DEER-RANGE RESEARCH IN NEVADA

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Heavy past and anticipated future use of Nevada's big-game herds and ranges suggests the need for a pool of information upon which to base management decisions. The Nevada Fish & Game Commission has the responsibility of managing resident deer. The Bureau of Land Management manages the ranges that support an estimated 66% of Nevada's wildlife including 65% of the deer.

Most range users recognize the fact that big game or wildlife in general should receive a reasonable share of the annual forage production on public range lands. The degree of competition between livestock and big game populations is not generally known. Nor do we know the extent to which deer herds use available forage. Other questions are: how many deer can graze a certain habitat-type or species without doing damage? What is the relative condition of deer moving onto and coming off key winter or summer range areas? What are the best methods for making such determinations?

These and other questions have been plaguing both agencies. Recognizing the need for a fact finding program, representatives from both agencies approached the range management section of the Max C. Fleischmann College of Agriculture and requested that a cooperative research project be designed to attempt to find answers to some of these questions. As a result a cooperative research project was developed and entitled "The evaluation and management of big game habitats in Nevada". It will be my purpose today to, in a general way, discuss our methodology and some of our initial results.

Work began July 1, 1964 on the following objectives:

1. To evaluate the potential forage production, range condition and trend for selected big-game ranges throughout the state. We hope to be able to develop better methods and procedures use for a good resource inventory.

2. To determine the degree of dual use and competition with livestock on key areas. This will be useful for the determination of the equitable allocation or distribution of grazing to wildlife and livestock.

3. To determine characteristics of deer feed - palatability, nutrition, species preference, etc. To ascertain the relative plane of nutrition available on a given range unit.

4. To document herd health in relation to range condition by testing criteria that might be useful for relating the condition of the animal to that of the range.

5. To determine the influence that certain range improvement practices (spraying, seeding, fencing, water developments, etc.) have on the welfare of the big-game resource.

6. To consider certain methodology problems inherent in the evaluations made as a part of the previous objectives. Attempts will be made to evaluate the relative efficiency of field study methods that could be adapted for resource evaluation to be made by field technicians of the Nevada Fish & Game Commission and the Bureau of Land Management.

As the project developed we initiated analysis on 8 important Nevada deer ranges mostly in central, eastern and northern portions of the state. Eight three-phase exclosures have been established for the purpose of determining deer-livestock competition. Two of the locations are on summer deer ranges, one is on a year-round range and the other 5 are located on winter ranges.

Our appraisal of the range areas surrounding the exclosure sites is based upon the "habitat-type" concept. It is our feeling that one must have a good synecological understanding of the range landscape in order to successfully understand site potential and relative productivity. In addition such an approach will increase the relative efficiency of a resource inventory.

The term "habitat-type" was coined by Daubenmire and can be defined as follows, "the collective area which is capable of supporting the same relatively homogeneous climax plant association." Poulton furthers this definition by proposing that a "habitat type denotes an ultimate unit of the sum environment", and that "these basic units constitute the basic subdivisions of the landscape for management purposes."

Deer habitat study plots must be placed in what are recognized as homogeneous stands representative of specific "habitat types" or seral plant communities that occur in space and time. One must be fully aware of and understand the fact that upon placement of a study plot that it is only representative of sites with similar potential.

This concept is somewhat similar to that of the "key area", however, there is one important difference. With the "key area" concept it is considered that all or most of the range is exhibiting trends similar to the area evaluated. With stratification by "habitat-type", we are assuming that this is not necessarily true.

In many past instances this concept was overlooked, especially in the placement of study exclosures. The resultant heterogeneous hodge-podge of species and sites represents nothing. And to make matters worse, no quantitative data has been gathered on many three-phase deer exclosures.

We are forced to make some large assumptions concerning the use of the three-phase exclosures. First, we must assume that annual forage production within the fully protected acre represents site potential. Protection can sometimes lead to species stagnation which in turn prevents the representative area to produce forage at a true optimum. Another important assumption is that deer use within the low fence is equivalent to that outside the exclosure. In most instances pellet group counts supported this assumption. A third assumption is that the difference between forage production inside the low fence and outside is indicative of the difference in utilization between deer and deer-livestock as a group. Many of our results are highly significant and were used to compute relative forage utilization by deer and by livestock.

Clipping was accomplished in two plot sizes - 4 x 12 ft. and 20 x 20 ft. In some instances individual plants had to be clipped. Grasses and forbs were clipped within the smaller plot nested within the larger plot which was used to obtain browse production data.

On the White Rock winter range, mean cumulative deer-days use/acre was almost directly in proportion to density of bitterbrush. Significant differences in deer use by plant community existed as shown in the table.

On Morey Bench the same trend prevailed. On both areas, "closed" communities of pinyon-juniper with little other forage receives negligible use.

At Fox Mountain deer were taking negligible amounts of the total potential forage production, represented by the totally protected area. Though rumen analysis showed considerable consumption of grass at certain times of the year, the effect of this on total grass production was non-significant. The lion's share of annual growth of all species was consumed by livestock. The slight decrease, in 1965, of livestock use of bitterbrush and mountain mahogany was believed to be due to a highly significant increase in grass production in 1965.

At Fort Ruby winter range, livestock had consumed 70% of the annual growth of bitterbrush before deer arrived on the range. Deer then took another 20%.

In addition to this we kept records on certain characteristics of unprotected bitterbrush on 7 of the 8 study locations which supported stands. We found that the per cent of bitterbrush severely hedged varied from 77 to 100% with 6 of the 7 greater than 97%. The per cent of decadent bitterbrush (by our definition, 50% or more dead) varied from 0 to 66% and the per cent of dead bitterbrush cover varied from 3% to 48%. The welfare of this important deer feed varies widely around the state and on 6 of the 7 areas livestock consume much more of the bitterbrush than do the deer.

Another phase of our overall deer-range investigations in Nevada involves a study of feed habitats, forage nutrition and animal condition, on four deer ranges - two summer and two winter. Animal and plant collections have been made at each study area. Sixty animals have been collected per year: 30 during May, July and September from the two summer ranges at the rate of 5 animals per date and location and a similar number during November, January, and March, on two winter ranges. In order to decrease data variation, an attempt has been made to collect only young does. Collections were timed to coincide with animals arriving on an important winter or summer range, after they had been there for sometime, and just prior to the time they would be leaving.

Tissue samples were taken from front and hind quarters, loin, tail, kidney, and heart and the per cent fat was determined. In addition a complete field autopsy is made for each animal. While the data have not yet been analyzed statistically there do seem to be some interesting trends as regards the first full year of data. For example, per cent tissue fat in the carcass of a mule deer seems to vary most in the tail and loin chop (this cut contained any subcutaneous fat present) and little in the front and hind quarters. As might be expected there was little variation in the per cent fat of heart and kidney. Both of these tissues are the last to reflect poor condition. Another factor is that ranges have been in relatively good condition with respect to moisture since the initiation of the study and we have yet to collect any extremely poor animals.

We feel that the tail and loin chop show the most promise for the development of a diagnostic tool for routine use as an indicator of animal condition.

All rumens were analyzed botanically. A point method was used to quantify all identifiable species and species groups. During this process we found it necessary to develop a set of correction factors in order to more closely determine the original dry weight proportions of the forage consumed. Examples of this data provide information concerning feed habits during the collection months. For example, summer collections at Fox Mountain indicated 12% utilization of grass and about 40% utilization of Mountain Mahogany and bitterbrush. The latter two species dropped to near 10% in July and September. The consumption of big sagebrush and choke cherry were negligible in May but increased in July and September to absorb some of the reduced bitterbrush utilization. Snowbrush (Ceanothus velutinus) also helped take up the void.

On the Morey Bench winter range study area consumption of desert bitterbrush was in excess of 60% in November, decreased to 45% in January and to 25% in March. Big sagebrush constituted about 20% of the diet throughout the entire winter grazing period. Pinyon, juniper and grass increased by March to offset the reduced consumption of desert bitterbrush.

Starting the summer of 1966 we, at the direct request of the co-operating agencies, intend to concentrate on objective #5. The work thus far on evaluating the influence of range improvement projects on our deer herds has centered around some pinyon-juniper chaining operations. On one area we have found that the chained area is used approximately 2.64 times greater than adjacent untreated areas. Bitterbrush leader growth averages 11 inches on the treated area compared to 4 inches on the control. Results also indicate which portions of the treated area are providing the most benefit. Data of this nature will lead to guides for future improvement projects. We have compared the use of parametric versus non-parametric statistics for comparing pellet group counts. Initial results suggest that sub-sampling theory holds real promise for the development of good sampling techniques to be used in an efficient "deer activity index".

It is our hope that we will be able, during the course of this study, to develop better overall methods for deer habitat resource evaluation. Examples of this include development of procedures for correcting deer rumen samples on a dry weight basis, development of better procedures for detecting significant deer-livestock competition relationships. There is a real void of methods that are truly useful for purposes of efficiently evaluating deer ranges. The entire problem is complicated by the fact that we have no "herd units" to work with. Gruell and Papez found that, in Elko County, there are no herd units but that deer tend to faithfully return to the same winter or summer range. This recalls the need for a careful stratification of the range landscape into units of similar productivity and management requirements.

Many ranges producing excellent deer forage are scarcely used. The mule deer is a creature of habit and will nearly always return to the same winter or summer range. For this reason, many highly productive areas are not producing optimum numbers of deer while other ranges are overcrowded. We are seeking ways of "interesting" deer in unused ranges.