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William L. Baxter
Nebraska Game and Parks Comrnission

Carl W. Wolfe
Nebraska Game and Parks Comrnission

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William L. Baxter and Carl W. Wolfe
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Abstract

Ecological relationships of ring-necked pheasants with rainwater basins were studied on a nine-section study area in south-central Nebraska.

Nesting studies conducted from 1960 through 1964 revealed the importance of vegetation complexes associated with wetlands as nesting cover. During the five-year period, 25 percent of all nests were initiated in this covertype, and 25 percent of all chicks were produced in this covertype. The wetlands also provided high quality brooding, loafing, roosting and winter cover.

Human activities have destroyed 83 percent of the 3,909 wetlands in the rainbasin area. The greatest loss occurred in smaller basins. Acreages in the basins remaining have been reduced by 44 percent. Governmental agencies control 5 percent of the remaining basins comprising 25 percent of the remaining acreage.

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The rainwater basin area of Nebraska contains some 3,745 square miles of area distributed through 10 counties in the south-central portion of the state. The area is characterized by gently rolling loess plains dissected in areas by well-defined drainages. In a large portion of the area the drainages end in closed systems resulting in the rainwater basins. These basins are usually 1 to 40 acres in size but some range up to 1,000 acres. The importance of these wetlands as waterfowl nesting areas has been documented previously by Linder (1959), Evans and Wolfe (1967).

Peculiar to many of these basins is scott-silt loam, a soil type which is characterized by an impervious layer of clay. The primary loss of run-off water which collects in these basins is to evaporation (50 inches annually). Little water is lost to percolation, since downward movement of water through the layer of clay is extremely slow. The soil in these basins is fertile, but tilth is poor because of the high percentage of clay. For the same reason this soil type is highly susceptible to drought and flooding.

Data presented were collected on a nine-square-mile study area on private lands in Clay County, Nebraska, under P-R Project W-28-R (The Life History and Ecology of the Ring-necked Pheasant).

Land use on the study area was recorded from 1955 through 1964. Between 90 and 95 percent of the area was intensively cultivated or grazed, depending upon the amount of water present in the basins. The principle crops on the area were grain sorghum, corn, wheat and alfalfa.

Plant communities associated with the basins are divided into two categories to facilitate analysis and discussion. These categories are unused areas and native hay fields. During the 1-year period, areas classified as unused comprized about 5 percent of the total land area, while native hay comprised about 9 percent of the total study area. Basins and their perimeters are used most profitably for haying or grazing the native sedges and grasses. However, during dry years many basins are plowed and planted to row crops. In wetter years, a cosmopolitan plant community occurs in and adjacent to the basins. This community includes aquatics such as cattails (Typha sp.) and bulrush (Scirpus sp.), excellent stand of smartweed (Polygonum sp.) and yellow coreopsis (Coreopsis sp.), and common dryland weeds such as fireweed (Kochia scoparia sp.) or sunflower (Helianthus sp.).

Methods

A nesting study was conducted on the Clay Center area from 1960 through 1964. This study was conducted by systematically searching randomly selected plots in each covertype. The nesting study was patterned after Stoke's (1949) work on Pelee Island. All covertypes except row crops

were searched. The sampling rate varied from 1:6 to 1:16 depending on the expected frequency of nests. The sampling rate for covertypes associated with the basins was 1:6.

Cover preference and brood cover utilization studies were conducted by walking randomly selected transects in the various covertypes during three periods: early morning, midday and evening. A trained hunting dog was used to assist in locating birds. Other methods of obtaining data concerning pheasant use of these wetlands included random observations, aerial counts during inclement weather and observations that were incidental to activities such as nest searching or night trapping.

Results and Discussion

Nesting Cover

Vegetation complexes associated with the rainbasins are important nesting cover, especially during dry years. Rainbasins and their associated vegetation contribute significantly to total chick production.

During the five-year nesting study, from 7 to 37 percent of all nests established on the area were established in covertypes associated with the basins. The five-year mean for nests established in these covertypes was 25 percent. Chick production in these covertypes ranged from 2 percent to 49 percent of the total chick production, with a five-year mean of 25.4 percent.

Brood Cover

Basins play another important role in the ecological requirements of pheasants by providing high quality brood cover. Table I indicates the utilization of covertypes by pheasant broods. Since the acreages of the different covertypes utilized by pheasant broods varied tremendously, all observations have been converted to chicks observed per 100 acres.

Plant communities associated with rainbasins averaged 109 chicks per 100 acres. Of this total, 60 chicks per 100 acres were in unused areas and 49 chicks per 100 acres were in native hay.

Other covertypes utilized by pheasant broods and the number of chicks per 100 acres include:

(1) Roadsides - 129 chicks/100 A.

(2) Fencerows - 283 chicks/100 A.

(3) Wheat stubble - 11 chicks/100 A.

(4) Grain sorghum - 5 chicks/100 A.

From these figures it is apparent that noncultivated areas such as basins, roadsides, and fencerows are preferred covertypes utilized by pheasant broods. However, the number of chicks utilizing a covertype does not tell

Table 1. Cover utilization by pheasant broods.

Covertype	Chicks/100 Acres	Time of Day	Activity
Basin Assoc. Comm.	109	All day	Loafing, feeding, roosting
Roadsides	129	All day	Loafing, feeding, roosting
Fencerows	283	Midday	Loafing
Wheat stubble	11	Early AM	Roosting
Grain sorghum	5	AM, Midday	Feeding, loafing

the entire story. Therefore, a look at cover utilization by time of day will help clarify the importance of various covertypes.

Pheasant broods exhibited definite preferences for the various covertypes during certain parts of the day. Brood observations in fencerows were limited to the midday sampling period, indicating that this covertype was used primarily for loafing cover. Most of the brood observations in grain sorghum were made in the morning or midday sampling periods. Thus, it appeared that grain sorghum provided good feeding and loafing cover.

Native hay, a part of the basin complex, and what stubble were of primary importance as roosting cover. Nearly all broods observed in these covertypes were observed very late in the evening or very early in the morning.

Roadsides and unused areas showed no apparent time-use patterns. The number of observations in these covertypes were evenly distributed during all time periods.

The importance of wetlands as brood cover is apparent. Even in wet years when the presence of water during the nesting season precludes the use of basins as nesting cover, these wetlands serve this function. Characteristically, many of the basins are dry and vegetated by mid-summer.

Roosting Cover

The importance of the plant communities associated with the basins as roosting cover for pheasant chicks has been shown. The basins and associated vegetation also provide important roosting cover for adult birds. The importance of this covertype as roosting cover is only surpassed by wheat stubble.

Loafing Cover

The areas classified as unused provide excellent loafing cover for pheasants. Adult birds were consistently observed in this covertype during the middle portion of the day.

Winter Cover

The wetlands and associated vegetation also provide winter cover for pheasants, especially in situations where heavy growths of woody or weedy vegetation, such as plum thickets or kochia patches, were associated with the wetland community.

A comparison of pheasant populations on the Clay Center area with populations on another 9-square-mile study area in Clay County and the Harvard area is useful at this point to demonstrate the importance of wetland areas.

During the ten-year study, pheasant populations on the Harvard area were consistently lower than populations on the Clay Center area. Linder, Lyon, and Agee (1960:226) stated that the differential was due to the fact that the number of successful nests at Clay Center was approximately twice the number at Harvard. In terms of climate, soil types and land use patterns, the areas are quite similar. However, one noticeable difference

on the Clay Center area is the presence of wetlands. The percentage of basin area in relation to total land area on the Clay Center area was 4.5; on the Harvard area only 0.9 percent of the total area was made up of basin area.

That basins make a significant contribution to total chick production, especially during dry years, has been demonstrated. Additional nesting cover provided by the basins partially explains the differential in populations between the areas. However, the total difference cannot be attributed to increased quantities of nesting cover, since the basins only provide this type of cover during dry years.

We have also shown that the basins are preferred brood cover in most years, wet or dry. We feel that the basins tend to draw broods from other covertypes used for nesting cover, thereby reducing incubating hen-chick interactions which could result in nest abandonment. Linder (1965) demonstrated that an incubating hen could be induced to abandon her nest upon full contact with chicks.

Man's Influence on Wetlands

Man's influence on the wetlands in southcentral Nebraska has resulted in dramatic land use changes. Originally 3,909 wetlands were present in this ten-county area. These basins had a combined surface area of approximately 92,000 acres. Through rapidly changing agricultural activities, particularly irrigation, more than 3,200 or 83 percent of these basins have been permanently destroyed. The acreage loss amounts to approximately 37,000 acres or 40 percent of the original acreage. Size of the basins lost to agricultural operations is an important factor. Sevently percent of all the destroyed basins covered 10 acres or less, and 93 percent were under 25 acres in size. Thus, the greatest loss has occurred in the smallest basins with a resulting decrease of the interspersion or diversity of covertypes.

Losses of acreage have also occurred in the 692 basins which remain. They have been reduced in size by approximately 44 percent. Loss of permanent basins and size reduction of remaining basins was accomplished by: drainage, land leveling, concentration of water in dugouts, and siltation.

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