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DEPARTMENT of FISH & GAME

SONAL HABITAT USE BY WHITE-TAILED DEER
IN THE HATTER CREEK ENCLOSURE
Project W 131-R-1
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Idaho Fish and Game Department
Federal Aid to Wildlife Restoration

SEASONAL HABITAT USE BY WHITE-TAILED DEER IN THE HATTER CREEK ENCLOSURE

by

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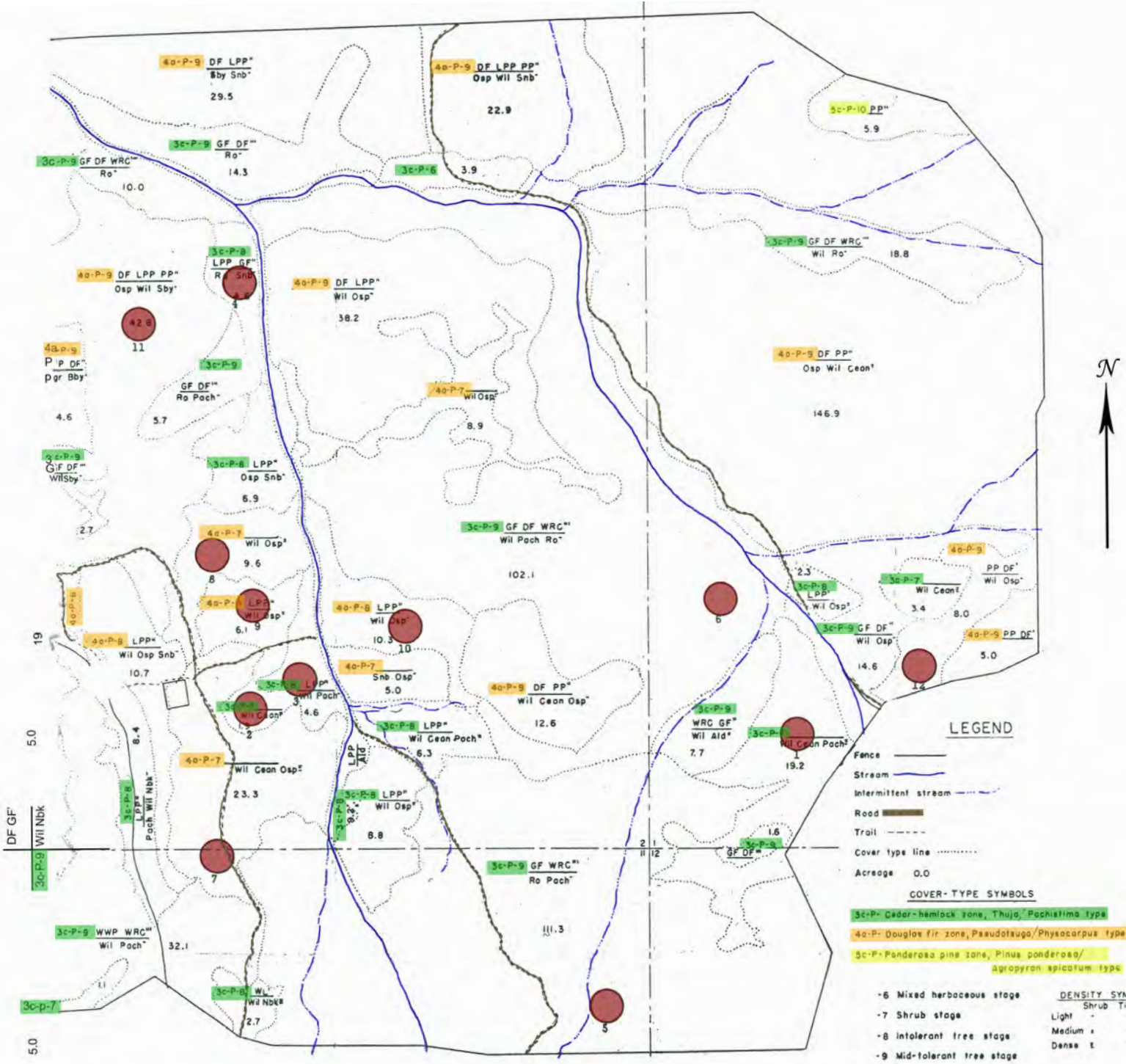

COVER-TYPE MAP

HATTER CREEK ENCLOSURE

UNIVERSITY OF IDAHO EXPERIMENTAL FOREST,

LATAH COUNTY

T40N R4W

1 inch = 430 feet

May 8, 1954

J. V. BASILE

Figure 1. Locations of twelve study sites used in white-tailed deer habitat use research. H. Shaw, 1962.

Study site location

SEASONAL HABITAT USE BY WHITE-TAILED DEER IN THE HATTER CREEK ENCLOSURE

INTRODUCTION

In northern Idaho, as in other portions of the United States, research on white-tailed deer (Odocoileus virginianus ochrourus Bailey)[1] has dealt largely with food habits and food availability. Basile (1954) studied the effects of snow on browse availability in the University of Idaho's Hatter Creek deer enclosure. Marsh (1954) studied the effects of silvicultural thinnings on browse production in this area, and Roberts (1956) studied the seasonal food habits of deer in five major cover types occurring in the exclosure.

These studies have provided information upon which management of woodland habitat for production of deer forage can be based. In general, they have emphasized the importance of shrub and early tree seral stages in producing browse for white-tailed deer. They do not, however, yield insight into another aspect of deer behavior which may be important in the management of deer habitat: the choice of habitat, or cover, by deer in response to factors of the environment other than food.

Deep snow has long been recognized as a major influence on winter movements of deer on northern ranges. Severinghaus (1947) and Webb (1948) both noted that deer moved to dense stands of conifers during times when snow was deep, regardless of the lack of available forage in these areas. Pengelly (1961) has shown that white-tailed deer were forced to yarding areas along streams by deep snow in northern Idaho. In the Hatter Creek enclosure, snow does not generally accumulate to as great a depth as it does further north or at high elevations. Needs for wintering habitat in such areas are not clearly understood.

Other influences, such as temperature, wind, and rain, on deer movements are more subtle than that of snow. Gerstell (1937) gave data concerning the effect of cold on deer condition. He found deer living at temperatures below 30 degrees Fahrenheit lost weight at an average rate of three to twelve pounds per week. Severinghaus' study (op. cit.) under natural field conditions, did not support Gerstell's findings. He found deer to be oblivious to all but the most extreme temperatures, moving only in response to food or heavy snow.

In a study of cover choice by penned deer, Robinson (1960) found their animals kept in an open cover type through the winter maintained their condition as well as those in a dense of stand of timber. He attributed this to the fact that, even in open areas, deer were capable of selecting sites with favorable micro-climates. He also proposed that all but the lowest temperatures occurring within the range of white-tailed deer were within the physiological range of thermal neutrality for the species. This was partly corroborated by the results of Silver and her collaborators (1959) in a study of the basal metabolism of deer. They found no significant change in metabolism rate at temperatures ranging from approximately 19 degrees Fahrenheit to 68 degrees Fahrenheit.

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[1] Scientific names for animals discussed in this thesis are taken from Miller & Kellogg, 1955.

Evidence to date indicates that temperature alone does not seriously influence distribution of deer populations. This will probably have to be verified by controlled experiments. Nonetheless, field studies of deer population dispersal in relationship to temperature will serve as aids to wildlife managers until adequate experimentation is possible.

Studies on other mammals and birds have indicated that certain aspects of habitat choice are innate and do not necessarily involve those factors that the wildlife manager considers to be limiting. This would indicate a degree of uniformity of cover selection during any one season over the years. Harris (1952) has shown that habitat selection in deer mice (Pexomyscus maniculatus) varies even at the sub-specific level. This present study was not an attempt to make a comparative analysis of seasonal habitats of the various races of white-tailed deer, but involved cataloging facts concerning habitat selection which will add to the present knowledge within the field of comparative ethology.

OBJECTIVES

1. To investigate intensity and form of habitat use by white-tailed deer in six major cover types in the Hatter Creek deer enclosure.

2. To gain insight into the relative effects of climatic factors and food availability on movements of deer populations.

THE STUDY AREA

The Hatter Creek enclosure is located approximately six miles south of Princeton, Latah County, Idaho, in the northern foothills of the Thatuna Mountain range. Its 800 acres are surrounded by a nine-foot deer- and cattle-proof fence. Basile (op. cit.) cover-mapped the area in detail. Using Daubenmire's (1952) classification, he recognized three major vegetation associations in the enclosure: the Pinus ponderosa/Agropyron spicatum[1], the Pseudotsuga menziesii/Physocarpus malvaceus, and the Thuya plicata/Pachistima myrsinites. Thilenius (1960) further classified the northern portion of the area and included two more associations: the Abies grandis/Pachistima myrsinites and the Pinus ponderosa/Symphoricarpos rivularis. Basile used Hungerford's (1951) adaptation of Graham's (1945) cover-type classification in delineating seral stages present in the area. He found the three major associations to be represented by stages ranging from mixed herbaceous to mid-tolerant tree.

The Pinus ponderosa and Abies grandis associations cover only small areas within the enclosure and will not be considered in this study. The Pseudotsuga/Physocarpus association occupies the southern and western exposures and drier sites within the area. The Thuya/Pachistima association occurs on the northern and eastern exposures. These associations are by far the most important in the enclosure, covering approximately 790 of the 800 acres. They alone will be considered in this study.

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[1]Scientific names of plants used in this paper are according to Davis (1952).

THE STUDY PERIOD

The study was initiated in September, 1960, and ended approximately June 31, 1962. It covers two entire autumns, winters, and springs, and one entire summer.

The two winters had sharply contrasting weather. The first (1960-1961) was relatively warm for the region and was devoid of heavy snowfall. The second was quite cold, with a greater than average snowfall. Climatological information, as taken from records from the weather station at Potlatch, Idaho (U.S. Department of Commerce, 1960, 1961, 1962), is summarized in Figures 2, 3, and 4. These probably represent somewhat lower actual precipitation and higher temperatures than occur in the study area.

METHODS

STUDY SITES

Twelve sites were selected within the enclosure for detailed investigation of deer use. Two of these were located in each of six major cover types. Cover types sampled included the shrub, intolerant tree, and mid-tolerant tree stages of the Pseudotsuga/Physocarpos and Thuya/Pachistima zones. Measurements made on these sites were supplemented by frequent observation of other areas in the enclosure.

Locations of the study sites were selected randomly within each cover type (Figure 1). The sites were circular in shape with a diameter of 166 feet. Within each site were 32 100-square-foot circular plots. Four plots were located on each of eight evenly-spaced radial lines (Figure 5). The center of the first plot on each line was placed 17 feet from the center of the site. The remaining plots were spaced evenly at 21-foot intervals. The declination from north of the first line to be placed on each site was taken from a table of random numbers. The remaining seven lines were spaced at 45-degree angles around the center.

Two measurements were used in describing the sites. Presence of aerial portions of shrub and tree species on or above the 100-square-foot plots were recorded as a measure of composition. From these data, the per cent of plots holding plant species tallied was calculated for each site, yielding a measurement of shoot frequency as defined by Greig-Smith (1956, p. 10). Only the four most abundant shrub species and four most important tree species were used to characterize the sites reported in the text of this thesis (Tables I and II). Frequencies of all plants recorded on the sites are given in the appendix.

Shoot frequency adequately describes the relative abundance of plants, but does not indicate the availability of browse species to deer. This study emphasized use at the cover type level. Thus, no attempt was made to take detailed measurements of availability.

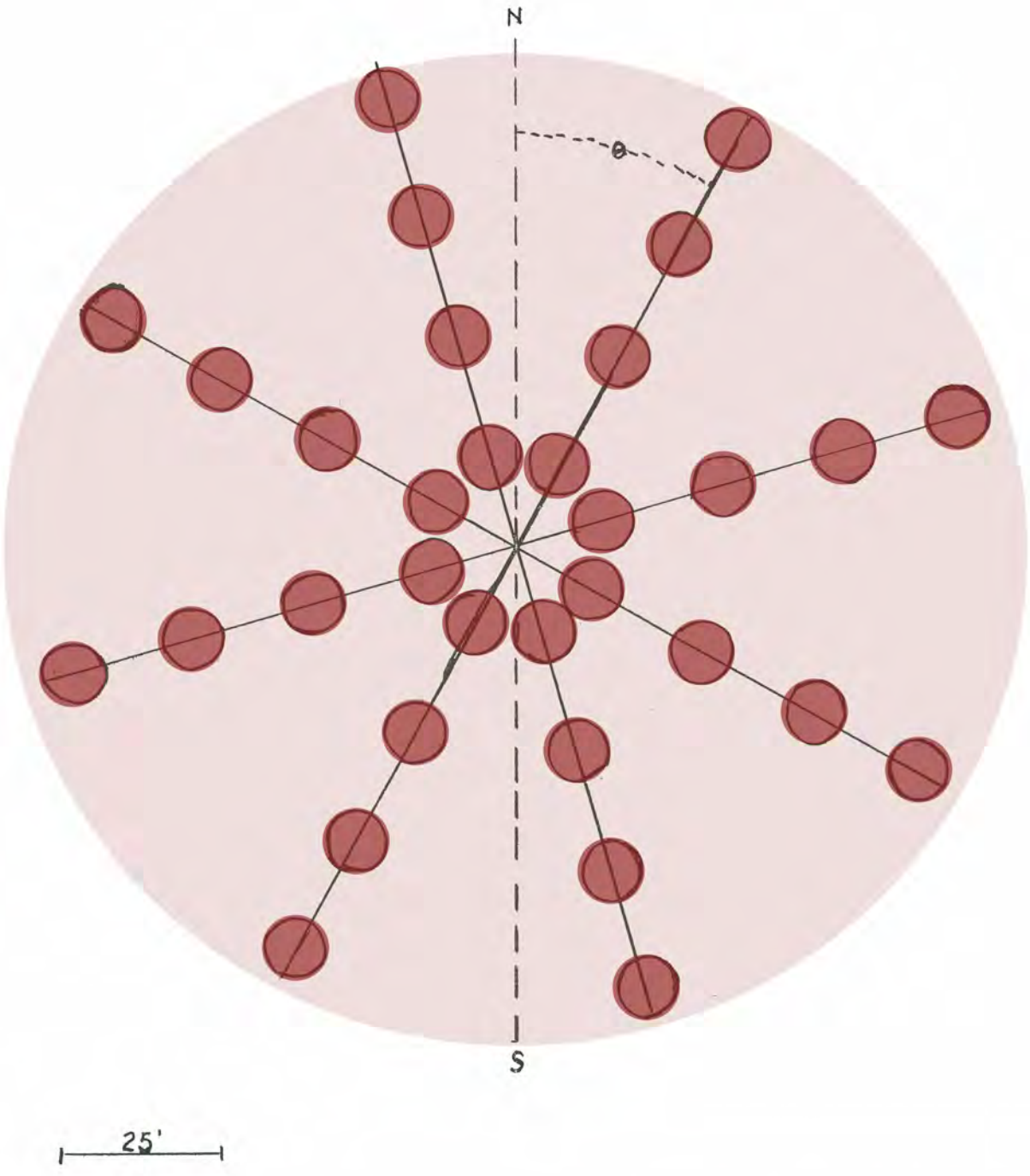


Figure 5. Diagram of study sites. The center of each site was selected randomly within each cover type. Declination from north (a) of the first line on each site was taken from a table of random numbers. Circles represent 100-square-foot plots.

A second measure was that of concealment value of cover occurring on each site. A modification of the coverboard technique developed by Wight (1938) was used for these measurements. In estimating cover values, I stood at the center of the site while an assistant held a 1" X 4" x 9' board at the center stake of each small plot (Figure 6). Data were recorded as per cent of board covered at each of four levels marked on the board: zero to two feet, two to four feet, four to six feet, and six to eight feet. Data from all plots on a site were then averaged for each level. Cover-board measurements were made during August, 1961, while the plants were in full foliage, and in late November and early December, 1961, after leaves of deciduous species had dropped (Tables III and IV).

PELLET-GROUP COUNTS

Attempts at direct observation of deer were made without success, hence an indirect method of measuring relative use of cover was needed. Rogers et al (1958) used pellet-group counts as a measure of relative deer use on several fenced pastures in Colorado. Welch (1960) used the method to study seasonal deer distribution in Arizona. This seemed to be the only available method for measuring relative use of cover types at all seasons of the year.

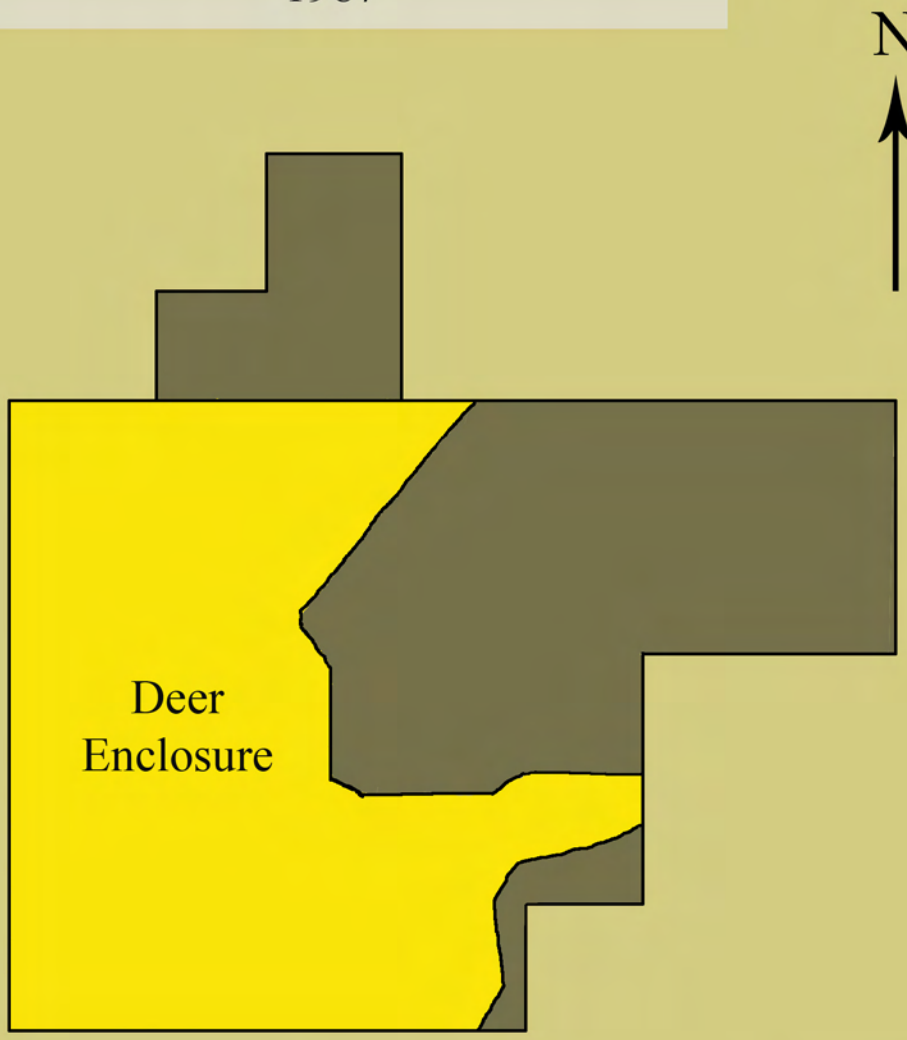
Hart (1955) in evaluating the pellet-group count on grassy sites in South Dakota found few groups missed on plots as small as 100 square feet. For this reason, error due to pellet groups not counted, even in dense vegetation, was considered small in this study.

Several estimates of daily defecation rates of deer are available for use in census (Bennett, et al, 1940; Rogers, et al, op. cit.), but no research has been done on the distribution of pellet deposition through the day. Validity of the pellet-group count as a measure of relative use of an area as small as the Hatter Creek unit is based upon an assumption that deer defecate uniformly throughout their daily activities. Correspondence from individuals having experience with penned deer has thrown doubt upon the validity of this assumption.

Dr. Robert L. Cowan (1961) of Pennsylvania State University has noted that pellet groups accumulate near feeding trays and watering devices in his experimental deer pens. Harold D. Bissell (1962) of the California Department of Fish and Game found that mule deer (Odocoileus hemionus) used in a pen-feeding study defecated mostly during the hours between six p.m. and eight a.m.

At Hatter Creek, where deer can easily pass through all cover types in a single day, and where deer may use different cover types for different purposes, differential rates of deposition may affect the value of the counts as indices of relative use. Research on defecation patterns of deer under experimental conditions is needed before pellet-group counts can be applied to studies of habitat use.

East Hatter Creek Unit Map
1987



University of Idaho Experimental Forest

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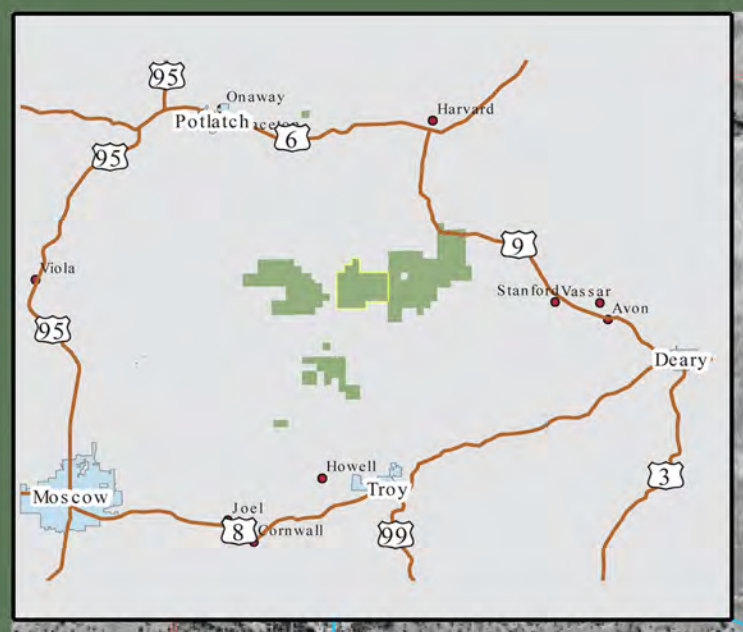

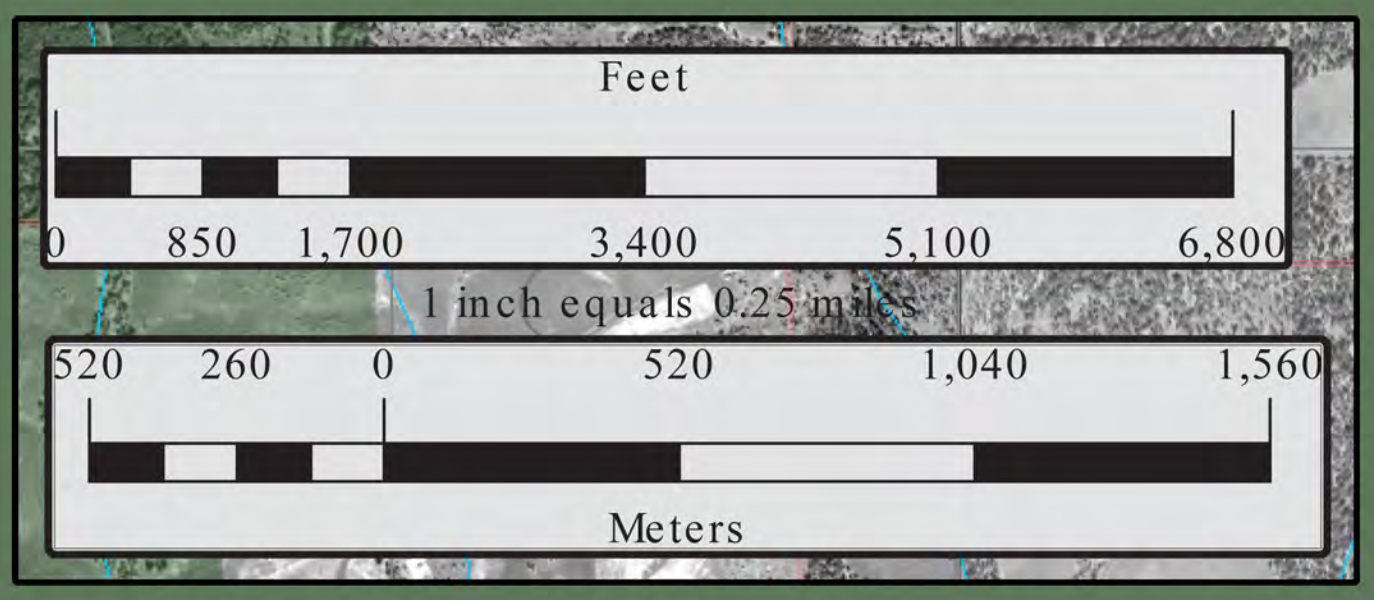

East Hatter Creek

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