



Distribution, movements, and habitat use during spring, summer, and fall by mule deer in the north Salish Mountains, Montana
by Bret Jeffrey Stansberry

A thesis submitted 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:

This study was conducted in the north Salish Mountains of northwest Montana during summer 1988 and spring, summer, and fall 1989 to determine deer distribution, movements, and habitat use in relation to environmental variables. Three tentative population-habitat units (PHUs), distributed in relation to winter ranges, were delineated. PHU 1 was 165.3 km², PHU 2 was 10.6 km², and PHU 3 was 13.9 km². The winter range on PHU 1 was divided into 3 sub-units based on winter relocations of radio-collared deer. Deer with indistinct seasonal ranges (ISR) made up 31.5% of all radio-collared deer, deer with adjacent seasonal ranges (ASR) accounted for 16.7%, and deer with distinct seasonal ranges (DSR) comprised 51.9%. In addition to summer and winter home ranges, accessory areas were used by deer during spring and fall. Mean date of departure from winter range was earlier in 1988 than 1989 and mean date of return to winter range was later in 1988 than in 1989. All 54 radio-collared deer showed high fidelity to seasonal ranges. Summer home range size decreased significantly from 2.7 km² in 1988 to 1.2 km² in 1989 possibly due to abundant precipitation and increased forage production. Lodgepole pine and mixed conifer were cover types used most heavily in spring, summer, and fall by radio-collared deer. In contrast to ISR and ASR deer, DSR deer made extensive use of sub-alpine fir cover types. Use of cover types by 5 deer occupying fall accessory areas shifted from ponderosa pine and mixed conifer to lodgepole pine and sub-alpine fir. South to west aspects were used most heavily by all deer. ISR deer used steep slopes most often, while ASR and DSR deer used moderate slopes. Comparison of plant phenology stages and deer movement indicated deer used areas as plants became green in the spring or stayed green in the fall.

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By

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APPROVAL

of a thesis submitted by

Bret Jeffrey Stansberry

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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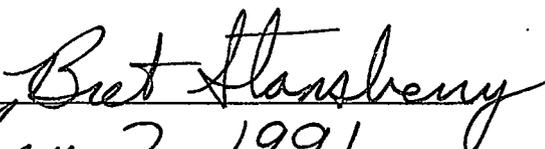
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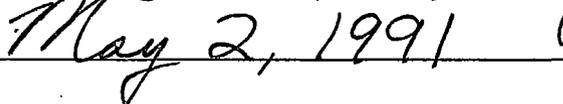
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ABSTRACT

This study was conducted in the north Salish Mountains of northwest Montana during summer 1988 and spring, summer, and fall 1989 to determine deer distribution, movements, and habitat use in relation to environmental variables. Three tentative population-habitat units (PHUs), distributed in relation to winter ranges, were delineated. PHU 1 was 165.3 km², PHU 2 was 10.6 km², and PHU 3 was 13.9 km². The winter range on PHU 1 was divided into 3 sub-units based on winter relocations of radio-collared deer. Deer with indistinct seasonal ranges (ISR) made up 31.5% of all radio-collared deer, deer with adjacent seasonal ranges (ASR) accounted for 16.7%, and deer with distinct seasonal ranges (DSR) comprised 51.9%. In addition to summer and winter home ranges, accessory areas were used by deer during spring and fall. Mean date of departure from winter range was earlier in 1988 than 1989 and mean date of return to winter range was later in 1988 than in 1989. All 54 radio-collared deer showed high fidelity to seasonal ranges. Summer home range size decreased significantly from 2.7 km² in 1988 to 1.2 km² in 1989 possibly due to abundant precipitation and increased forage production. Lodgepole pine and mixed conifer were cover types used most heavily in spring, summer, and fall by radio-collared deer. In contrast to ISR and ASR deer, DSR deer made extensive use of sub-alpine fir cover types. Use of cover types by 5 deer occupying fall accessory areas shifted from ponderosa pine and mixed conifer to lodgepole pine and sub-alpine fir. South to west aspects were used most heavily by all deer. ISR deer used steep slopes most often, while ASR and DSR deer used moderate slopes. Comparison of plant phenology stages and deer movement indicated deer used areas as plants became green in the spring or stayed green in the fall.

INTRODUCTION

Recent studies in mountain and mountain-foothills habitat of southwestern Montana (Pac et al. 1991) have indicated that mule deer ecology varies widely depending on the specific habitat complexes present. Also patterns of habitat use often differ among individual deer in the same population. In northwestern Montana, mule deer occupy a variety of coniferous forest habitats managed intensively for timber production. Little is known about mule deer ecology in these habitats, especially in relation to timber and habitat management.

Although mule deer have been studied extensively in mountain-foothill environments, few studies have been conducted in coniferous forest environments similar to northwest Montana. Bailey (1960) and Fairman (1966) studied winter movement and distribution in the Rattlesnake drainage in west-central Montana. Knoche (1967) studied the ecology of the Rattlesnake winter range. Yeager (1984) studied use of cover on winter range on the Flathead Indian Reservation in west-central Montana. Simpson (1988) studied seasonal distribution in south-central British Columbia.

My study was established to provide baseline information on mule deer ecology in the north Salish Mountains. Specific objectives were to determine spring,

summer, and fall distribution and habitat use. Relationships between migration behavior and plant phenology were also established. Research was conducted during summer 1988 and spring, summer, and fall 1989.

STUDY AREA

The study area was located along the northwest flank of the Salish Mountains approximately 80.5 km northeast of Libby, in Lincoln County, Montana (Fig. 1). The area encompassed approximately 446 km², within the Rexford Ranger District of the Kootenai National Forest. Boundaries were Pinkham Creek on the north and east, Tenmile Creek on the south, and Lake Kooconusa on the west.

Geologically, the study area is underlain by strata from the Belt Super Group of the late Precambrian age (Johns 1970). This portion of the Salish range was created by faulting and folding during the Late Cretaceous to Early Tertiary ages and is characterized by north-northwest trending folds in the Belt sediments. The area was completely covered by the Cordilleran ice sheet except for the higher peaks. Elevations range from 744 m along the shore of Lake Kooconusa to 2,131 m at the top of McGuire mountain.

Topographically, the study area was comprised of 2 distinct zones (Fig. 2). From lake level to about 1,524 m, the area is characterized by very steep, broken terrain, including steep cliff faces and talus slopes. This terrain

