The Nesting and Brood-Rearing Ecology of Sharp-Tailed Grouse in Relation to Specialized Grazing Systems

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Approximately 14 million acres of native grasslands remain in North Dakota (Whitman and Wali, 1975). Of this native grassland, an estimated 90 percent is privately owned with the majority used to graze domestic livestock. These private rangelands produce significant numbers of different prairie wildlife species. Although, per-acre production of some species is lower on private grasslands versus intensively managed wildlife areas, overall production is, in most cases, higher on private lands.

Overgrazing has been cited repeatedly as a major factor in the decline of many wildlife species (Bryant, 1982). Overgrazing is not only detrimental to wildlife, it is harmful to the range resource and ultimately to the economic well-being of the landowner. On private grasslands, grazing is, and will continue to be, the primary land-use. What is required of wildlife managers is to identify and promote economically sound grazing management practices that are compatible with different wildlife management goals.

Range managers have been investigating grazing systems for improvement of range condition and profit for over 30 years, but studies of the effects of grazing systems on wildlife have been few. Bryant (1982) reviewed 214 wildlife-grazing interaction studies of which only 24 actually evaluated grazing impact on wildlife. Nineteen of the 24 studies reported grazing systems improved conditions for wildlife over those of continuous or season-long grazing. One of the most notable exceptions to this was sharp-tailed grouse. Based upon these results, a study was initiated to evaluate the effects of short-duration, twice-over deferred-rotation, and season-long grazing on the movements, nest locations, brood habitat-use, and productivity of sharp-tailed grouse.

STUDY AREA AND METHODS

The short-duration, twice-over deferred-rotation, and season-long grazing treatments (Figure 1) were established in 1982 at the Central Grasslands Research Station in south-central North Dakota. Idle, native-grass pastures were available at the station to serve as control plots.

The short-duration grazing system was implemented on a half-section of rangeland as eight 40-acre paddocks. In 1984 and 1985, 65 cow/calf pairs were allocated to the half-section in early June and grazed to November in a five-day graze, 35-day rest sequence. Each paddock was grazed four times each year, resulting in 153 and 160-day grazing seasons.

A 320-acre season-long grazing treatment was located south of the short-duration treatment. In 1984 and 1985, 45 cow/calf pairs were stocked on this treatment. Cattle were allocated and removed on the same dates as the short-duration treatment.

The twice-over deferred-rotation system was located on a section adjacent to the other treatments. In 1984, two replicates of three 80-acre pastures each were grazed by 50 cow/calf pairs in a 28-day graze, 56-day rest sequence. In 1985, a fourth 80-acre pasture was added to each replication and 60 cow/calf pairs were grazed 20 days followed by 60 days rest in each pasture. Each cell was grazed twice during the June to November grazing season both years.

All sharp-tailed grouse dancing grounds found within a one-mile radius of the station boundaries were censused three times from May 1 to April 15. Sharp-tailed grouse hens were trapped, using cloverleaf traps or rocket nets, from the dancing grounds located on or nearest the grazing treatments. The radio-tagged hens were monitored with

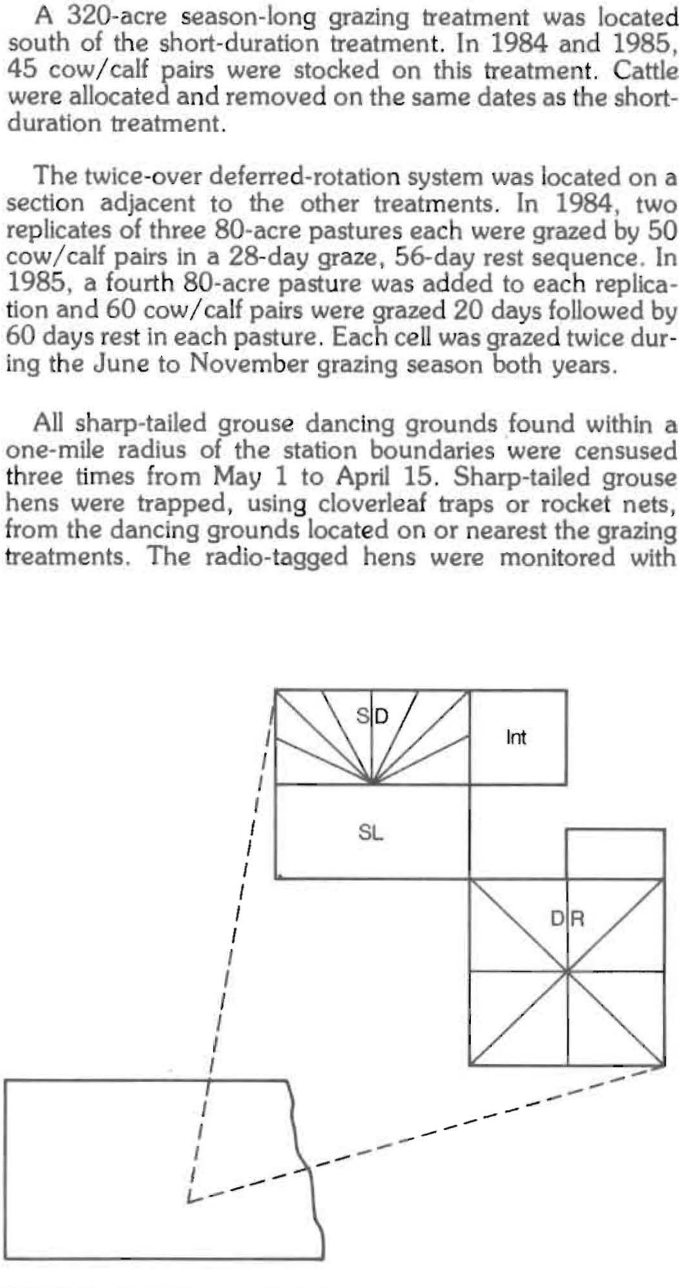

Figure 1. Location of short-duration (SD), season-long (SL), twice-over deferred-rotation (DR), and Intermittent (Int) pastures at the Central Grasslands Research Station.

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standard telemetry equipment to the nests, through the nesting period, and with broods to determine nesting habitat, nest success, and brood habitat-use. Nests were also located by chain dragging, in which a 100-foot 3/4 inch chain was pulled behind two three-wheeled motorcycles at a low speed, in an attempt to flush hens from the nest. Hens located this way were trapped from the nest with bownets and fitted with the radio-transmitters.

Visual obstruction readings (Robel et al., 1970) were taken along permanent transects in each of the grazing treatments and the idle area to determine habitat available for nesting and brood-use. Visual obstruction readings were also taken at the nest and brood sites to determine habitat utilization. Visual obstruction data was reported in decimeters (4 inches) of vegetation height where 100 percent obstruction occurred.

RESULTS

Thirteen sharp-tailed grouse dancing grounds were located on or within a one-mile radius of the station boundaries covering 35 square miles. A total of 123 displaying males were counted in 1984 and 119 males in 1985. This was 3.51 males per square mile and 3.40 males per square mile for the two years, respectively. The census indicated a drop in the number of males per square miles of 3.3 percent. A statewide census showed a drop of 20.2 percent for the same time period (J. Kobriger, ND Game and Fish, Personal Communication).

In 1984, no hens trapped on dancing grounds were fitted with radio-transmitters due to not receiving the radios until early June, which is after the time period that grouse hens visit the dancing grounds. However, 14 nests were located by chain-dragging and nine hens were trapped and fitted with radiotransmitters. Of these 14 nests, one was in short-duration, four in deferred-rotation, six in an intermittantly grazed pasture, and three in idle areas. Five of the nests were successful and nine unsuccessful (Table 1).

In 1985, a total of 38 sharp-tailed grouse (19 males, 19 females) were trapped from three dancing grounds. Another seven hens were located by chain-dragging, trapped and fitted with radiotransmitters. A total of 20 nests were found from the 26 radiotagged hens, of which three were in short-duration, one in season-long, five in twice-over deferred-rotation, nine in idle areas, and two on adjacent, privately owned, grazed pastures. Of these 20 nests, 14 were successful, 4 were destroyed by predators, and two were run over by vehicles (Table 2).

Table 1. Summary of 1984 sharp-tailed grouse nesting by grazing treatment.

Grazing Treatment	No. Nests	Mean Clutch Size	No. Successful	No. Unsuccessful
Short-duration	1	12	0	1
Deferred-rotation	4	11	2	2
Season-long	0	0	0	0
Intermittant	6	12	3	3
Idle	3	14	0	3
Total	14	12	5	9

Table 2. Summary of 1985 sharp-tailed grouse nesting by grazing treatment.

Grazing Treatment	No. Nests	Mean Clutch Size	No. Successful	No. Unsuccessful
Short-duration	3	12	3	0
Deferred-rotation	5	13	3	2
Season-long	1	10	1	0
Intermittant	0	0	0	0
Idle	9	12	5	4
Other	2	12	2	0
Total	20	12	14	6

Over 65 percent of the sharptail nests were situated in western snowberry communities (Figure 2). Western snowberry, locally called buckbrush, covers over 30 percent of the station (Lura 1984). These buckbrush communities appear to be important as they may be the only vegetative component that provides sufficient cover for spring nesting on the treatments. The remaining nests were found in areas dominated by mid-grasses, green needlegrass, needle-and-thread, and smooth brome.

Vegetation in each treatment was similar in early spring (Tables 3 and 4). In both years, over 85 percent of the vegetation in early spring visual obstruction transects on all treatments had readings of 1.0 decimeter or less; 75 percent of the nests in 1984 and 70 percent in 1985 were found in vegetation with obstruction reading of greater than 1.0

In 1984, there was insufficient brood data to report. However, in 1985, five hens with broods were still utilizing the study area. Hens with broods had moved off the grazing treatments by mid July to the idle areas of the Station. The broods were utilizing class I and II seasonal wetlands that had dried up by late June.

Figure 2. A sharp-tailed grouse nest in a western snowberry community.

Table 3. Frequency (%) of early spring and nest visual obstruction readings in 1984.

	Visual Obstruction Reading				
Treatment	0.0-.50	.51-1.00	1.01-1.50	1.51-2.00	2.01-3.00
Short-duration	81	18	1.0	0	0
Deferred-rotation	79	21	0	0	0
Season-long	80	18	2	0	0
Intermittant	71	24	5	0	0
Idle	8	37	32	11	12
Nest	8	17	17	25	33

Table 4. Frequency (%) of early spring and nest visual obstruction readings in 1985.

	Visual Obstruction Reading				
Treatment	0.0-.50	.51-1.00	1.01-1.50	1.51-2.00	2.01-3.00
Short-duration	37	50	11	1	1
Deferred-rotation	78	20	2	0	0
Season-long	28	58	9	4	1
Intermittant	48	50	2	0	0
Idle	23	33	27	8	9
Nest	5	25	30	20	20

SUMMARY

With grazing systems becoming more popular, there is a need to determine how this change in grazing will affect the wildlife utilizing these rangelands. The grazing treatments at the Central Grasslands Research Station have provided the opportunity for studying these effects in south-central North Dakota. To date, the grazing systems have not adversely affected the sharp-tailed grouse population in this area, as the population appears to have remained stable since the establishment of the grazing treatments. In an attempt to get a better understanding of the grazing sharp-tailed grouse interactions, this study will be continued through the spring and summer of 1986.

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