FORAGE UTILIZATION BY CATTLE AND WHITE-TAILED DEER ON A NORTHERN IDAHO FOREST RANGE

A Thesis

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INTRODUCTION

Much of the low-elevation forest land of Northern Idaho is summer range for domestic livestock and year-long range for white-tailed deer, (Odocoileus virginianas ochrourus, Bailey). The majority of these forest lands have an understory dominated by shrubs. Good forage grasses are rather scarce except in small, localized areas. At the present time beef cattle are the most numerous domestic animals using the ranges. During the 1940's sheep were grazed, but the current poor market has curtailed this enterprise to a great extent.

Several factors combine to make cattle production in Northern Idaho different when compared to other operations in the southern part of the state. First and of greatest importance is that most of the cattle owners do not depend on cattle for the major part of their livelihood. They are either small wheat farmers or loggers who run a few cattle on the forest for the extra income the calves will bring in the fall. Since cattle production is only a sideline, these people do not and cannot afford to put much emphasis on any type of range management.

A second factor is the complexity of forest land ownership. Federal, state, and private lands are so intermixed that it is a difficult and expensive task to consolidate enough land into a single holding so a range

management plan can be inaugurated. Because of the involved land ownership pattern, fencing to control cattle distribution is almost impossible. Cattle trespass cannot be controlled and badly depleted private holdings are often found in the middle of federal or state lands on which some attempt is being made to improve grazing management.

Third, because of the abundance of shrubs in the understory of the forests the cattle are forced to utilize browse for the greater part of their food supply. When first released on the range they seek and use the palatable forage grasses that are present and subsequently subsist on browse and forbs for the remainder of the grazing season.

Several studies conducted in Northern Idaho have indicated that white-tailed deer subsist almost exclusively on browse, (DeNio, 1938; Pengelly, 1954; Basile, 1954; Roberts, 1956). The utilization of browse by cattle during the summer obviously decreases the available food supply of the white-tailed deer that remain on the area year long. Whether or not this utilization of browse by cattle is detrimental to the welfare of the white-tailed deer and has resulted in decreased vigor and production of the browse plants is unknown. It was with these points in mind that this study was initiated.

OBJECTIVES

1. To determine the food habits of cattle using the low-elevation forest ranges of Northern Idaho.

2. To determine the extent to which cattle utilize the browse species which are also important food items in the diet of white-tailed deer.

3. To determine if dual use by cattle and white-tailed deer has resulted in decreased vigor of the browse plants.

DESCRIPTION OF STUDY AREA

GENERAL DESCRIPTION

The study was carried out in the Hatter Creek Enclosure and adjacent University of Idaho and U. S. Forest Service lands. These areas are typical of much of the low-elevation forest grazing lands in Northern Idaho.

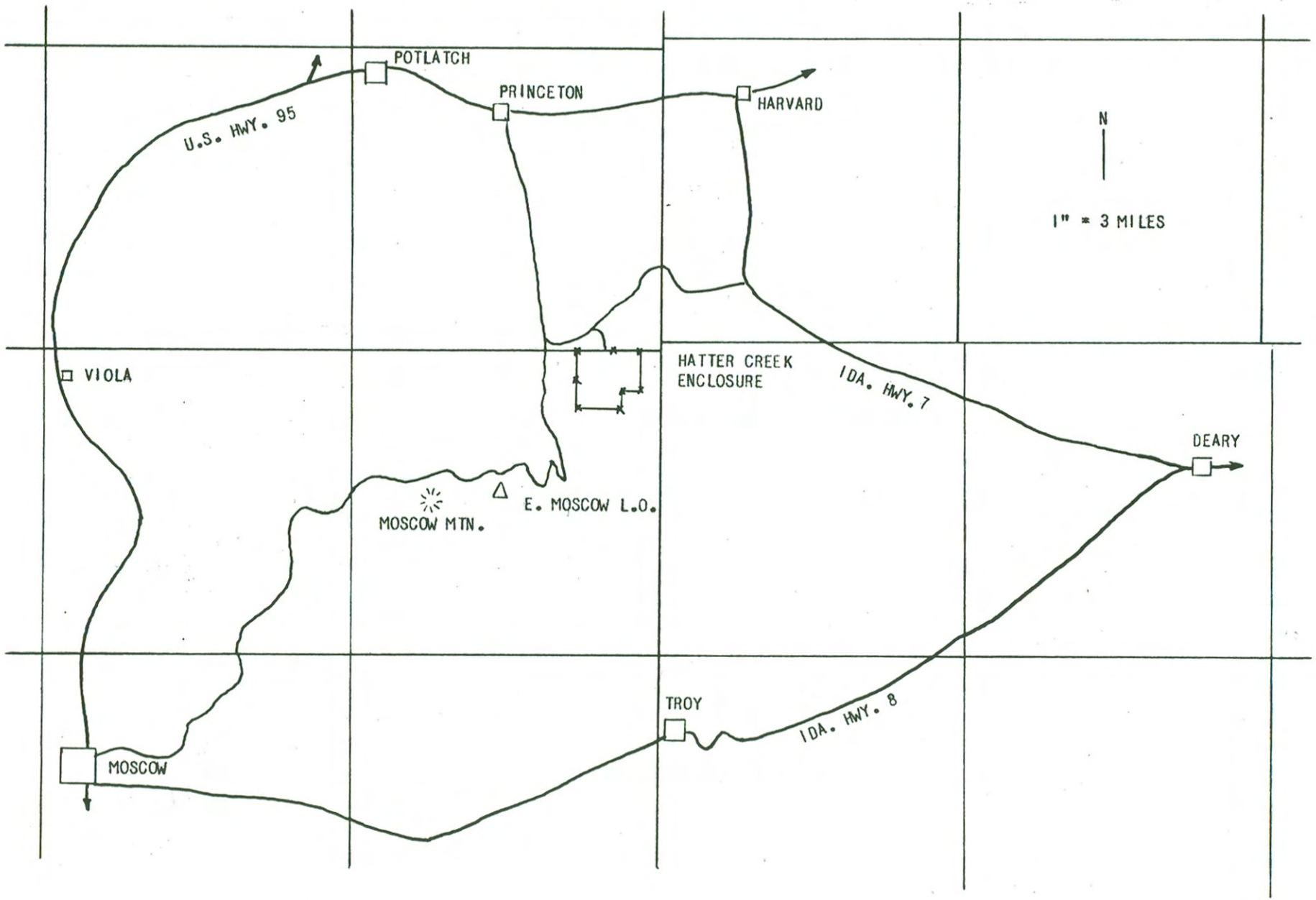
The enclosure has been protected from livestock grazing for eleven years (1949-1960) and presents a good example of vegetation protected from this influence. White-tailed deer are the major big-game animal in the enclosure. Since the fence was built in 1949, only eleven deer have been removed from the enclosure (Roberts, 1956) and it supports a healthy population of white-tailed deer.

The lands surrounding the enclosure are similar to it in vegetation, soils, and topography. They are rather heavily grazed by cattle from late spring to early fall. These lands are also white-tailed deer range throughout the year.

LOCATION AND SIZE

The study area is located on the north slope of Moscow Mountain in the Hatter Creek Block of the University of Idaho Experimental Forest (T40N and T41N, R4W). It is approximately thirty-two miles by road North and East of Moscow, in Latah County, Idaho (Map 1). Approximately 520 acres of forest land are included in the study area; 240 acres in the northeastern third of the Hatter Creek Enclosure and 280 acres outside of the enclosure and adjacent to the North and East sides.

Map 1. Generalized map showing the location of the study area.



TOPOGRAPHY

The general area of the study site is one of moderately steep foothills. Basalt Hill, the summit of an east-west ridge, rises to approximately 3,300 feet above sea level. The lowest point on the study area is about 2,500 feet. Drainage is northwesterly through intermittant streams which empty into Hatter Creek and eventually into the Palouse River at Princeton, Idaho. The steeper slopes are on the eastern half of the study area on the flanks of Basalt Hill. The western half is more or less undulating terrain with occasional flats.

ECOLOGICAL CLASSIFICATION

There are four vegetational associations present on the study area. All have been disturbed in the past by logging and fire and are presently in seral condition. Following the classification of Daubenmire (1952), these associations are: the Thuja plicata/Pachistima myrsinites; the Abies grandis/Pachistima myrsinites; the Pseudotsuga menziesii var. glauca/Physocarpus malvaceus; the Pinus ponderosa/Physocarpus malvaceus; and the Pinus ponderosa/Symphoricarpos rivularis.

The stream bottoms and steep north-facing slopes within the study area support the Thuja/Pachistima association, but, since these areas do not provide a large volume of forage, they were not sampled in this study.

The Abies/Pachistima association is found on flats and mesic north and east slopes with moderately deep loess soils. The dominant tree species is presently Pseudotsuga menziesii var. glauca. Pinus contorta var. latifolia and Abies grandis are other common members of the overstory.

Important shrubs are Amelanchier alnifolia, Symphoricarpos rivularis,

CONCLUSIONS

To decide if there is presently forage competition on the study area one must first define the word competition. If the utilization of the same plant by both deer and cattle is considered to be competitive, then a forage competition does exist. However, dual use of a range may also be considered more efficient use. This is especially true if one class of animal utilizes a forage species that is not used by another class of animal. On the study area, Physocarpus malvaceus and Holodiscus discolor fall into this category. These species are apparently much more palatable to cattle than white-tailed deer. Furthermore, utilization by cattle appears to stimulate the amount of palatable forage produced by the plants. This may also increase the use of these plants by white-tailed deer.

If the Physocarpus and Holodiscus are continuously subjected to heavy use, there will be a decline in their vigor. It does not appear that this point has as yet been reached for these species in the area used in this study. In fact, a greater amount of use on these two plants would probably be advantageous. Whether or not this could be accomplished without damaging other more palatable species such as Ceanothus is another problem.

From the economic standpoint there seems to be little competition. The livestock owners are presently grazing about as many cattle as they are allowed and it is doubtful if the removal of all the deer (if this were possible) would enable them to graze very many more.

It is also doubtful if the removal of all the cattle from the area would do much to increase the present white-tailed deer population. Although no exact figure on the present size of the white-tailed deer population is available, these animals are not scarce in the area. This is

especially noticeable during the winter months when the deer are much easier to observe. While there may be some influx of deer during the winter, the white-tailed deer is notably nonmigratory and may spend the greater part of his life within a short distance of the place he was born (Severinghaus and Cheatum, 1956). Therefore, it seems that summer and winter deer populations will be relatively the same. Signs of overpopulation such as general high lining of conifers, high winter mortality, etc., are not in evidence inside or outside the enclosure fence in the area used in this study. Thus, it must be concluded that at the present time white-tailed deer are numerous if not abundant in the area and that the presence of cattle during the summer has not as yet lowered the food supply of the deer to the point where it is inadequate for their winter survival.

RECOMMENDATIONS

A more flexible grazing management plan should be inaugurated on the University of Idaho Forest which will provide for improved range management in the area. Special attention should be given to establishing turn-on and turn-off dates that are based on the growth stage of the vegetation and not on the calendar. Salt grounds should be placed on ridges and not next to water. New salt grounds should be established in little used areas to improve cattle distribution.

The present study should be continued to obtain more conclusive information on the food habits of the cattle.

A clipping study should be initiated to determine the amount of forage being produced in the different cover types. The 3 by 16-foot plots already established could be used for this work. Randomly selected plots should be clipped at intervals during the summer. Such a study would give an indication of the effect of the cattle on forage production and provide a basis for determining the intensity of stocking for cattle.

Rumen samples from white-tailed deer should be collected during the summer months to provide a check on the food habits information obtained from utilization sampling.

SUMMARY

The low elevation forest lands of northern Idaho are grazed during the summer by cattle and year-long by white-tailed deer. These forests have an understory dominated by shrubs. Good forage grasses are scarce. Because of the scarcity of grasses the cattle utilize browse for the major part of their food supply. White-tailed deer have been found to subsist almost entirely on browse.

This study was initiated to determine: (1) the food habits of cattle using the forest ranges of Northern Idaho, (2) the browse species receiving use by both cattle and white-tailed deer and the extent of this use, (3) the effect of this dual use on the vigor of the browse plants.

The study was conducted in the northern third of the Hatter Creek Enclosure and on areas adjacent to the north and east sides of the enclosure. The enclosure is grazed only by white-tailed deer. The areas outside the enclosure are grazed by cattle from May 15 to October 15, and by white-tailed deer year-long.

The composition of the vegetation on the study area was sampled at fifty randomly located sites. Twenty-five of these sites are outside the Hatter Creek Enclosure where the understory is utilized by cattle and white-tailed deer. The other twenty-five are inside the enclosure where the only use is by white-tailed deer. The information from the composition sampling was used to determine the ecological classification of the sampling sites and to provide an indication of the relative abundance of the forage species.

Utilization of the forage was sampled on 200, 3 by 16-foot rectangular

plots arranged in blocks of four on the sites used to sample composition. On each plot, all browsed current annual stems were counted and the percentage utilization of each species was estimated. These measurements were carried out three times during the 1959 grazing season.

Stem length measurements were made on seven important browse species to determine: (1) if a quantitative method of measuring browse utilization could be developed from a random sample of the lengths of unbrowsed and browsed current annual stems, (2) the time of greatest stem growth, and (3) to obtain a measure of vigor. These measurements were carried out on the utilization sampling plots and inside small control subexclosures which are completely protected from ruminant grazing.

The vegetational associations producing the majority of the browse forage on the study area are the Abies/Pachistima and the Pseudotsuga/Physocarpus. The Pinus/Symphoricarpos association occurs on only a small part of the study area and has an understory dominated by grasses. The Thuja/Pachistima association has limited understory and provides very little forage of any type. Only the first three associations mentioned above were sampled in this study. All are in seral stages of succession because of past logging.

Browse species utilized by cattle in order of importance were: Symphoricarpos rivularis, Spiraea betulifolia, Physocarpus malvaceus, Rosa spp., Amelanchier alnifolia, Holodiscus discolor, Ceanothus sanguineus, and Lonicera utahensis.

For white-tailed deer the important browse species were: Symphoricarpos rivularis, Ceanothus sanguineus, Rosa spp., Spiraea betulifolia, Physocarpus malvaceus, Vaccinium membranaceum, Amelanchier alnifolia, Philadelphus

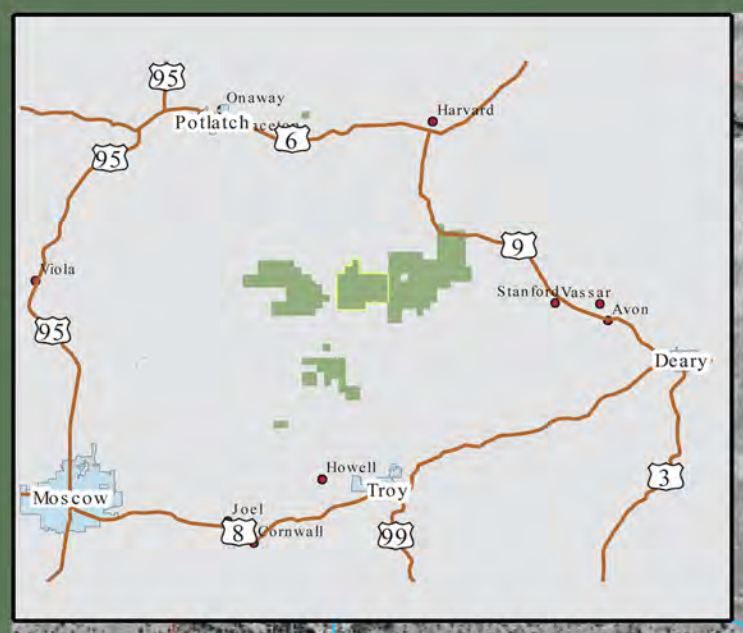
lewisii, Holodiscus discolor.

The results of the stem length measurements showed the time of greatest growth was during the months of April and May. Growth after June 15, 1959, was not significant.

It was found to be impossible to develop a quantitative method of measuring browse utilization using the difference in mean lengths of unbrowsed and browsed current annual stems. In most instances the mean length of the browsed stems was greater than that of the unbrowsed stems. This may be due to: (1) the smaller size of the sample of browsed stems, (2) an unconscious bias on the part of the observer in selecting browsed stems, and (3) a preferential selection of longer stems by the deer and cattle.

No significant difference was found between the mean stem lengths of the browse species measured in the two treatment areas. This may indicate that as yet, there has been no decline in the vigor of these species from dual use by cattle and deer. Heavy use on some of the less palatable browse species by cattle has resulted in increased "sucker shoot" growth which has increased the palatability of these plants for both deer and cattle.

Utilization of forbs and grasses was found to be much more intensive by cattle than by white-tailed deer. The only use recorded on coniferous reproduction was in the deer-only treatment area. This use was so slight that it can be considered insignificant.



Bennett Lumber Products

UI Experimental Forest Administrative Map 2004

- Running Surface Water
- Railroad Grade
- Forest Gravel Road
- County Paved Road
- County Gravel Road
- County Dirt Road
- State Road
- Public Land Survey System
- Forest Gates
- CB Mile Markers
- Cattleguards
- Fire Ponds
- Bennett Lumber Products
- Potlatch Corporation
- City of Troy Forest

Hatter Creek Road

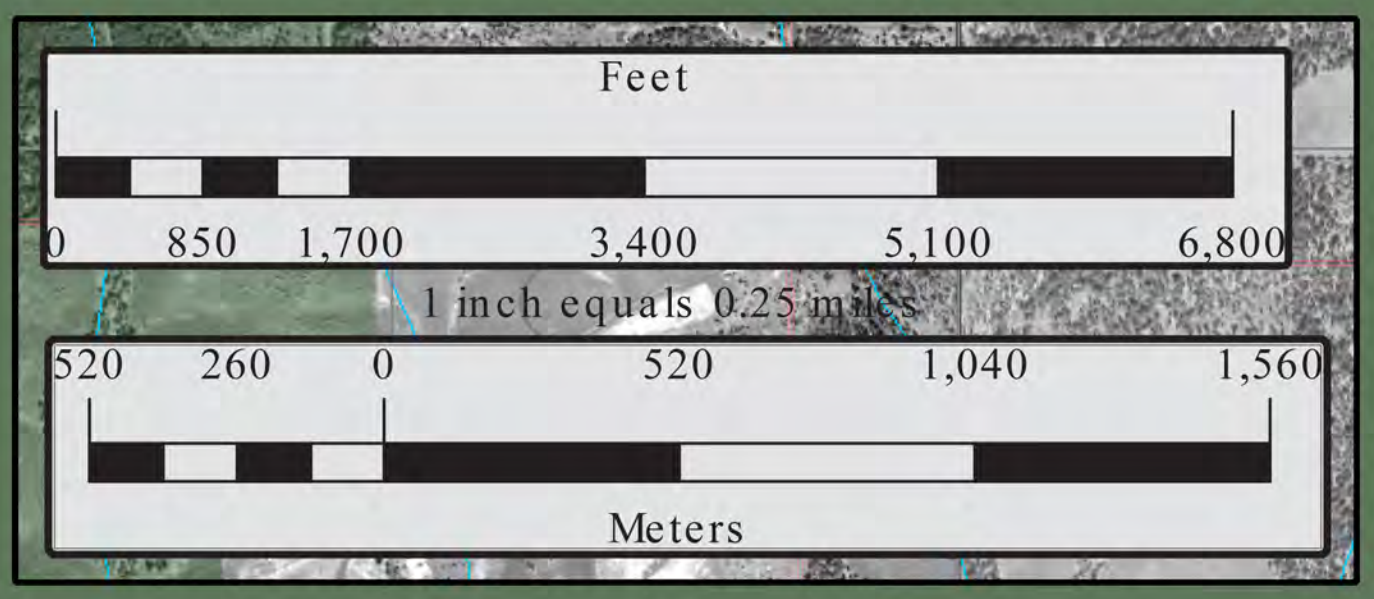
East Hatter Creek

40N04W02

40N04W01

40N04W11

40N04W12



East Hatter Creek

Location of Complete Research:

Author & Title: Thilenius, John Fredrick
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University of Idaho Library:

Call Number- SD427.G8T45

College of Natural Resources:

Department- Wildlife

Other Sources: