Use of clearcuts by elk in the Little Belt Mountains, Montana
by Thomas Alfred Day

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

Abstract:
A study was conducted during two summers and one fall in the southeastern Little Belt Mountains of central Montana to obtain data pertaining to use by elk of clearcuts located in extensive stands of lodgepole pine. Secondary objectives were to record data on movements and summer distributions of two separate elk herds that winter on the south slopes and to note areas used by cattle. Ground vegetation of the lodgepole pine understory and of four groups of clearcuts; 2-4, 7-10, 11-15, and 16, 17, and 20 years of age, was evaluated from measurements within randomly spaced 2X5 dm. plots. Coverage values for grasses, forbs, and shrubs were greatest in the 7-10, 2-4, and 16, 17, and 20 year age groups, respectively. Elk used clearcuts only when they were located within or near traditional summer range areas. Data of observations of elk and pellet group counts in 40 intensively studied clearcut blocks indicated the most suitable conditions for elk were present when the block was located the greatest distance from human disturbance, closest to extensive stands of timber cover, adequately treated for disposal of slash, and of younger age (2-10 years). The size of opening appeared to be a negligible factor of influence. Elk were observed using 26 of the 40 clearcuts. Ninety-two percent of 1816 observations of elk using these 26 clearcuts were made in four of them. Apparently all conditions must be suitable for a block to receive appreciable elk use. Elk wintering on one area of the south slopes moved along two major routes to summer range where they concentrated activities in three main areas which they shared with elk from a larger herd that wintered on the north slopes. Elk wintering on another area of the south slopes moved along one main route to one summer area of activity upon which they were separated from the ' other segments. Competition between elk and cattle was relatively unimportant on higher summer range, but appeared significant on the lower winter range areas of the south slopes.

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Date April 16, 1973

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Approved:

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Bozeman, Montana

June, 1973

ACKNOWLEDGMENT

To the following, among others, the author wishes to express his sincere appreciation for their contributions to this study: Dr. Don C. Quimby, Montana State University, who directed the study and aided in preparation of the manuscript; Drs. Robert L. Eng and Richard J. Graham, Montana State University, for reviewing the manuscript; Dr. Richard Mackie, Montana State University, and Mr. Thomas Mussehl, Mr. H. O. (Buck) Compton, and Mr. Kenneth Coop, Montana Fish and Game Department, for advice and field assistance; Father John B. Kirsch, for aid with literature review; Dr. Martin Hamilton, for advice on statistical analysis; personnel of the Lewis and Clark National Forest for use of facilities and cooperation; my parents and my wife, Jill, for patience, encouragement, and assistance. During the study the author was supported by the Montana Fish and Game Department under Federal Aid Projects Nos. W-120-R3 and 4.

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ABSTRACT

A study was conducted during two summers and one fall in the southeastern Little Belt Mountains of central Montana to obtain data pertaining to use by elk of clearcuts located in extensive stands of lodgepole pine. Secondary objectives were to record data on movements and summer distributions of two separate elk herds that winter on the south slopes and to note areas used by cattle. Ground vegetation of the lodgepole pine understory and of four groups of clearcuts; 2-4, 7-10, 11-15, and 16, 17, and 20 years of age, was evaluated from measurements within randomly spaced 2 X 5 dm. plots. Coverage values for grasses, forbs, and shrubs were greatest in the 7-10, 2-4, and 16, 17, and 20 year age groups, respectively. Elk used clearcuts only when they were located within or near traditional summer range areas. Data of observations of elk and pellet group counts in 40 intensively studied clearcut blocks indicated the most suitable conditions for elk were present when the block was located the greatest distance from human disturbance, closest to extensive stands of timber cover, adequately treated for disposal of slash, and of younger age (2-10 years). The size of opening appeared to be a negligible factor of influence. Elk were observed using 26 of the 40 clearcuts. Ninety-two percent of 1816 observations of elk using these 26 clearcuts were made in four of them. Apparently all conditions must be suitable for a block to receive appreciable elk use. Elk wintering on one area of the south slopes moved along two major routes to summer range where they concentrated activities in three main areas which they shared with elk from a larger herd that wintered on the north slopes. Elk wintering on another area of the south slopes moved along one main route to one summer area of activity upon which they were separated from the other segments. Competition between elk and cattle was relatively unimportant on higher summer range, but appeared significant on the lower winter range areas of the south slopes.

INTRODUCTION

Rising public concern with environmental quality has recently brought to light some "so-called" undesirable results of clearcut logging practices. Immediately apparent to at least some individuals are gross changes that degrade the scenic quality of our forests. Changes of a more subtle nature that may have significant effects on the quality of wildlife habitat are not revealed by casual observations. Thus the ecological effects of block clearcutting of lodgepole pine on quality of elk *(Cervus canadensis nelsoni)* (Bailey) habitat have not been completely elucidated. Investigative committees such as Bolle, *et al.* (1970), and Berntsen, *et al.* (1971) have indicated that much more information is needed concerning the relationship of elk to other resource management objectives. These groups, from qualitative observations of more or less survey types of studies, could find little evidence of either an overall adverse or beneficial effect of clearcutting on the welfare of elk, but they did find greater amounts of forage for big game following increased clearcutting.

Information concerning forage changes following clearcutting is more extensive than information concerning the effects of clearcutting and associated activities, such as road building, on the year long ecology of elk. The most extensive work of this nature was done in Oregon with the Roosevelt elk by Harper (1966 and 1971). In Montana, two studies were conducted in the Little Belt Mountains. Kirsch (1962) studied elk use of clearcuts in summer 9 and 10 years after the first block of timber was harvested in the Deadhorse Sale Area in 1951. Coop (1971) obtained data concerning habitat use and associated behavior of elk in major drainages prior to extensive logging.

From June - September, 1971, and June - December, 1972, I collected data in this general area which would add to that compiled previously. Emphasis was placed primarily on use by elk of clearcuts in the Deadhorse Sale Area. Information concerning the movements and distribution of those elk that winter on the south-facing slopes of the Little Belts was another objective of the study. Range use of the area by livestock was also noted.

METHODS

Botanical nomenclature follows Booth (1950) and Booth and Wright (1959). Assistance in species recognition of plants was provided by comparisons with specimens in the extensive collection made by Coop from the study area in 1969 and 1970 (Coop 1971).

All vegetation sampled was within the intensively studied portion of the Deadhorse Sale Area. Using the method proposed by Daubenmire (1959), quantitative data expressing species composition of vegetation, and frequencies and canopy coverages of individual taxa less than one meter in height were collected and analyzed. Twenty or forty 2 X 5 decimeter plots spaced 15 to 50 paces apart were evaluated in each clearcut or lodgepole timber stand sampled. Numbers of plots and spacing between plots were roughly proportional to the size of the vegetation stand sampled. Shape of vegetation stands dictated the pattern of plot locations to adequately cover all portions. Data were also collected at plots established and evaluated in 1961 by Kirsch (1962) in both clearcuts and mature timber stands. Differences in forage production between stands of mature lodgepole pine and clearcuts of varying ages were shown by average canopy-coverage values for forage classes (Daubenmire 1959). These data also indicated successional changes.

At the location of each vegetation plot in clearcuts elk, deer, and cattle pellet groups within an 11.7' radius circle, 1/100 acre, were counted and classified as to time of deposition (current or previous years). These recordings were converted to pellet groups/acre to provide a comparative index of animal use.

Physical characteristics of clearcuts including cutting and thinning dates, slopes, elevations, aspects, and tree regeneration measurements were compiled from U. S. Forest Service records. Recent aerial photographs were used to calculate acreages of separate clear-cut blocks. Approximate areas were determined using a dot grid.

Thirty-three elk wintering on the south-facing slopes have been marked for individual identification since the winter of 1970. Fifteen elk were marked with 3" neckbands similar to those described by Knight (1966), and 18 were marked with a 6" pattern. In addition, a large number of elk had been marked on the Judith Game Range during previous years.

Distribution, movements, and use of individual clearcuts were determined by recording the locations of marked and unmarked animals observed. Group size, sex, age, and activity of the elk were also recorded. Foot and vehicle travel provided the modes of transportation while making observations. Aerial observations from a 150 Super Cub were scheduled on a monthly basis during the first summer of study and weekly when practical during the second summer and fall. A 25-60 X spotting scope and a 7 X 50 binocular aided in making observations.

Cattle allotment boundaries, numbers of cattle present, and dates of use of lands suitable for elk during any season were provided from U. S. Forest Service records. Cattle distributions were secondarily noted during observation periods and aerial flights.

STUDY SITE

Gieseker *et al.* (1953) described the 1,648 square mile area comprising the Little Belt Mountains as being formed by a broad folded-arched uplift which has been eroded and dissected to produce rounded peaks and deep rock-walled canyons with limestone of carboniferous age exposed on the northern and southern slopes. The study area of approximately 250 square miles lies in the southeastern portion (Figure 1). Latitudinal boundaries were the Higgins Park area on the west and the East Fork of Haymaker Canyon on the east. The Lewis and Clark National Forest Boundary was the southernmost extremity. Prominent features of the northern boundary were High Mountain, Dry Pole Canyon, Ettien Ridge Road, and the West Fork of Lost Fork. Twenty square miles of the Deadhorse Sale Area which lies between the Musselshell and Judith River drainages were designated an intensive study portion (Figure 2). Boundaries were the East Fork of Lion Creek on the west, Spring Creek Road on the east, the Forest Boundary on the south, and the heads of Corral and Big Hill Creeks and Hoover Springs on the north. Previous work (Kirsch 1962) indicated heavy use by elk of clearcuts in this area. It contained 62 clearcut blocks which form 34 separate entities because of adjoining edges. The blocks varied from 2-20 years of age and 7-104 acres in size.