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ELK vs. LIVESTOCK: FORAGE UTILIZATION STUDY IN PORTIONS OF THE GILA NATIONAL FOREST.

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Abstract: In areas where elk (*Cervus elephus*) and livestock, mainly cattle (*Bos taurus*), occupy the same rangeland the potential for competition exists, which may adversely effect each species. Competition between these herbivores may occur for herbaceous vegetation in areas with high elk numbers and moderate livestock numbers. In portions of the Gila National Forest some ranchers claim that the steady increase in elk numbers has caused them to run livestock numbers below that allocated by the United States Forest Service. This has resulted in numerous management challenges including the management of forage utilization for livestock and wildlife. A research study was designed to obtain documented information on livestock and elk forage utilization in portions of the Gila National Forest. To determine forage utilization we concentrated on five selected riparian areas. Our three main objectives were 1) determine an index of relative elk and livestock use, 2) determine forage utilization by elk, and 3) determine utilization by elk and livestock combined. Current data from the study shows a trend that forage utilization in riparian areas during spring and summer months is heavy regardless of which species is present. During fall and winter months utilization of riparian areas decreases dramatically. However, data has only been collected for one year and is still in progress. During the year this data was collected (1996) the Gila National Forest was experiencing below average precipitation causing drought like conditions and a decrease in upland forage. Due to these conditions, elk and livestock populations concentrated in riparian areas causing an increase in forage utilization.

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Key Words: cattle, competition, elk, forage utilization, riparian habitat

INTRODUCTION

Is a crisis pending regarding the management of America's rangelands? Apparently many people seem to think so due the increasing number of range management conflicts. The conflict or potential for conflict between livestock and wild ungulates has been recognized by and is of some concern to resource managers and scientists for many years. Instead of decreasing in intensity, this conflict has become broader and more bitter as

the years go by. It would seem that as we learn more about the proper management of both livestock and wildlife on our ranges, some progress would be made toward solving the battle of conflicting use (Severson and

Medina 1983). One of the main range conflicts that has been on the increase is management of rangelands between elk (*Cervus elaphus*) and cattle (*Bos taurus*). Because elk and cattle often share the same rangelands and have similar diets, they are likely ungulate competitors on rangelands of North America (Nelson and Leege 1982, Nelson 1984). Most western rangelands in the U.S. that are occupied by elk are also grazed by cattle at some time of the year. In areas where elk and livestock occupy the same rangeland the potential for competition exists, which may adversely effect each species. Competition between these herbivores may occur for herbaceous vegetation in areas with high elk concentrations and moderate livestock numbers. Elk and cattle often make similar dietary choices and can extract high nutrient value from grasses (Hanley 1982).

What exactly constitutes competition between two individual species? Let's take a look at the basic concepts of competition. The defining concepts that are applicable to the issue of elk and livestock competition are as follows:

1. Common use of a limited resource by 2 different species.
2. Disturbance or displacement of 1 species by another.
3. Reduction in population performance of 1 species by another because of competition for a limited resource or because of physical disturbance.

Dual use by elk and livestock does not always imply that competition does exist. To demonstrate competition, either elements 1 or 2 must occur and result in element 3. Most of the studies conducted in the past have dealt mainly with food as the limited resource between elk and cattle (Nelson 1984). Many factors influence competition for food among large herbivores (Vavra et al. 1989). The most important factors include (1) consumption equivalence, (2) dietary overlap, (3) forage quantity and quality, (4) forage use, (5) timing of use, (6) height of foraging reach, (7) density

or stocking rate of animals, and (8) spatial and temporal distribution of animals (Nelson 1982). These factors are not independent of each other and may interact in multiple ways to increase or decrease the actual degree of competition.

Without question, the most confounding and frustrating process facing public range managers today is that of stocking allocation among wild and domestic ungulates. To help with this dilemma managers are calling upon specialists from different fields of research for opinions, advice, and data from research studies. This is where we come in, we are currently conducting a forage utilization study between elk and livestock in portions of the Gila National Forest. The data from this study will hopefully help with management conflicts between elk and livestock.

JUSTIFICATION

The Gila National Forest located in southwestern New Mexico is currently experiencing rapid growth of Rocky Mountain elk (*Cervus elaphus canadensis*) population. Elk were reestablished in the Gila National Forest in 1936 and have increased to levels that are now creating conflicts over the concepts of multiple use management, habitat sustainability, and the overall health of the elk population. The rapid growth in the elk population has resulted in numerous challenges including the management of forage for both livestock and wildlife. Excessive utilization of herbaceous and woody vegetation may exist in areas with high elk concentrations and moderate livestock densities. Additionally, where livestock are scheduled to graze these areas utilization standards (set by the USDA-Gila National Forest) are frequently estimated to be exceeded before livestock arrive. In some areas this excessive utilization appears to occur only in the spring, while other areas experience this

level of grazing year round, especially in riparian areas.

The purpose of this study is to gather documented information on forage utilization by elk and livestock. Data are being collected in five riparian/cienega areas throughout the Gila National Forest. Elk numbers in these areas should be moderate to high with livestock present during some portion of the year. These data may be used by the New Mexico Department of Game and Fish and the USDA-Gila National Forest to improve management practices of elk and livestock populations in the Gila National Forest.

PRESENT OUTLOOK

In portions of the Gila National Forest the present outlook on forage utilization between cattle and elk is that elk populations have grown so large that they are consuming most of the forage on rested pastures in a rest rotation grazing system. Due to the large amount of elk utilization on these rested pastures, when ranchers put livestock on these pastures to graze there is not enough forage available to carry current livestock numbers. Some of the ranchers in the Gila argue that the steady increase in elk numbers have caused them to run livestock below stocking rates set by Gila National Forest-USDA. Jackson (1991) stated that ranchers in Catron County, N.M. have noticed a steady increase in elk numbers by detecting an increase in depredation on improved and irrigated pastures on deeded land. There also have been observations of much greater elk utilization on public land as well as expansion in distribution (Jackson 1991).

OBJECTIVES

To determine forage utilization we concentrated on five selected riparian zones and achieving three main objectives;

1. Determine an index of relative elk use;
2. Determine forage utilization by elk;
3. Determine forage utilization by elk and livestock combined.

PROCEDURES

Pellet-group counts will be used along line transects to obtain a relative index of use by elk and livestock in a given area. According to Neff (1968) pellet-group counts provide an objective measure of substantial population fluctuations and also aid in determining preferred habitat types and seasonal patterns. This method has also been used as an index to relative use of different habitats by big game species. To maximize results for time spent in the field we will use a series of circular plots measuring 0.01 acre (0.004 ha) and spaced 100 ft. (30 m) apart along a randomly selected line transect. For each study area we determined that 4 line transects consisting of 5 plots were the most efficient with the least error involved. The pellet transects will be cleared (cleaned of old pellets) upon installment, and with each data collection. Data will be collected immediately after livestock removal from study area and immediately before livestock arrive on the study area. The permittees in charge of grazing the study areas will determine when the livestock arrive and leave the study areas. Rapid deterioration of pellets may cause data to be collected more frequently.

To determine the amount of herbaceous vegetation being utilized by elk and cattle, data will be collected from ten randomly placed elk and livestock exclosures, measuring 4 ft. X 4 ft. (1.2 m X 1.2 m) at the base. During data collection we will clip the vegetation using a 1 ft X 2 ft (30.48 cm X 60.96 cm) rectangle frame. Data will be collected inside the cages (ungrazed) and outside of the cages (grazed) and comparisons of the two data sets will be analyzed. After data collection the cages will be moved to a new randomly selected area. Data collection will take place immediately before livestock are put into a study area and again immediately after livestock are taken

from the study area. A dry weight will be obtained by oven-drying the clippings to remove moisture content. The clippings will be statistically analyzed using a paired t-test comparing the grazed and ungrazed quadrats within the study area. Utilization rates can then be estimated by using the dry weight in conjunction with the pellet counts to make inferences to the species we want to estimate utilization for. To estimate elk utilization we will use only the data collected when livestock are excluded from our study areas. To estimate elk and livestock utilization combined we will use the data collected during the period livestock were allowed to graze the study areas.

CONCLUSION/DISCUSSION

The results discussed are preliminary due to the fact that data have only been collected for one year and collections are still in progress. Currently all data combined shows that a trend that forage utilization in riparian areas during spring and summer months is heavy regardless of which species is present. During fall and winter months forage utilization of riparian areas decreases dramatically. This variation of seasonal use may be related to climatic characteristics such as drought conditions during the spring and summer months and wetter conditions during the fall and winter. During 1996 the Gila National Forest experienced below average precipitation which caused a decrease in upland vegetation. Due to the conditions we believe that elk and livestock populations concentrated in riparian areas causing an increase in forage utilization. Data is currently being collected for the second field season while these proceedings are being conducted and will hopefully show a normal distribution between precipitation and animal populations.

Roberts and Becker (1982) states that solving the livestock/big game conflicts will require a very close working relationship between wildlife biologist and range conservationists working in an advisory capacity, and livestock operators to develop and implement the plan. Some states are taking this approach to solving range conflicts, including

New Mexico. New Mexico Department of Game and Fish has established a special task force for elk and cattle interaction conflicts. The task force duties are to assess problems and try to come up with suggestions to resolve conflicts at a local level.

DELIVERABLES

The finished product of this study will be a masters thesis after two years, along with possible presentations at wildlife and livestock meetings. When the study is complete (2 years or more) a technical report will be presented to the Gila permittee association, the USDA-Gila National Forest, and the New Mexico Department of Game and Fish. This report will hopefully provide information that will help establish the best management strategy for the Gila National Forest to meet the objectives stated in the Multiple Use-Sustained Yield Act of 1960.

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