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HABITAT USE BY SPRING MIGRANT CANADA GEESE
IN THE KASKASKIA RIVER VALLEY OF ILLINOIS

by

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A Thesis Submitted in Partial
Fulfillment of Zoology Honors, Zool. 493

Dr. Thomas Tacha, Advisor

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ABSTRACT

A habitat route was driven 16 times in the Kaskaskia River bottoms near Vandalia, Illinois, from late February - early March, 1988. A total of 131,900 Canada geese (Branta canadensis) in 141 flocks were observed. Habitat use was highest in corn (46.2%), wetlands (24.6%), and winter wheat (21.3%). Flock activity data showed a mean of 68% of geese were observed feeding, and 15% resting. The high feeding percentage suggests the geese are entering hyperphagia when they reach the Kaskaskia River Valley, and food availability in this area can have an effect on productivity of Mississippi Valley Population (MVP) Canada geese.

INTRODUCTION

During spring migration, waterfowl are known to gain substantial lipid and protein reserves needed for reproduction (McLandress and Raveling, 1981; Thomas, 1983). Considerable data has recently been gathered concerning habitat use by MVP Canada geese on southern Illinois refuges and during spring staging in Wisconsin (Pritchert, 1987; unpubl. data, So. Ill. Univ.). However, little is known about habitat availability or habitat needs of geese at spring staging areas in central and northern Illinois. Radiotelemetry data from 1986 and 1987 show that the Kaskaskia River Valley between Lake Shelbyville and Carlyle Lake in Illinois is heavily used by MVP geese directly after their departure from southern Illinois refuges in late February - early March (unpubl. data, So. Ill. Univ.). The

relationship between lipid and protein deposition and habitat needs along the Kaskaskia River is unclear. The purpose of this study was to document habitat availability and use by Canada geese during spring, 1988 in the Kaskaskia River Valley near Vandalia, Illinois.

STUDY SITE AND METHODS

The Kaskaskia River flows south through Central Illinois, and is the water source for both Lake Shelbyville and Carlyle Lake. This study took place north of Carlyle Lake in Fayette County, including land east and west of the Kaskaskia River. The area is characterized by large cropped bottomland fields and steep hills.

A circular 83km habitat route, representative of habitats in the area, was designated, stretching from Vera, Illinois south to Carlyle Lake Waterfowl Management Area (CLWMA) subimpoundments, with Vandalia, Illinois as the approximate center. Habitat availability was assessed within 0.8km of the route through cover mapping. The route was driven February 23, 26, 27, 28, and March 5 and 6, 1988, 2 to 3 times daily for a total of 16 routes. Weather conditions during the study were normal, with the average daily temperature being 39 degrees. An ice storm left 1 inch of ice on roads and fields on March 4, so scheduled routes were not driven on that day. For each goose flock observed, flock size, habitat type, and flock behavior were recorded.

Habitat availability was summarized as percentage of total ha available to goose use in each of 8 habitat types. Habitat use was determined by recording the percentage of

geese observed in each of the 8 habitat types. Proportional use divided by proportional availability yielded a Selectivity Index (SI) for each habitat. Flock behavior was separated into 6 categories: alert, comfort, feed, locomotion, rest, and other. Behavior data was summarized as the overall mean percentage of geese exhibiting each behavior, and mean percentage of each behavior by habitat type. Differences in behavior by habitat were compared by Analysis of Variance (ANOVA). Duncan's Multiple Range Test clarified significant variance.

RESULTS AND DISCUSSION

A total of 29,141.7 ha was determined to be available for goose use on the habitat route. Soybeans and corn accounted for 68.2% of the available land, winter wheat 18.2%, other forage 6.7%, and wetland 5.4%. Included in the wetland category was a portion of the CLWMA subimpoundment that was planted to corn before flooding. Milo, alfalfa/clover, and other grain comprise the remaining 1.5%. A total of 131,900 geese were observed in 141 flocks. Habitat use is based upon 14 routes (16 routes were driven, but two routes on 5 March had no observations, probably due to the presence of ice still in the fields). Habitat use (Table 1) was highest in corn (46.2%), wetland (24.6%), and winter wheat (21.3%) and lowest in milo, other grain, and alfalfa/clover, which received no use. These data are fairly consistent with habitat use by geese over winter and at spring staging in Wisconsin, with the exception that use of alfalfa clover is quite a bit lower (Bell and Klimstra, 1970;

Pritchert, 1987; unpubl. data, So. Ill. Univ.). Wetland was the only habitat significantly selected for ($P < 0.05$), and soybeans were significantly selected against ($P < 0.05$).

Pritchert (1987) found that geese wintering at Rend Lake, Illinois, selected for winter wheat, alfalfa clover, and wetland, and against soybeans, milo, and other forage.

Flock activity (Table 2) data is based on 95 flocks. Feeding and resting comprised 83% of flock activity. Feeding had an overall mean of 68%, and was significantly greater in corn (66%), soybeans (71%), and winter wheat (87%) than in other forage or wetland (ANOVA; $F=3.8$; $df=4,90$; $P < 0.007$). Rest did not vary significantly by habitat (ANOVA; $F=1.84$; $df=4,90$; $P, 0.127$), but had an overall mean of 15%. Alert, comfort, and locomotion were approximately equal, and made up 15% of the total, while other activities comprised only 2%. Pritchert (1987) had an overall percentages of 31% feeding and 38% resting. Because these percentages include wetlands, which at Rend Lake is primarily lake, and in this study included a flooded corn wetland, mean percentage feeding was compared excluding wetland feeding. This results in geese at Rend Lake showing 57% feeding (Pritchert, 1987), and geese at Vandalia showing 65% feeding.

CONCLUSIONS

Habitat use by Canada geese in the Kaskaskia River Valley remains consistent with habitat use elsewhere. The activity of these birds, however, shows an increase in feeding behavior and a decrease in resting behavior compared to that on wintering refuges in southern Illinois. This high

feeding percentage indicates that the geese could be entering active hyperphagia, beginning protein and lipid deposition in preparation for reproduction when they reach the Kaskaskia River Valley. The importance of this area rests in providing an adequate food supply of grain and forage crops in the spring to insure good productivity for the MVP Canada goose population.

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Table 1. Habitat availability and use by Canada geese in the Kaskaskia River bottoms in central Illinois during Spring, 1988.

Habitat	^a Available		Mean % use (SE)	Selectivity index
	ha	%		
Corn	9922.8	34.0	46.2 (0.1)	1.4
Soybeans	9966.3	34.2	6.7 (0.0)	0.2*
Milo	84.8	0.3	0.0	
Other Grain	245.9	0.8	0.0	
Winter Wheat	5296.3	18.2	21.3 (0.0)	1.2
Alfalfa/Clover	111.2	0.4	0.0	
Other Forage	1950.3	6.7	1.2 (0.0)	0.2
Wetland	1564.1	5.4	24.6 (0.1)	4.6*
TOTAL	29,141.7	100.0	100.0	

^a

Does not include roads, residential areas, forest, and other habitats considered unavailable to geese.

*

Proportional use significantly different from availability (Z - tests, $P < 0.05$)

Table 2. Diurnal activities of Canada Geese in Kaskaskia River bottoms in central Illinois during Spring, 1988.

Habitat ^a	Mean % (SE) Activities					
	Alert	Comfort	Feed	Locomotion	Rest	Other
Corn	7 (2) AB ^b	6 (2) B	66 (5) AB	5 (1) B	14 (4) A	2 (0) A
Soybeans	2 (0) B	3 (1) B	71 (6) AB	3 (1) B	20 (6) A	1 (0) A
Winter Wheat	3 (1) B	2 (1) B	87 (1) A	3 (0) B	4 (1) A	1 (0) A
Other Forage	11 (8) A	3 (0) B	36 (10) B	40 (23) A	9 (4) A	1 (0) A
Wetland	3 (1) B	19 (7) A	44 (10) B	10 (4) B	24 (7) A	1 (1) A
Overall \bar{x}	4 (1)	6 (1)	68 (3)	5 (1)	15 (2)	2 (0)

^a No geese were observed in milo, other grain, or alfalfa/clover habitats.

^b Different letters within columns denote significantly different ($P < 0.05$) means, Duncan's Multiple Range Test.