Ring-necked pheasant production on post-contract Conservation Reserve Program grasslands in southwestern North Dakota

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The objective of our research was to use post-Conservation Reserve Program lands to evaluate the effect of multiuse land management systems and demonstrate the potential viability and sustainability of producing both agricultural and wildlife outputs. Ring-necked pheasants (Phasianus colchicus) utilized the seasonlong grazing pasture and idle land to a greater extent than crop and hay lands for nesting cover. Our findings suggest that under proper utilization, a multiuse land management system has the potential to produce both agricultural and wildlife outputs.

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Introduction

The Conservation Reserve Program (CRP) was established in 1985 as amended by the Food Security Act (U.S. Department of Agriculture, 1997). The program was intended to aid farmers in placing marginal agricultural land into the CRP for at least a 10-year period. The goals of the CRP include the improvement of water quality and the prevention of soil erosion. Recent additions to the CRP have included the creation of prime wildlife habitat as a goal of the program (Risley et al., 1995).

Throughout the northern Great Plains, enrollment into CRP has been substantial (Farm Service Agency, 2008). As well as providing income to landowners (Leistritz et al., 2002), many wildlife populations, including the ring-necked pheasants, have benefited (Riley, 1995). The increase in ring-necked pheasant populations has been, in part, attributed to the increased nesting and winter habitat provided by CRP. Along with increased ring-necked pheasant populations, southwestern North Dakota has seen an associated increase in hunting opportunity. For many economically stressed communities, an increase in hunting opportunities has led to an increase in revenues brought about by the large influx of in-state and out-of-state sportsmen and women. The increase in revenue has benefitted many local economies and provided income for landowners who may charge for guiding services and access fees (Hodur et al., 2004).

The future of the CRP is not clear. In 2007, approximately 419,794 acres of CRP lands were removed from the program in North Dakota, with the participation of more lands due to expire before 2010 (Farm Service Agency, 2007). The future use of CRP land could impact local economies, as well as aspects of the environment, including ring-necked pheasant populations.

Previous research has demonstrated differences in use between row crops and CRP grasslands by ring-necked pheasants during the breeding season (Best et al., 1995). However, little data is available with respect to ring-necked pheasant use of grazing lands. Early research in southwestern North Dakota found no nests in heavily grazed pastures (North Dakota Game and Fish Department, 1956). For some landowners, managing post-CRP lands for both agricultural and environmental outputs may be beneficial, both economically and environmentally. Therefore, the objective of this research was to use post-Conservation Reserve Program lands to evaluate the effect of multiuse land management systems and demonstrate the potential viability and sustainability of producing both agricultural and wildlife outputs.

Materials and Methods

The study sites were in Adams County, in southwestern North Dakota. Both study sites were within three miles of Hettinger, N.D. All animal care and handling procedures were approved by the North Dakota State University Institutional Animal Care and Use Committee prior to the initiation of the study. Each study site consists of approximately 640 acres of land. Treatments were determined using a randomized complete block design on two different study sites (replicates). Each study site was divided into three different plots and treatments (grazed, hayed, idle, crop) selected randomly. The seasonlong (SL) treatment comprised 320 acres and was grazed by 33 to 45 Angus x Hereford cows. The remaining treatments comprised 80 acre parcels and included no-till barley (NTB), no-till corn (NTC), hayed (HAY) or idle (ID). The SL was grazed from June 1 to Jan. 1 each year, targeting 50 percent use. Stocking densities were adjusted each year to achieve approximately 50 percent use. HAY was harvested annually during the second week in July. The NTB was harvested for forage as hay in early July and grazed as aftermath with unharvested NTC from Jan. 1 to April 1, at which time the cows were returned to the Hettinger Research Extension Center, calved and fed harvested forage until June 1. The ID represented continued CRP and remained intact without any forage harvesting. The NTC and NTB were managed using an annual crop rotation system between two 80-acre parcels.

Pheasant nest recruitment of each land management type (SL, NTB, NTC, HAY and ID) was determined using a technique described by Higgins et al. (1969). Pheasant nests were located by dragging a 100-foot chain 0.33 inch in diameter between two all-terrain vehicles (ATVs). Presence of a nest was determined when a hen was flushed from her nest and one or more eggs were present. Each study site was searched in its entirety once every two weeks beginning in late April or early May and continuing until July 15 to determine the presence of nests and timing of primary nesting (Hanson and Progulske, 1973). Upon locating each nest, time of nest initiation was determined utilizing a technique described by Westerkov (1950). Each nest was revisited every three to five days to determine nest fate. Ring-necked pheasant nest success was calculated using a modified Mayfield method as described by Miller and Johnson (1978). A nest was considered successful when at least one chick hatched and left the nest. Nest density and standard errors of the mean were calculated for each treatment.

Results and Discussion

The degree of disappearance was lower than the target 50 percent on all ecological sites for both years (Table 1). Forage utilization was greatest on the loamy overflow ecological sites, compared with loamy or shallow loamy sites in 2006 and 2007. The loamy sites were more utilized than the shallow loamy sites in 2006 and 2007. The loamy ecological sites had greater disappearance than the shallow loamy sites in 2006; however, the shallow loamy sites had greater disappearance than the loamy sites in 2007.

Thirty-three ring-necked pheasant nests were located in 2006. On average, hen pheasant nest initiation occurred during the third week of May, with the earliest observed nest initiated on April 18 and latest initiated on June 7. In 2007, 46 nests were located, with the average initiation date occurring about a week earlier (May 9) than 2006. The earliest observed nest was initiated April 11 and latest initiated June 10. In 2006 (representing pretreatment of study), nest densities (number of nests per/100 acres) were similar among treatments (P = 0.90; Table 2). Nest densities ranged from

Table 1. Degree of disappearance (%) for the loamy, loamy overflow and shallow loamy ecological sites near Hettinger, N.D., in 2006 and 2007.

	2006		2007	
Ecological Site	**Grass**	**Forbs**	**Grass**	**Forbs**
Loamy	45.2 ± 10.4	32.4 ± 7.6	28.0 ± 6.8	70.0 ± 10.0
Loamy overflow	53.7 ± 1.6	21.2 ± 0	44.2 ± 8.8	50.0 ± 0
Shallow loamy	27.5 ± 15.0	39.8 ± 10.6	31.3 ± 8.5	80.0 ± 10.0

Table 2. Nest density (nests/100 acre) and nest success (% successful) on NTC, NTB, HAY, SL and ID treatments on post-Conservation Reserve Program lands near Hettinger, N.D., in 2006 and 2007.

	Treatment[1]					
Item	**SL**	**ID**	**HAY**	**NTC**	**NTB**	***P*-value[2]**
Nest density/100 ac.						
2006	2.8 ± 0.60	1.3 ± 0	2.5 ± 1.35	1.9 ± 1.9	2.5 ± 2.5	0.90
2007	3.4 ± 1.25	10.0 ± 5.0	1.3 ± 0.00	1.3 ± 1.25	0	0.06
Nest success, %						
2006	53.5 ± 17.5	1.0 ± 1.0	18.5 ± 17.5	6.0 ± 6.0	50.0 ± 50.0	0.41
2007	33.5 ± 16.5[ab]	58.5 ± 41.5[ab]	100.0 ± 0.0a	1.0 ± 1.0[ab]	0[b]	0.05

[1]Treatment abbreviations: SL = seasonlong grazing, ID = idle, HAY = hay lands, NTC = no-till corn, NTB = no-till barley.
[2]P-value for treatment; $P \leq 0.05$ considered significant.
[a,b]Means within rows having differing superscripts differ $P \leq 0.05$.

1.25 nests/100 acres in the ID to 2.8 nests/100 acres in the SL. Nest density exhibited a trend for treatment effect ($P = 0.06$; Table 2) in 2007, with nest densities ranging from no nests in the NTB to 10 nests/100 acre in the ID.

The percentages of successful nests ($P = 0.41$; Table 2) did not differ among treatments for 2006. However, nest success was different ($P = 0.05$; Table 2) between the NTB and the HAY treatments in 2007 at 0 percent and 100 percent, respectively. There were no other significant differences in nest success among treatments in 2007.

Results obtained from the 2006 field season were baseline in nature. The blocks (replicates) had been enrolled in the CRP for at least the previous 10 years. Consistent with previous studies, ring-necked pheasants at our study sites used the cropland to a lesser degree as nesting cover than those treatments that consisted of a permanent cover, primarily seasonlong grazing and idle lands. Under a moderate grazing strategy (50 percent disappearance), hen pheasants continued to utilize these areas as nesting cover. In contrast with previous studies, a moderate grazing plan may be more beneficial for nesting ring-necked pheasants than pastures and rangelands that are heavily grazed.

Our findings demonstrate the importance of maintaining areas of permanent cover for ring-necked pheasant production and recruitment. Fifty percent disappearance of available herbage may leave sufficient residue to meet the nesting and cover requirements of breeding pheasants. Therefore, landowners may benefit economically under such a grazing regimen by providing forage for continued livestock production, as well as maintaining the appropriate cover required for ring-necked pheasant production. Although we are two years into our four-year trial, our data suggests that landowners with lands enrolled in CRP who are concerned with both agricultural and environmental outputs may benefit from a similar management plan as the one utilized in this study.

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