks of the Judith River, part of the headwaters of Yogo Creek, and about one-third of the head drainages of the South Fork of the Judith River. The area is bordered by ridges or divides along the north, west, and part of the south. The South Fork of the Judith served as a boundary for part of the southern and all of the eastern edges.

Four major vegetation zones (Figure 2): ponderosa pine-grassland (*Pinus ponderosa*), ponderosa pine, Douglas-fir (*Pseudotsuga menziesii*), and Engelmann spruce-subalpine fir (*Picea engelmannii-Abies lasiocarpa*) were described for this area by Kirsch (1962). Numerous seral lodgepole pine (*Pinus contorta*) stands are located throughout the Douglas-fir and spruce-fir zones. White bark (*Pinus albicaulis*) and limber pine (*Pinus flexilis*) are found along dry ridges and slopes. Big sagebrush (*Artemisia tridentata*) is the only large significant shrub occurring in the area with fairly extensive stands located on the slopes and bottoms adjacent to the Middle and Lost Forks in the Douglas-fir zone.

Of the 125,000 acres, a total of 108,000 were classified by personnel of the U. S. Forest Service according to timber types and classes. The remaining 17,000 acres were listed as forests of non-commercial value or were unclassified. Ponderosa pine, Douglas-fir, Engelmann spruce, subalpine fir, and lodgepole pine make up approxi-

mately 7.5, 40, 9, 1, and 26 percent, respectively of the classified timber types. Nonforested lands make up some 11.5 percent with less than 2 percent being listed as privately owned. White bark and limber pine were classified as making up some 3 percent of the timber but in addition to this, some of the non-commercial timber is also composed of these species.

Most of the parent material is limestone in nature with formation of drainages resulting in rounded and somewhat flattened ridge tops and divides. Several of the canyons have areas with steep, rugged, limestone outcroppings.

Approximately 800-1,200 elk which summer in the Judith River drainages at elevations up to 8,500 feet, winter primarily on the Judith Game Range and adjacent lands at about 5,000 feet elevation. Another 200-300 head winter in scattered groups along the foothills some 20 miles to the south and southwest of the Judith Game Range.

