January 1975

Recommendations for Management of Sharp-Tailed Grouse in the Nebraska Sandhills

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GAME AND PARKS COMMISSION

RECOMMENDATIONS FOR MANAGEMENT OF SHARP-TAILED GROUSE IN THE NEBRASKA SAND HILLS

by

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January, 1975

A Contribution From Federal Aid in Wildlife Restoration Act

Pittman-Robertson Projects W-33-R and W-38-R

INTRODUCTION

Research was conducted on sharp-tailed grouse in the Nebraska Sand Hills from 1958 through 1973. The purpose of the study was to obtain information and develop techniques necessary for effective management of the species. Habitat requirements, population dynamics, mobility, food habits and census methods were investigated. Results of the study were reported by Sisson (1975). On the basis of these results, recommendations on habitat management and spring population surveys were developed.

SUMMARY OF RECOMMENDATIONS

Range Management

1. Limit annual utilization of forage to no more than 50 percent of new growth; reduce utilization if forage does not consist of at least 75 percent climax species until that composition is reached.

2. Use a deferred rotation with two pastures on a last-out, first-in schedule. Maintain pastures of 1,280 acres or more with adequate water and salt distribution.

3. Regulate grazing to allow approximately 15 percent of each pasture grazed to remain unused each season.

4. Winter graze pastures dominated by choppy sand hills sites when feasible.

5. Insure adequate woody cover by fenced exclosures around stands susceptible to livestock overuse.

Spring Display Ground Survey

1. Modify present survey procedures to allow estimating numbers of active display grounds in the sampling area without counting numbers of grouse.

2. Concentrate sampling in areas where land use changes are expected to cause long-term changes in population levels.

3. Consult a statistician for a sound experimental design.

Range Management

The range of sharp-tailed grouse is restricted to areas dominated by native grassland or grassland interspersed with woodland. In the Midwest, the range of the sharptail has continued to decrease as native grassland has been utilized for crop production and other intensive land uses. The present range of sharp-tailed grouse in Nebraska is restricted to the Sand Hills region which occupies approximately 20,000 square miles in the North Central part of the state. The Sand Hills is the "largest continuous

undivided expanse of grassland in the Great Plains" (Burzlaff 1962:2). The loose, sandy soils of the Sand Hills have made most of the region unsuitable for crop production, resulting in a lack of agricultural development. The primary land use in the Sand Hills is production of forage for livestock. The presence of sharp-tailed grouse in the region is attributed to the dominance of native grassland.

Sharp-tailed grouse populations fluctuate annually with success of reproduction. Annual variations in reproductive success result from variations in weather and associated changes in habitat. However, land use determines long-term changes in population levels. The most pronounced population changes occur when the amount of grassland in an area changes. Loss of grassland results in loss of necessary habitat and decreases in grouse populations. However, the presence of grassland does not insure suitable grouse habitat. Use of grassland for livestock production also affects grouse habitat and population levels.

According to Burzlaff (1961:4) the goals of range management are:

1. Keep the range covered with good forage plants.

2. Maintain range feed reserve.

3. Increase livestock and wildlife products.

4. Reduce and control the flow of water from rangelands.

5. Control soil erosion on range watersheds.

In practice, the primary objective of range management in the Sand Hills is to attain the maximum sustained yield of livestock products from the range. Livestock production is determined by the quantity and quality of forage. "Range condition" is a common measure of production and quality of forage. It is defined as "the present state of vegetation on a site relative to the potential climax plant community for the site." For example, on a site in "excellent" range condition, 75 to 100 percent of the forage yield is from climax vegetation. According to Burzlaff (1962:13) range in excellent condition is the most productive; therefore, the highest sustained yields of livestock can be expected on range in excellent condition. Although increased livestock production may result initially from overstocking range in good or excellent condition, range condition and productivity will decrease and long-term yields will be lower. Therefore, one of the most important tools of range management for livestock is the regulation of stocking rates to maintain high range condition. An accepted standard for proper range utilization is removal of no more than 40 to 50 percent by weight of current forage production annually (Soil Conservation Service, 1967). However, control over utilization of forage cannot be achieved by regulation of stocking rates alone. According to Hormay (1970:15) livestock graze selectively by plant species and areas, consistently preferring the more accessible areas and most palatable plant species. This behavior results in an uneven pattern of use. Therefore, to achieve better utilization of forage, while maintaining high range condition, it is necessary to control the distribution of livestock on the range.

Methods commonly used to control distribution of grazing include fencing, distribution of water and salt, and rotation of use between pastures. Uniform distribution of grazing is desirable from a livestock production viewpoint. This has led to the development of "planned grazing systems."

A planned grazing system has been defined as "one in which two or more grazing units are alternately rested from grazing in a planned sequence over a period of years." The rest period may be throughout the year or during all or part of the growing season. It is a system also known as 'High Intensity-Low Frequency (HILF)'." (Soil Conservation Service, 1973). In general, planned grazing systems in the Sand Hills require relatively small pastures (640 acres or less). As the number of pastures in a system increase, the period of time livestock are in a given pasture shortens and the density of animals increases, thus forcing more uniform utilization of plant species and areas.

Characteristics of grassland necessary for maintaining high sharp-tailed grouse populations differ from those considered desirable from a livestock production viewpoint. Research on habitat requirements of sharptails in the Sand Hills indicated that grouse require different topographic sites and successional stages of vegetation for different activities. Nesting grouse select sites having dense stands of climax grass species interspersed with some forbs and low shrubs or half-shrubs. Most nesting hens selected sites on north-facing slopes, whereas sites in earlier successional stages on more level terrain were selected for feeding by both adults and hens with broods. However, loafing adults and broods selected sites having more shrubby cover. Courtship sites were usually located in overused areas near watering facilities. Availability of habitat required for successful nesting and brood rearing is considered one of the most important factors limiting sharp-tailed grouse in the Sand Hills. Overstocking of range with livestock results in loss of climax vegetation necessary for successful nesting. Shrubby cover needed by broods for protection from weather extremes also deteriorates under excessive grazing pressure. Maximum carrying capacity for sharp-tailed grouse on Sand Hills range can best be achieved by maintaining an interspersion of sites having different range condition classes.

While high utilization grazing systems may be desirable from a livestock production viewpoint, they result in loss of habitat diversity and interspersion required by sharp-tailed grouse. The preference of nesting grouse for sites having climax vegetation indicates that maintenance of high range condition is desirable for grouse. Grazing systems utilizing relatively small pastures (less than 640 acres) and/or more than two pastures in rotation should be avoided. From a grouse production viewpoint, selective grazing of livestock is desirable. In general, grazing should be regulated to allow approximately 15 percent of a pasture to remain unused during a season. Experience indicates that a two-pasture system grazing livestock in one pasture during the first half of the season and in the other pasture the remainder of the season is a desirable compromise. Rotation should be on a last-out, first-in basis and pastures should be at least 1,280 acres (2 square miles) in size.

During the period 1969 to 1971 a six-pasture rotation using pastures averaging approximately 640 acres in size was used on Bessey Division, Nebraska National Forest. The six-pasture system was found to be less desirable for livestock production and range recovery than the two or three-pasture systems in use on the balance of the Nebraska National Forest, Bessey Division. The six-pasture system was subsequently discontinued. From an ecological viewpoint, the diversity of vegetation resulting from selective grazing by livestock and wild herbivores would be expected to contribute to the long-term stability and productivity of the system. This concept

should be carefully considered in evaluating the long-term impact of intensive grazing systems designed to achieve uniform utilization.

Another range management practice which is expected to be beneficial to sharptail populations is winter grazing on pastures dominated by the choppy sands range site. Winter grazing would allow maintenance of high range condition and would reduce destruction of shrubby vegetation. Since livestock on winter pasture require supplementary feed and attention during inclement weather, winter grazing is feasible only on pastures near ranch headquarters.

Woody vegetation frequently deteriorates in areas where livestock are concentrated. In such areas it would be desirable to fence out some woody stands to provide cover for grouse. Badly overgrazed stands of chokecherry and plum on Bessey Division, Nebraska National Forest, have shown remarkable recovery within a few years after being protected from livestock by fencing. Such stands are also utilized by other wildlife species, notably deer and passerine birds.

Spring Display Ground Survey

Censuses of birds attending display grounds in spring have long been used for estimating densities or trends in densities of prairie grouse. The method was used as early as 1929 in Wisconsin. Systematic spring display ground surveys were initiated in 1955 in Nebraska. Early morning surveys are conducted each spring along approximately 20 automobile routes distributed throughout the prairie grouse range in the state. Each route is approximately 20 miles long.

The surveys are accomplished on a given route in two stages. The investigator first drives along the route, stopping to listen for displaying grouse at approximately one mile intervals. The approximate locations of display grounds are determined by recording directions from which displaying grouse can be heard from each stop and by using triangulation from two or more adjacent stops. The second stage of the survey consists of locating as many of the grounds heard as possible and counting the numbers of males and females in attendance. This is usually done the morning following the audio portion of the survey. An attempt is made to conduct counts on calm, clear mornings to minimize variation in counts due to effects of weather on audibility and attendance of grouse on grounds. Such weather conditions do not always coincide with the annual peak in display activity which results in considerable experimental error. Also, manpower limitations usually permit only one survey on each route each year. Therefore, experimental error cannot be accounted for in making year-to-year comparisons.

Use of data from display ground surveys to measure changes in numbers of sharp-tailed grouse is based on the assumption that one, or some combination of variables measured (i.e., numbers of grounds, numbers of males, etc.) is directly related to population size. The validity of this assumption has not been established because no valid measure of abundance has been available for use as a standard. Research on communal courtship behavior characteristic of sharp-tailed grouse and other members of the grouse family indicates that

densities of display grounds and displaying males are not necessarily related to spring populations. Densities of display grounds and numbers of males per ground are considered to be limited regardless of population size. When populations increase above a certain level, an excess of non-breeding males results. Therefore, counts of displaying males would not be sensitive to changes in populations above the level of breeding capacity. However, pronounced and continuing declines of populations in an area have been accompanied by decreasing numbers of display grounds and total displaying males. It is interesting to note that under such conditions, average numbers of males per ground have remained constant.

Based on the above discussion, it is suggested that spring display ground inventories can only be expected to reflect pronounced changes in spring grouse populations and that such changes can be detected by measuring changes in densities of display grounds without counting numbers of individual birds.

Use of spring population estimates, assuming such estimates are valid, for estimating fall population levels is questionable for prairie grouse as well as other upland game species because of the variability of success in reproduction. This was concluded more than 20 years ago by Baker (1953: 60-61) who studied greater prairie chickens in Kansas. He stated: "Considering potential losses, among young birds, caused by adverse weather, spring censuses are not sufficient bases for fixing regulations."

It is suggested that the primary value of spring display ground surveys, for developing hunting season recommendations, is to determine if a spring population is present in an area, and whether a pronounced decline or increase in population size is occurring. This would provide a basis for determining which areas should be open to hunting. The use of spring display ground counts as a basis for setting the length of the hunting season or bag and possession limits does not appear to be justified. The value of counts of numbers of grouse attending display grounds does not appear to justify the effort or cost of making such counts.

It is recommended that spring display surveys be conducted only in areas where land use changes are expected to result in long-term changes in grouse population levels. Sound experimental design should be used to allow meaningful comparisons between areas or detection of trends. Since spring surveys seem to be most useful for detecting long term changes in populations, they may not need to be conducted annually in each sampling area.

Literature Cited

Sisson, L. H. 1975. In press. The sharp-tailed grouse in Nebraska: research study. Nebr. Game and Parks Commission, Lincoln.

Burzlaff, D. F. 1961. Nebraska handbook of range management. Univ. Nebraska Ext. Circ. 60-131. 35pp.

_____. 1962. A soil and vegetation inventory and analysis of three Nebraska sandhills range sites. Univ. Nebraska Res. Bull. 206. 33pp.

Baker, M. F. 1953. Prairie chickens in Kansas. Univ. Kansas Mus. Nat. Hist. and State Biol. Surv. Misc. Publ. 5. 66pp.

U.S. Soil Conservation Service. 1967. National handbook for range and related grazing lands.

_____. 1973. Planned grazing systems. Conservation Information Sheet No. 63. Lincoln, Nebr. 10pp.

Hormey, A. L. 1970. Principles of rest rotation grazing and multiple-use land management. U.S. Dept. Inter. and U.S. Dept. Agric. 26pp.