Responses of elk to a 500 kV transmission line on the North Boulder winter range, Montana
by Gerald Patrick Nelson

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

Abstract:
This study was an attempt to determine the effects that a 500 kV powerline had on a wintering population of elk in southwestern Montana. The positioning of the powerline corridor separated important security and thermal cover from open grassland feeding areas. Track surveys of corridor crossings by elk were used to determine any "turnback behavior" as a result of the powerline. Seven 24-hour telemetry sessions were conducted during the winter of 1984-85. Home ranges for 10 of the 13 elk wearing operating radio-collars could be computed and plotted for one or more of the 24-hour sessions. Visual observations and pellet group surveys were used to augment the other methods used in the study. No "turnback behavior" was detected from monitoring the track surveys. The absence of corridor crossings shortly after precipitation was observed twice. The absence of corridor crossings with no prior precipitation (4 days) was observed once. Telemetry and pellet group surveys showed the importance of open grasslands as feeding areas and timbered, areas as security and thermal cover. The majority of the feeding areas were south of the powerline, and the majority of the security cover was north. Visual observations helped ascertain the importance of travel avenues between bedding and feeding areas, especially during deep and drifting snow conditions. Elk displayed an alarm response while crossing the corridor on 3 occasions. In January of 1985 a crossing of the power line corridor during a snowstorm by a group of at least 14 elk was documented. Any hindrances or modifications of the elk populations use of the winter range could not be conclusively confirmed by any of the methods used in this study. It appears that the North Boulder elk herd uses all the winter range habitat available at this time.

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APPROVAL

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Gerald Patrick Nelson

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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ABSTRACT

This study was an attempt to determine the effects that a 500 kV powerline had on a wintering population of elk in southwestern Montana. The positioning of the powerline corridor separated important security and thermal cover from open grassland feeding areas. Track surveys of corridor crossings by elk were used to determine any "turnback behavior" as a result of the powerline. Seven 24-hour telemetry sessions were conducted during the winter of 1984-85. Home ranges for 10 of the 13 elk wearing operating radio-collars could be computed and plotted for one or more of the 24-hour sessions. Visual observations and pellet group surveys were used to augment the other methods used in the study. No "turnback behavior" was detected from monitoring the track surveys. The absence of corridor crossings shortly after precipitation was observed twice. The absence of corridor crossings with no prior precipitation (4 days) was observed once. Telemetry and pellet group surveys showed the importance of open grasslands as feeding areas and timbered areas as security and thermal cover. The majority of the feeding areas were south of the powerline, and the majority of the security cover was north. Visual observations helped ascertain the importance of travel avenues between bedding and feeding areas, especially during deep and drifting snow conditions. Elk displayed an alarm response while crossing the corridor on 3 occasions. In January of 1985 a crossing of the powerline corridor during a snowstorm by a group of at least 14 elk was documented. Any hindrances or modifications of the elk populations use of the winter range could not be conclusively confirmed by any of the methods used in this study. It appears that the North Boulder elk herd uses all the winter range habitat available at this time.

INTRODUCTION

The final stage of the "Colstrip Project" (Colstrip EIS 1979) was to construct a 500 kilovolt (kV) powerline to conduct electricity from coal-fired electrical generators in Eastern Montana to consumers in the Pacific Northwest. This alternating current (ac) transmission line passes through the North Boulder River big game winter range on the east side of the Continental Divide. In addition to supporting a wintering herd of 450 to 500 elk (Cervus elaphus nelsoni), this portion of Hunting District 318 also provides winter range for mule deer (Odocoileus hemionus) and moose (Alces alces shirasi). The powerline passes through this winter range in a location which separates the upper-slope areas of timbered security cover from the lower-slope areas of open grasslands which are important foraging areas for elk. Since winter range is considered a limiting factor for elk in most northern temperate climates (Proceedings of Western States Elk Workshop 1973), it is essential, from a management standpoint, to know what effects construction and electrification of such a transmission line would have on a wintering elk population.

The powerline towers and access roads were completed in 1982. The corridor was cleared and the conductors were strung and energized in 1983. This study was a continuation and completion of a project that began in December of 1982. The main objective of the study was to determine if the presence of the powerline had any effect on the elk population's use of the winter range. I began on the project in March 1984 and conducted my first full field season in the winter of 1984-85. Two prior field seasons, conducted by another student (Canfield 1984), included the pre-energization winter of 1982-83 and the post energization winter of 1983-84. Each field season began in late December and concluded when snow conditions allowed elk to move off the winter range.

STUDY AREA DESCRIPTION

Location

The study area is located in southwestern Montana, about 26 kilometers (km) north of Butte and about 14 km west of Boulder (Figure 1). Originally the North Boulder River constituted the southern boundary of the study area, the 2100 meter (m) contour line the northern boundary, Basin Creek the eastern boundary, and Little Cottonwood Creek the western boundary. These boundaries were extended to include the 10 square (sq) km of the Lowland Creek Drainage directly south of the study area as some of the radio-collared elk used this area almost exclusively.

Climate

Average annual precipitation for the study area is 45 centimeters (cm) (Ross and Hunter 1976). This ranges from 40 to 50 cm with precipitation increasing as elevation increases. The average daily maximum and minimum temperatures for the period December 1984 to

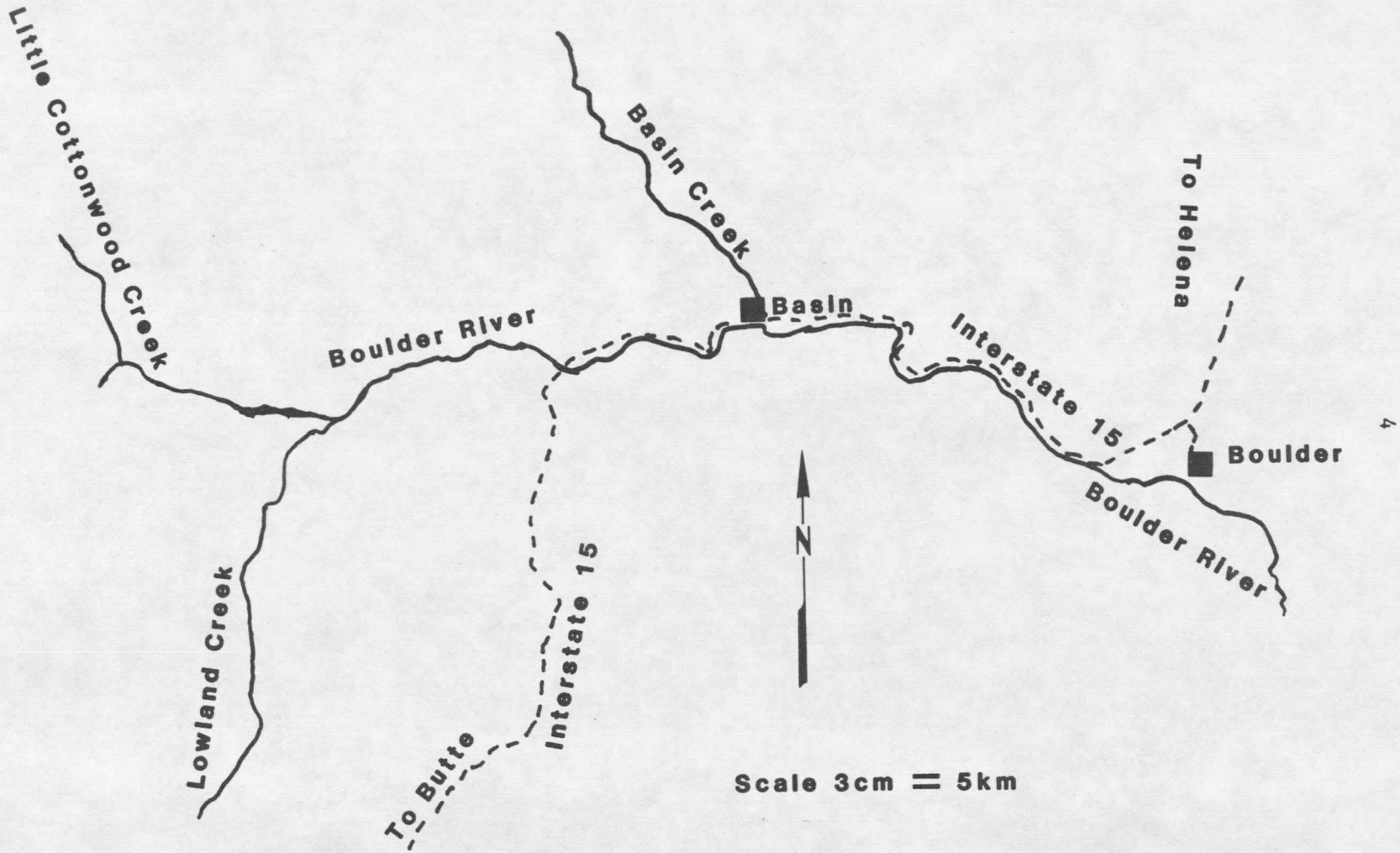

Figure 1. Map of study site and the surrounding area.