Green vegetation and fecal protein relationships in two southeastern Montana mule deer populations
by Donna Elizabeth Griffiths

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:
A study was conducted on 2 areas in southeastern Montana in 1987-1988 to determine environmental factors important to survival of mule deer in that region, and the times of year when individual factors become critical. Weights of forbs and grasses clipped from 4 sites reached a peak in May or June, then declined throughout summer and fall. In 1987 weights of grass apparently began to increase again in mid-summer after declining from the first peak. Amounts of vegetation clipped were smaller in 1988 than in 1987, probably due to decreased rainfall in 1988. Percent nitrogen values for deer pellets collected from the 2 areas ranged from 1.31 on 11/25/87 to 3.78 on 5/21/88.

Fecal N varied with grams of water in vegetation clipped. Fecal N was only slightly higher in summer 1987 than in summer 1988. Fecal N from the 2 study areas was similar except during 17 October-7 December 1987, when fecal N was significantly higher ($p < 0.02$) on the Ashland area than on the Boxelder area. Radio telemetry and observations of unmarked deer provided data on movements and use of cover types. Fourteen cover types were identified on the Ashland study area, 11 on the Boxelder area. Riparian areas were used heavily in summer but very little in winter. On the Ashland area the skunkbush type was important in summer and the alfalfa type was important in October. On the Boxelder area deer were more likely to be found near the creeks in summer and fall than in winter, and on cold winter days than on warm winter days. Deer on the Boxelder area used the same general areas yearlong. Some deer on the Ashland area migrated between distinct summer and winter ranges. Movement of many deer on the Boxelder area to the largest creek in late summer or early fall suggested that succulent forage was scarce at that time on other parts of the area. Deer appeared to use smaller areas in summer than in winter. Fawn:100 doe ratios showed a generally increasing" trend from July 1987 to February 1988 and again from June 1988 to September 1988. Reliability of these ratios is doubtful due to small sample sizes. Dates and causes of death of marked deer were recorded when they were known. A mule deer population model developed in New Mexico was tested for its usefulness in southeastern Montana. The model accurately predicted a peak in deer numbers in fall 1984, with a subsequent decline.

Predicted birth rates appeared to be too low. A major problem with the model was inaccurate prediction of overwinter mortality. A population model for use in southeastern Montana should include some measure of winter severity.

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Fish and Wildlife Management

MONTANA STATE UNIVERSITY
Bozeman, Montana

February 1990

APPROVAL

of a thesis submitted by

Donna Elizabeth Griffiths

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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13 Feb. 1990
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Date 13 Feb. 1990

ACKNOWLEDGEMENTS

I thank Dr. Harold Picton, my major professor, for his guidance and encouragement. Dr. Richard Mackie provided extensive editorial advice. Dr. Robert White and John Weigand also critically reviewed the manuscript.

Thanks go to Steve Knapp, of the Montana Department of Fish, Wildlife and Parks, who assisted me in many ways and shared his unpublished data. I also thank Neil Martin, Heidi Youmans, and other MDFWP personnel who provided support and assistance.

I wish to thank the U.S. Forest Service personnel of the Ashland Ranger District, especially Tom Komberec and Mark Petroni, for allowing me to stay at the Fort Howes Work Center and the Ashland Ranger Station and for sharing information about the Ashland study area. I thank Keith Stevens for his flying expertise and his patience. I thank the staff of the M.S.U. Chemistry Station Analytical Lab for fecal nitrogen analysis. Clif Youmans provided helpful suggestions on analysis of fecal samples. I thank local landowners, especially the Brownfields and Philippis, for their cooperation and hospitality. Finally, I thank Jim Wenban, who not only provided moral support, but helped with typing and preparation of tables.

Funding for the project was provided by the Montana Department of Fish, Wildlife and Parks.

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ABSTRACT

A study was conducted on 2 areas in southeastern Montana in 1987-1988 to determine environmental factors important to survival of mule deer in that region, and the times of year when individual factors become critical. Weights of forbs and grasses clipped from 4 sites reached a peak in May or June, then declined throughout summer and fall. In 1987 weights of grass apparently began to increase again in mid-summer after declining from the first peak. Amounts of vegetation clipped were smaller in 1988 than in 1987, probably due to decreased rainfall in 1988. Percent nitrogen values for deer pellets collected from the 2 areas ranged from 1.31 on 11/25/87 to 3.78 on 5/21/88. Fecal N varied with grams of water in vegetation clipped. Fecal N was only slightly higher in summer 1987 than in summer 1988. Fecal N from the 2 study areas was similar except during 17 October-7 December 1987, when fecal N was significantly higher ($p < 0.02$) on the Ashland area than on the Boxelder area. Radio telemetry and observations of unmarked deer provided data on movements and use of cover types. Fourteen cover types were identified on the Ashland study area, 11 on the Boxelder area. Riparian areas were used heavily in summer but very little in winter. On the Ashland area the skunkbush type was important in summer and the alfalfa type was important in October. On the Boxelder area deer were more likely to be found near the creeks in summer and fall than in winter, and on cold winter days than on warm winter days. Deer on the Boxelder area used the same general areas yearlong. Some deer on the Ashland area migrated between distinct summer and winter ranges. Movement of many deer on the Boxelder area to the largest creek in late summer or early fall suggested that succulent forage was scarce at that time on other parts of the area. Deer appeared to use smaller areas in summer than in winter. Fawn:100 doe ratios showed a generally increasing trend from July 1987 to February 1988 and again from June 1988 to September 1988. Reliability of these ratios is doubtful due to small sample sizes. Dates and causes of death of marked deer were recorded when they were known. A mule deer population model developed in New Mexico was tested for its usefulness in southeastern Montana. The model accurately predicted a peak in deer numbers in fall 1984, with a subsequent decline. Predicted birth rates appeared to be too low. A major problem with the model was inaccurate prediction of overwinter mortality. A population model for use in southeastern Montana should include some measure of winter severity.

INTRODUCTION

Mule deer (Odocoileus hemionus) populations in eastern Montana tend to fluctuate considerably (Wood 1987, Wood et al. 1989). An ability to predict population changes would allow hunting to be better adjusted to deer numbers. This would improve the ability of managers to balance deer numbers with landowner tolerance for deer and to provide maximum hunting opportunity without adversely affecting deer populations.

Deer populations are monitored by the Montana Department of Fish, Wildlife and Parks (MDFWP) in several southeastern Montana areas. Mule deer on 2 of these--the Boxelder Creek trend area, near Hammond, and the Ashland Hills trend area, near Ashland--were radio collared or marked with neck bands by the MDFWP to obtain population dynamics information for use in a population simulation model. My study was conducted on these 2 areas. The objective was to identify environmental factors that should be included in a population model--those likely to influence southeastern Montana mule deer survival and reproduction--and to determine times of year when these factors become most critical for these populations. Field work was conducted from July 10, 1987 to September 20, 1988.

DESCRIPTION OF STUDY AREAS

Ashland Study Area

Geography

The Ashland study area extended approximately 30 km south of Ashland, Montana, and comprised approximately 357 km^2. It was bordered to the north by Montana Highway 212, to the west by the Tongue River, O'Dell Creek, and Stocker Branch, and to the east by Otter Creek (Fig. 1). Elevations ranged from about 890 m along the Tongue River to 1265 m near the center of the area. O'Dell and Otter Creeks flow northwest into the Tongue River, which flows north. Most smaller streams flow in a generally east-west direction. Only the Tongue River and Otter Creek consistently contain flowing water. There were 15 to 20 small reservoirs and about 10 wells, which may provide water for deer, on the study area.

Geology

Surface geology of the study area consists of weakly consolidated sedimentary rocks of the Tongue River Member of the Fort Union Formation. Sandstone, shale, lignite, and porcelainite beds are present. These sedimentary rocks erode easily, forming cliffs, knobs, and pinnacles (Warren 1959).