United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

Research Note
PNW-439
February 1986

Use of Curlleaf Mountain-Mahogany by Mule Deer on a Transition Range

J. Edward Dealy, Paul J. Edgerton, and Wayne G. Williams

Abstract

Using the pellet-group sampling method, we concluded that migrating mule deer showed no preference in use between two ratios of curlleaf mountain-mahogany cover and openings on a northern California transition range. Where there is a need to develop forage openings in transition habitats dominated by dense thickets of curlleaf mountain-mahogany, manipulation of cover levels within the extremes tested in this study should provide sound management options.

Keywords: Wildlife habitat, deer (mule), curlleaf mountain-mahogany.

Introduction

Curlleaf mountain-mahogany *(Cercocarpus ledifolius* Nutt.) is a small hardwood tree that is valuable in the western United States as a forage and cover species for mule deer and other ungulates and as cover and nesting habitat for many smaller species of wildlife (Dealy 1971, 1975; Leckenby and others 1982; Thomas and Maser 1979). Land managers and biologists are interested in developing intensive management prescriptions to enhance the habitat value of plant communities where curlleaf mountain-mahogany is the primary overstory component. Many stands of curlleaf mountain-mahogany are too tall and dense to provide significant forage for mule deer. Land managers often consider the use of logging in large thickets to improve the balance of forage and cover but question the effect that reduced cover will have on use by deer.

The study reported here tested the hypothesis that on a winter migration route, habitat combining 30-m-wide cover and 30-m-wide cleared strips will be used at a different intensity by deer than habitat combining 91-m-wide cover and 30-m-wide cleared strips.

———————————————

J. EDWARD DEALY is principal research ecologist, Forestry Sciences Laboratory, P.O. Box 909, Juneau, Alaska 99802. PAUL J. EDGERTON is supervisory research wildlife biologist, Forestry Sciences Laboratory, 1133 N. Western Ave;, Wenatchee, Washington 98801. WAYNE G. WILLIAMS is range technician, Forestry and Range Sciences Laboratory, Route 2, Box 2315, La Grande, Oregon 97850.

Study Area and Methods

Study Area

The study area is located near Alturas, California, in the Devil's Garden District of the Modoc National Forest, on and around Mowitz Butte (fig. 1). Topography is slightly rolling with occasional low hills and lava outcroppings present. Elevation is approximately 1300 m. Vegetation is a mosaic of ponderosa pine *(Pinus ponderosa* Dougl. ex Loud.), western juniper *(Juniperus occidentalis* Hook.), and curlleaf mountain-mahogany in the overstory, and antelope bitterbrush *(Purshia tridentata* (Pursh) D.C.), big sagebrush *(Artemisia tridentata* Nutt.), serviceberry *(Amalanchier alnifolia* Nutt.), and green rabbit-brush *(Chrysothamnus viscidiflorus* (Hook.) Nutt.) in the shrub layer. Idaho fescue *(Festuca idahoensis* Elmer) is the primary grass species. Soils are primarily well-drained Turnquist loams of medium depth. There is some pumice influence in this area. Frequent basalt outcroppings occur throughout the study area.

The area provides important transitory range for the migratory herd of Devil's Garden mule deer. A few resident mule deer also use the area during the summer, but most use occurs in late autumn as deer migrate to lower elevation wintering areas and in the spring as they return to higher summer range (fig. 1).
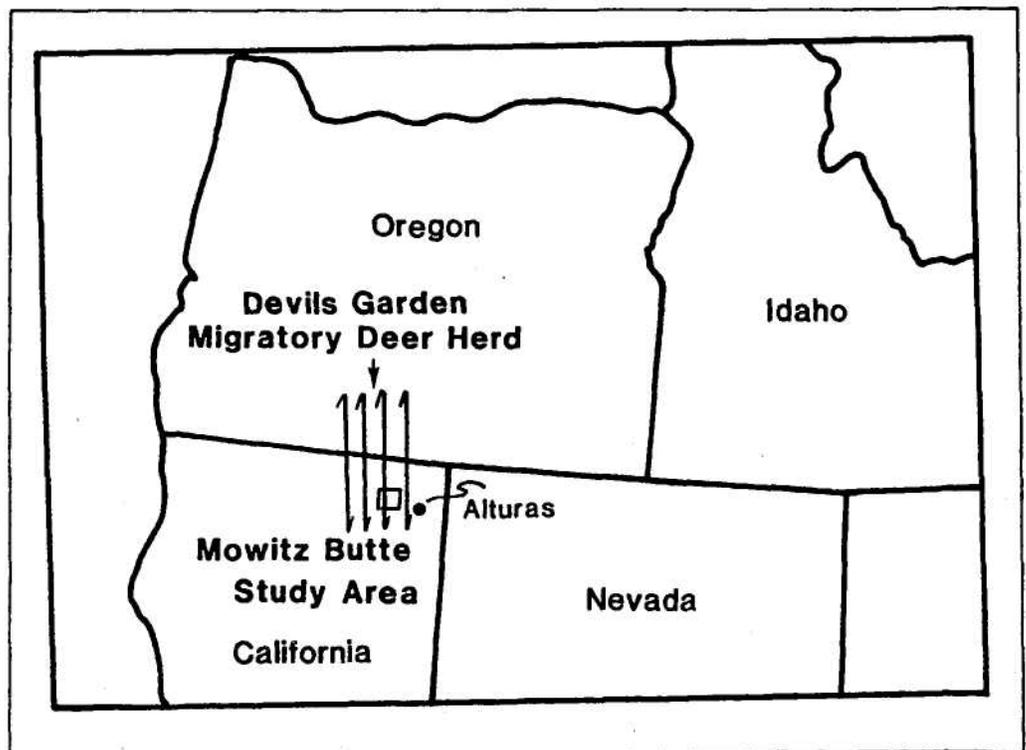

Figure 1.—Location of the Mowitz Butte study area and the migration route of the Devil's Garden deer herd.

Methods

The basic plot layout is a randomized block design, each block consisting of a 0.4- x 0.8-km rectangle. Five sites with the most abundant curlleaf mountain-mahogany were selected for the blocks. Tree crown closure averaged 55 percent and varied among blocks from 52 to 59 percent. Each block was separated into two 0.4- x 0.4-km treatment sites. Two treatments were imposed on each block: 30-m-wide cover strips, and 91-m-wide cover strips (fig. 2).

Treatments were installed in 1972 by clearing 30-m-wide strips of all tree cover every 30 m on one treatment and clearing 30-m-wide strips every 91 m on the other treatment. Selection of treatments for position in each block was done randomly.

Deer pellet groups were sampled to determine pretreatment and posttreatment differences and differences between treatments. On each 0.4- x 0.4-km treatment site, 20 transects were installed, each with 20 randomly placed 9-m^2 circular plots for a total of 400 plots per treatment per block. Pellet group data were combined for logged corridors and cover areas within each treatment in each block. Pellet groups were aged as plots were read, and only current year groups were counted and recorded. Deer pellet groups were sampled for 2 years before treatment and for 5 years afterwards.
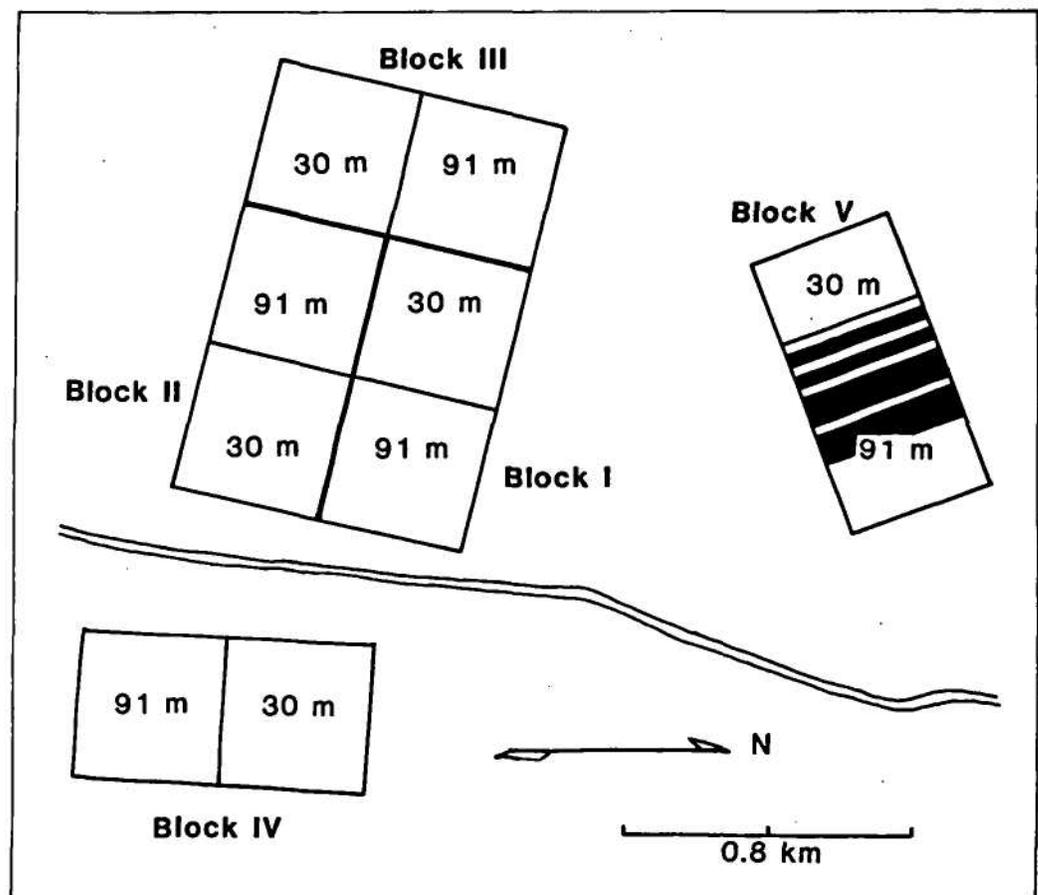

Figure 2.—Distribution of blocks and treatment locations in the study area.

Results

Before-treatment means for the 30- and 91-m leave strips were 16 and 15 pellet groups per transect, respectively. After-treatment means for 30- and 91-m leave strips were 14 and 15 per transect, respectively. The test showed no significant difference at a 95-percent confidence interval between treatments or between pretreatment and posttreatment periods.

Blocks 1 through 5 had mean numbers of pellet groups of 12, 19, 19, 19, and 6, respectively. The test for block differences was highly significant.

Discussion and Conclusions

There is controversy among researchers concerning whether or not pellet group distribution accurately represents animal distribution (see Neff 1968 for a review of literature). Collins and Urness (1981) did not get a good correlation between pellet group distribution and actual use of habitat subunits by deer. Their habitat subunits appeared to be limited to only a portion of the habitat needed for day-to-day living. Deer moving among subunits produced a disproportionate distribution of pellet groups in relation to actual use. Leckenby (1968) also found poor correlation between distribution of deer pellet groups and actual observed use of habitats. These habitats had similar characteristics to those of Collins and Urness (1981) in that deer needed more than one type of habitat to fulfill their requirements. Conversely, White (1960), working in western Montana, found good correlation between distribution of mule deer pellet groups and observed subhabitat use; Bennett and others (1940), sampling white-tailed deer pellet groups in several forest types of Pennsylvania, showed good agreement between pellet group distribution and population observations.

In our study we expected that deer would use two habitats of different cover-to-opening ratios at different intensities. The difference in our treatment areas, compared to those of Collins and Urness (1981) and Leckenby (1968), was that each of our areas contained portions of cover and openings representative of the entire migration route in that locale. There was, therefore, no apparent necessity for animals to move between treatments except to change ratios of cover and openings. Because there was no difference in numbers of pellet groups among the different ratios of cover and openings, and with the assumption that pellet group distribution was a true indicator of animal distribution, we concluded that deer showed no preference between treatments.

Where there is a need to develop forage openings in transition habitats dominated by dense thickets of currleaf mountain-mahogany, manipulation of cover levels within the extremes tested in this study should provide sound management options.

English Equivalents

1 meter (m) = 3.28 feet
1 square meter (m^2) = 10.764 square feet
1 kilometer (km) = 0.62 mile

Literature Cited

Bennett, Logan J.; English, P.F.; McCain, Randal. A study of deer populations by use of pellet group counts. Journal of Wildlife Management. 4(4): 398-403; **1940.**

Collins, William B.; Urness, Phillip. Habitat preferences of mule deer as rated by pellet-group distributions. Journal of Wildlife Management. 45(4): 969-972; **1981.**

Dealy, J. Edward. Habitat characteristics of the Silver Lake mule deer range. Res. Pap. PNW-125. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; **1971.** 99 **p.**

Dealy, J. Edward. Ecology of curlleaf mountain-mahogany in Oregon and adjacent areas. Corvallis, OR: Oregon State University; **1975.** 162 p. Ph.D. thesis.

Leckenby, Donavin A. Influences of plant communities on wintering mule deer. In: Western Proceedings, 48th annual conference, Western Association of State Game and Fish Commissioners; 1968 July 9-11; Reno NV. [Location of publisher unknown]: Western Association of State Game and Fish Commissioners; **1968;** 48: 201-208.

Leckenby, D.A.; Sheehy, D.P.; Nellis, C.H.; and others. Mule deer. In: Thomas, J.W.; Maser, C, eds. Wildlife habitats in managed range lands: the Great Basin of southeastern Oregon. Gen. Tech. Rep. PNW-139. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; **1982.** 40 p.

Neff, Don J. The pellet-group count technique for big game trends, census, and distribution: a review. Journal of Wildlife Management. 32(3): 597-614; **1968.**

Thomas, Jack Ward; Maser, Chris, eds. Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington. Agric. Handb. 553. Washington, DC: U. S. Department of Agriculture. **1979.** 512 p.

White, Keith L. Differential range use by mule deer in the spruce-fir zone. Northwest Science. 34(4): 118-126; **1960.**

do NOT detach label