

# SUBSPECIFIC COMPOSITION OF CANADA GEESE WINTERING IN SOUTHERN ILLINOIS

J.W. Spitzkeit and T.C. Tacha  
Cooperative Wildlife Research Laboratory  
Southern Illinois University  
Carbondale, Illinois 62901

## ABSTRACT

Subspecific composition of Canada geese (*Branta canadensis*) wintering at 3 southern Illinois refuges was estimated based upon culmen and tarsal measurements obtained from 1,079 trapped and 256 harvested adult geese. A data set was constructed from breeding ground measurements of adult *B. c. interior*, *B. c. maxima*, and *B. c. hutchinsii* for comparison to wintering area measurements. Based on discriminant function analysis, 97.0 percent of wintering geese were *B. c. interior*, 2.8 percent *B. c. maxima* and 0.2 percent *B. c. hutchinsii*. Subspecific composition did not vary ( $P>0.1$ ) between years, trapped and harvested samples, or refuges.

## INTRODUCTION

Canada geese wintering in southern Illinois represent a major portion of the Mississippi Valley Population (MVP) that nests in the Hudson Bay Lowlands of northern Ontario west of James Bay and south of Hudson Bay (Hanson and Smith 1950). Over 90% of the MVP winters in southern Illinois at Crab Orchard National Wildlife Refuge (CONWR) in Williamson County, Horseshoe Lake Conservation Area (HLCA) in Alexander County, Rend Lake in Franklin and Jefferson counties, and Union County Conservation Area (UCCA) in Union County and in Kentucky at Ballard County Wildlife Management Area (BCWMA).

Harvest of MVP Canada geese in Illinois is regulated by annual statewide and zone quotas. Alexander, Jackson, Union, and Williamson counties constitute the Southern Illinois Quota Zone, where goose hunting is terminated when annual quotas are reached. About 75% of the statewide Canada goose harvest occurs in southern Illinois; 60% in the Quota Zone and 15% at Rend Lake (Anderson 1984).

MVP geese have long been considered to be *B. c. interior* (Bellrose 1980), although *B. c. maxima* and *B. c. hutchinsii* mix with MVP geese in southern Illinois (Elder 1946, Bellrose 1980). Recent increases in Illinois populations of *B. c. maxima*

(Perkins 1981) have prompted interest in excluding *B. c. maxima* from harvest quotas (D.D. Thornburg, pers. comm.). This study examines the subspecific composition of Canada geese wintering in southern Illinois with emphasis on variation between years, locations, and trapped versus harvested geese.

## METHODS AND MATERIALS

Geese were captured using baited rocket nets (Dill and Thornsberry 1950) and swim-in traps (Arthur and Kennedy 1972). Geese were trapped at Rend Lake Wildlife Refuge during December-February 1982-83 and 1983-84, at UCCA October-February 1983-84, and at CONWR October-November 1983.

Harvested geese associated with each of the study areas were sampled November-December, 1983. Geese harvested at Rend Lake and CONWR were sampled at local hunt clubs and commercial plucking businesses, while geese at UCCA were sampled at the Public Hunting Area located on the refuge.

Length of exposed culmen (Baldwin et al. 1931) and tarsus (Dill and Lee 1970) were recorded for all sample geese. Age and sex were determined according to Hanson (1967).

Data analysis was conducted using the Statistical Analysis System (SAS) (Helwig and Council 1979). A calibration data set for the SAS discriminant function analysis procedure was constructed from breeding ground measurements of adult *B. c. interior* (N = 59) (Ravaling 1977), *B. c. hutchinsii* (N = 34) (MacInnes 1966), and *B. c. maxima* (N = 100) (unpublished data from resident Illinois flock, Southern Illinois University Cooperative Wildlife Research Laboratory) for comparison to measurements from wintering areas. Length of exposed culmen and tarsus were selected as discriminating variables because they were the only variables common to the 3 sets of breeding ground measurements. Measurements from immature geese were not used in subspecies analysis and sexes of adults were analyzed separately because of morphometric differences between ages and sexes (Spitzkeit 1984). Discriminant functions for adult males and females were > 90% accurate in classifying subspecies. Geese measured in southern Illinois were classified as *B. c. interior*, *B. c. maxima*, or *B. c. hutchinsii* by the discriminant procedure. Chi-square tests were used to compare subspecific composition among locations (refuges), years (at Rend Lake), and trapped versus harvested geese.

## RESULTS AND DISCUSSION

Discriminant function analysis of the sample of 1,079 trapped and 256 harvested adult Canada geese from Rend Lake, CONWR, and UCCA was 97.0 percent *B. c. interior*, 2.8 percent *B. c. maxima*, and 0.2 percent *B. c. hutchinsii*. Subspecific composition did not vary ( $P > 0.1$ ) between years (at Rend Lake), trapped and harvest samples, or refuge areas.

The lack of variation in subspecific composition among study locations suggests that subspecific composition of geese does not vary among refuges in southern Illinois. Furthermore, Spitzkeit (1984) found no consistent variation (within age and sex classes) among the same study locations in 13 different morphometric characteristics.

Consistent subspecific composition between years at Rend Lake suggests a few *B. c. maxima* and *B. c. hutchinsii* can be expected each year. However, the observed 97 percent *B. c. interior* justify setting quotas in southern Illinois to protect MVP

geese. Increasing quotas in southern Illinois by 3 percent may be justifiable if quotas are assumed to be an accurate assessment of allowable MVP harvest. Substantially higher proportions of *B. c. maxima* may be available for harvest in central and northern Illinois because of increasing numbers of *B. c. maxima* breeding in those areas. However, additional information on subspecific composition of Canada geese harvested in central and northern Illinois is needed before harvest is increased in these areas.

The three subspecies of Canada geese observed in southern Illinois were equally vulnerable to harvest. These data counter our hypothesis that, due to their larger size and resident nature, *B. c. maxima* are more vulnerable to harvest than other subspecies in southern Illinois.

### ACKNOWLEDGMENTS

Financial support for this study was provided by the Illinois Department of Conservation. We thank C.R. Paine, W.D. Klimstra, and A. Woolf for their advice and support; and D. Thornburg, W. Anderson, M. Carter, W. Mestel, D. Jaques, H. Atchison, L. Leitner, W. Adams, J. Robinson, R. Adams, and R. Harnishfager for field assistance. D.G. Raveling and J.S. Lawrence generously provided breeding ground measurements for use in our discriminant function analysis.

### LITERATURE CITED

- Anderson, W.L. 1984. Illinois waterfowl harvest, hunter activity, and attitudes toward September teal season, duck hunting zones, and goose hunting regulations in 1982. Ill. Dept. Conserv. Periodic Rep. No. 47. 14 pp.
- Arthur, G.C., and D.D. Kennedy. 1972. A permanent site waterfowl trap. J. Wildl. Manage. 36(4):1257-1261.
- Baldwin, S.P., H.C. Oberholser, and L.C. Worley. 1931. Measurements of birds. Scientific Publications of the Cleveland Museum of Natural History. Vol. II, Contribution No. 17. 143 pp.
- Bellrose, F.C. 1980. Ducks, geese and swans of North America. 3rd ed. Stackpole Books, Harrisburg, PA. 540 pp.
- Dill, H.H., and F.B. Lee, eds. 1970. Home grown honkers. U.S. Fish and Wildl. Serv. 154 pp.
- \_\_\_\_\_, and W.H. Thornsberry. 1950. A cannon projected net trap for capturing waterfowl. J. Wildl. Manage. 14(2):132-137.
- Elder, W.H. 1946. Age and sex criteria and weights of Canada geese. J. Wildl. Manage. 10(2):93-111.
- Hanson, H.C. 1967. Characters of age, sex, and sexual maturity in Canada geese. Ill. Nat. Hist. Surv. Biol. Notes 49. 15 pp.
- \_\_\_\_\_, and R.H. Smith. 1950. Canada geese of the Mississippi Flyway, with special reference to an Illinois flock. Bull. Ill. Nat. Hist. Surv. 25(3):59-210.
- Helwig, J.T., and K.A. Council, eds. 1979. SAS user's guide. SAS Inst., Inc. Raleigh, NC. 494 pp.
- MacInnes, C.D. 1966. Population behavior of eastern arctic Canada geese. J. Wildl. Manage. 30:536-553.
- Perkins, G.A. 1981. Status of giant Canada geese nesting in central Illinois. M.A. Thesis. So. Ill. Univ., Carbondale. 120 pp.
- Raveling, D.G. 1977. Canada geese of the Churchill River Basin in northcentral Manitoba. J. Wildl. Manage. 41(1):35-74.
- Spitzkeit, J.W. 1984. Morphometric and taxonomic characteristics of Mississippi Valley Canada geese wintering in southern Illinois. M.A. Thesis. So. Ill. Univ., Carbondale. 27 pp.