

## DEER HABITAT INVESTIGATIONS ON THE HUMBOLDT NATIONAL FOREST

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Basic information about the range resource and the animals that use this resource is essential if we are to manage the habitat properly. This paper will help bring you up to date on the approach we are taking in deer (Odocoileus hemionus hemionus) habitat investigations on the Humboldt National Forest.

The Humboldt National Forest plays a vital role in deer management in the State of Nevada. Included within the forest's 2,679,000 acres is a large per cent of the better deer summer range in the state. A wide range of habitat conditions exists within this complex. The most productive areas are found in the north on the Ruby and Humboldt Divisions. The forage here is comparatively lush, and is represented by a wide assortment of forb and browse species.

The other divisions are located in the north-central and east-central parts of Nevada. These areas are predominantly drier types with less abundant and less varied deer forage. Deer populations generally are more sparse on these divisions.

Deer winter habitat also is considered important on forest lands. Many areas are utilized quite extensively. The bulk of the area on the Humboldt is summer range, and this is the significant contribution to deer management with which this paper is concerned.

A composite of information gathered to date has given us a better understanding of deer habitat requirements. The study of pioneer diaries, miscellaneous publications, forest history, early photographs, and interviews with early residents has been of particular value in providing a background on past vegetal composition, impact, trend and deer occurrence.

### HISTORICAL BACKGROUND

The pristine range appearance of northern and eastern Nevada was considerably different than it is today. All available information in-

dicates that at the time of settlement perennial grasses composed a major portion of the vegetal composition on the higher summer ranges. Interspersed with the grasses was a variety of palatable forb and browse species. At the lower elevations, adjacent to the valleys, oftentimes the composition consisted of a rather sparse cover of sagebrush (Artemisia tridentata) beneath which was a rich stand of perennial grasses and forbs. Juniper (Juniperus osteosperma) where it occurred, was less abundant than today. Primarily, it was confined to the higher ridges and steeper rocky slopes. According to the statements of early residents, the perennial grass aspect predominated for some time following settlement.

Presumably, because the original vegetal cover was predominantly grasses, the ranges were not conducive to supporting large deer populations. Although documented information is fragmentary; nonetheless, it indicates that deer numbers were low prior to settlement.

Following settlement, and up through the 1890's, deer populations were apparently low. Mr. Frank Gedney of Ruby Valley and Mr. Robert Steele of Clover Valley told acquaintances that deer were seldom seen in the Ruby Mountains during this period. Similar statements are attributed to early residents in other areas that are now part of the Humboldt National Forest.

With the introduction of livestock in the 1860's the ecology of the ranges underwent a change. This change was slow at first but gathered momentum as settlers increased their cattle herds. This impact was relieved temporarily following the hard winter of 1889-1890 in which large numbers of cattle perished.

The 1890's ushered in the era of the large sheep operations. These operations were small initially and few in number, but expanded rapidly as they encroached on what was formerly cattle range. By 1905, sheep numbers were estimated to be in excess of 750,000 ewes in the area which is now the Humboldt National Forest. Lands in the Humboldt Division alone were being grazed by two-thirds of this total. In addition to this tremendous number of sheep, both cattle and wild horses had increased to large numbers also and were putting an additional burden on the range.

The ranges were heavily overgrazed by the turn of the century; and as a result, there was widespread depletion. Nearly 40 years of unrestricted grazing with corresponding heavy competition for forage had reduced carrying capacities tremendously. The more popular grazing areas had been virtually reduced to dust beds, while the country had a generally denuded appearance each fall. Alarmed at the widespread damage that had been done to the higher summer ranges, the majority of the cattle ranchers and some sheepmen were agreed that some type of management was a necessity. Without it, ultimately they would be forced to go out of business.

The aftermath of this widespread public feeling was the establishment of Forest Reserves. Between 1906 and 1911 lands now comprising the Humboldt National Forest were placed under custodial management, and for the first time an effort was made to adjust livestock numbers to the carrying capacity of the range.

A great deal of progress has been made over the years. Management practices such as stocking adjustments, conversion of use, and virtual elimination of wild horses materially reduced the impact on the range. Fire suppression encouraged vegetal recovery also.

Little improvement in range conditions could be seen during the formative years of Forest Service management. However, in time it was apparent that an increase in the vegetal cover was taking place. Through improved management, browse species were recovering, forbs were taking hold at the expense of grasses that had been thinned out, and the less desirable browse species were filling in over large areas previously occupied by grass species.

Probably the most striking vegetal change was the widespread increases in sagebrush. This plant, once described as being scattered in occurrence, took over large areas on the forest which were once grass types. Rabbitbrush (Chrysothamnus viscidiflorus) too increased; but its occurrence was more limited and localized in nature. (Photographs to be shown at the conclusion of this discussion will illustrate the foregoing statements.)

The publishing of Senate Document 199 (U.S. Forest Service, 1936) pointedly brought out the heavy loss of livestock carrying capacities resulting from overgrazing. This thorough analysis of man's use of the western range lands estimated that carrying capacities in northern Nevada were 71 per cent less in 1935 than in pioneer times. Furthermore, the perennial grass cover on sagebrush lands in central Nevada was estimated to be only 10 per cent and in northern Nevada only 24 per cent as thick as formerly.

A composite of information indicates that deer numbers were at their lowest point from about 1900-1910. This coincides with deer population levels in other western states during the same period. Their scarcity is attested to by the fact that tracks were a subject of conversation during these times, and for about a decade thereafter. Early residents have told me that the only way one stood a chance of bagging a deer was to wait for snow, find a set of tracks, and stay on them.

During the 1920's deer population levels were still very low. To illustrate, the Ruby Division, which today summers many thousands of deer, was estimated to be carrying a total population of 50 animals in 1921. All other divisions on the forest were similarly reporting very low numbers at this time.

Perhaps the best description of the habitat and the deer on the Humboldt Forest during the 1920's is contained in the Borell-Ellis (1934) report on Mammals of the Ruby Mountain Region of the Northeastern Nevada. After a three-year study between 1927-29, they wrote as follows:

"Deer ranged throughout the Ruby Mountains, but were nowhere numerous. Their numbers were undoubtedly kept down by lack of sufficient cover and forage plants of the required type. The area probably never supported ideal vegetation for deer. Heavy grazing by sheep and cattle has greatly reduced the already insufficient forage crop. Improved grazing regulations now in force by the United States Forest Service will help to restore the former conditions and may result in an increase in the number of deer."

It is common knowledge that deer increases first became noticeable during the later 1930's. These increases accelerated during the late 1930's and early 1940's, especially on the Santa Rosa, Snake, Schell, and White Pine Divisions. Based primarily on hunter success, it appears that on a forest-wide basis numbers peaked sometime during the 1950's and have since tapered off.

#### SUMMARY AND CONCLUSIONS

The various reasons responsible for deer increases on the forest will always be a matter of conjecture. However, from a habitat standpoint, let us pursue the chain of events in light of recent findings.

In Bulletin No. 36, Survey of Fish and Game Problems in Nevada, Leopold (1959) brought out for the first time, on a state-wide basis, the importance of summer ranges in deer management. Briefly, he had the following to say:

"In each area, the summer density of deer seems to be correlated roughly with the quality and variety of local forage. Deer investigators (including this author) have often said the population levels of migratory deer are determined primarily by the carrying capacities of winter ranges. This often is true, but in arid and semi-arid regions the quality of summer forage may strongly influence deer welfare. Deer well fed in summer probably mean healthier fawns, and animals of all ages go to the winter ranges in better shape. Thus in sizing up deer management in Nevada, it would be wise to consider the condition of both summer and winter ranges."

Leopold's suspicions were substantiated with publication of a cooperative study in Utah (Julander et al. 1961)

After studying two strikingly different summer ranges these workers concluded that the wide differences found in productivity were the direct result of summer range conditions. Does on the better Sublett range showed a fetal rate of 1.85. By fall this range still had an adequate supply of good forage. In contrast, carrying capacities were found to be low on the Antimony range. By the latter part of August the forage had been heavily utilized, forcing deer to subsist on less desirable species. The fetal count per doe was found to be 1.19.

Further evidence of productivity differences between the two areas were shown by fawn counts. A post season sample taken on the Sublett showed a fawn-doe ratio of 122:100. Pre-season counts on the Antimony showed 51:100. Fawn mortality from time of conception to late summer or fall also appeared to be greater on the Antimony.

The importance of sagebrush in deer management has been a subject of considerable discussion in recent years. Leach (1956) was the first to point out the value of sagebrush after analyzing stomach samples taken from animals on the Lassen-Washoe area as well as other areas in California. Julander (1962) called sagebrush the bread and butter plant on Utah winter ranges.

Based solely on observations, it is my belief that on all wintering areas of the Humboldt National Forest sagebrush must be considered the bread and butter plant. It is quite apparent that its widespread increase was instrumental in promoting the deer build-up and without it the carrying capacities of our winter ranges would be extremely low.

In view of all data studied to date, it is my considered opinion that the major factor behind the deer build-up was a higher nutritional level brought about by substantial increases in the more desirable summer forage. Through plant succession induced by livestock use the vegetal cover was largely changed to a forb-browse type. In time, these choice feeds were made more available to deer as a result of livestock adjustments and deer numbers built up accordingly.

The forest's primary function in deer management is that of providing summer habitat. Realizing its importance, we on the Humboldt have placed emphasis on summer range studies in carrying out our big game range analysis work. First, key areas were designated on the basis of ranger districts. These areas were selected as representative of the most important areas occupied by deer during the summer months. They are points of concentration or where dual use by deer and livestock is resulting in more than moderate utilization of the more important deer forage.

Production, utilization, impact, and trend are being determined on these key areas by means of various studies. They include site analysis transects, pellet group-chip count transects, soil disturbance

transects, and photo transects. It is believed the photo transects will be of particular value since they were set up to evaluate changes in individual plants, and ground cover as well as over-all changes. Future plans call for the construction of exclosures where practical.

Key area studies are invaluable in determining current deer habitat conditions. Through an understanding of what is taking place on important use areas, the land manager is better equipped to recognize practices harmful to deer habitat and other resource values. With this information available, he is in a position to make a wise choice when confronted with multiple use management decisions involving good land use.

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