

DIFFERENTIAL MIGRATION IN YEARLING AND ADULT LESSER SNOW GESE (*ANSER CAERULESCENS*)¹

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INTRODUCTION

The conservation and management of a migratory game species depend upon adequate understanding of the behavior of all segments of the population. Excessive hunting pressure on a population segment which traditionally winters in a specific area or a segment which traditionally migrates early may exterminate that tradition. Lesser Snow Geese (*Anser caerulescens*) of both blue and white color phases, not only have a long migration route but also, in recent years, are taking longer to complete the flight. A group of geese continues to arrive on the Gulf States wintering grounds early, and there has been speculation about the identity of these birds.

Cooch (1961) has reported that “. . . subadult Blue/Snow Geese remain with their parents until the first stages of incubation, then moult on the periphery of the breeding colony. There they associate with second year and failed-breeding adults. That cohort of the population migrates in mid-August and reaches the wintering areas in early October.” Successful breeders presumably migrated later.

It is possible, however, that this early migrating group of geese could be composed of a discrete segment of the population with this migratory tradition. Good management requires that we know the category to which these early migrating geese belong. If a discrete segment of the population is involved it would be important to ensure adequate escapement through appropriate regulation of the harvest.

METHODS

Band recovery data offer an opportunity to test the hypothesis that yearlings migrate earlier than breeding-age adults. If this hypothesis is correct, the yearling class of geese should have a temporal and geographical kill distribution that reflects their earlier migration and differs from that of breeding-age adults. The available data for the colonies on the coasts of Hudson Bay and Baffin Island were included in this analysis. Excluded are data for certain years in any colony where only adults or only locals (i.e., nonflying immatures) were banded. The central and western Arctic colonies were excluded because migration phenologies of their birds differed from those of the eastern colonies.

Few birds have been identified as yearlings at banding. For the purposes of this analysis first-year indirect recoveries of locals composed the yearling class and first-year indirect recoveries of birds recorded as “after hatching year” on the banding schedules were classed as adults.

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Figure 1 divides the migration route of these geese into five zones. Four of these zones have been used for the purpose of this analysis. Zone II was excluded because of the scarcity of recoveries. Band recoveries were compiled for 10-day periods, but the last of these periods in October, December, and January contained 11 days.

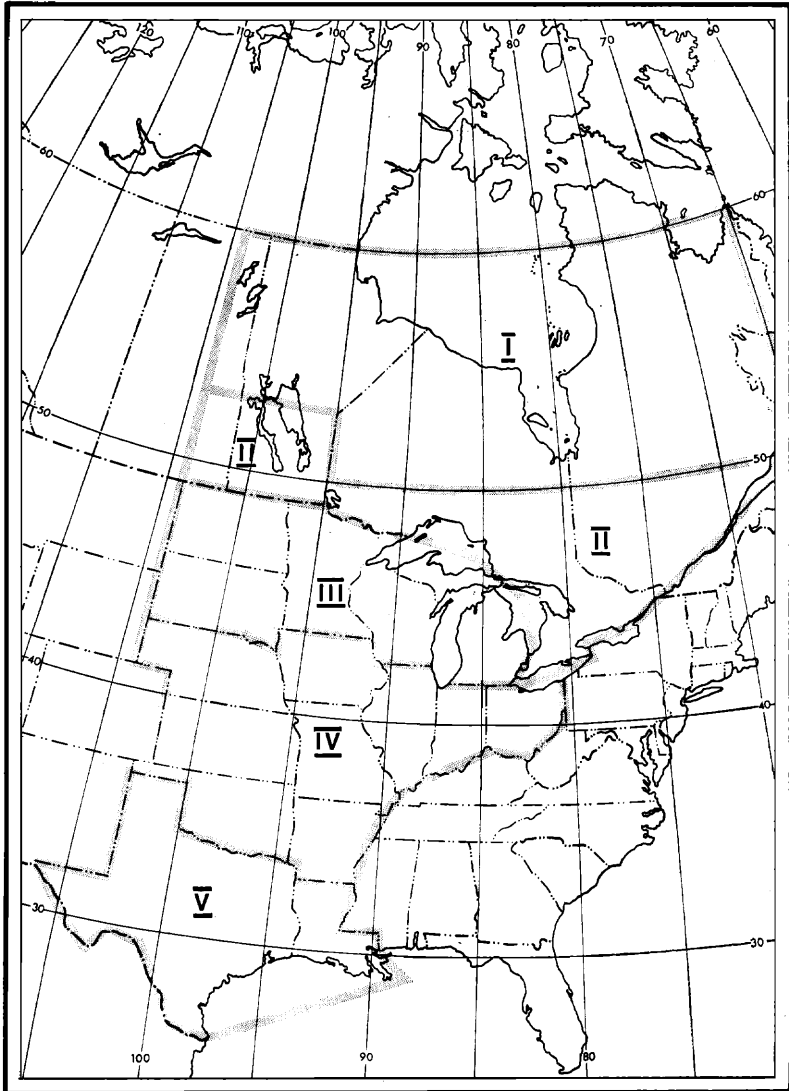


FIGURE 1. Zones on the migration route of Lesser Snow Geese breeding in the eastern Arctic. I. Hudson-James Bays. II. Southern Canada. III. Northern States. IV. Central States. V. Gulf Coast States.

RESULTS AND DISCUSSION

Table 1 summarizes the temporal distribution of 1,679 recoveries in these four zones. Data for both blue- and white-phase geese have been combined. For the purpose of analysis all totals in any 10-day period that amounted to less than five recoveries have been combined with the neighboring 10-day totals. A G-test (Sokal and Rohlf, 1969) was applied to the yearling : adult ratios in each zone. A significant difference was detected in Zone 1 ($P < 0.01$). There, until 20 September, yearlings outnumbered adults in the kill, but thereafter there was a steady rise in the proportion of adults until they outnumbered yearlings in the kill 5.67:1 in the 1-10 October period. Thereafter there was a sharp drop in the proportion of adults.

Zone I includes the coasts of James Bay and Hudson Bay and is the first staging area used by the geese in fall after leaving their brood range. Geese do not reach their maximum abundance on the south coast of Hudson Bay until just before mid-October and in southern James Bay a week later.

Two possible explanations exist for the observed patterns of band recoveries. Yearlings may reach the Canadian coastal staging areas earlier than breeding adults. The latter, made vulnerable to hunting by their still undersized young, arrive over a longer period of time and increase in numbers to a peak about 10 October. After breeding adults with their young have left, some yearlings and possibly adults that failed to nest linger until driven out by freeze-up.

There is evidence that in some years flocks of geese, lacking immatures, remain on the coast of Hudson Bay after the majority of the productive breeders have left on migration. A survey flight along 200 miles of the Hudson Bay coast from Winisk to the Manitoba border was carried out on 6 October 1972. A total of 8,693 Blue and Snow geese were photographed and only 1.29% were identified as immatures.

Freeze-up came unusually early in 1972 and a high proportion of the geese that stage along this coast had left by the time this survey flight was carried out. Lynch (1973) recorded 9.7% immatures among wintering Blue/Snow geese on the Gulf Coast in his mid-winter appraisals in 1972-73. He has also pointed out in many of his unpublished annual reports that a higher proportion of immatures is tallied in his early appraisals in October and November than later in the winter.

Lynch's data for the Gulf States (1973), however, related to a mixture of birds from all colonies in the eastern Arctic. In 1972, breeding success was low on Baffin and Southampton islands, but about normal in the colonies on the west and south coasts of Hudson Bay. This disparity in breeding complicates any comparison between Hudson Bay and the Gulf States.

The second, and less likely, explanation would require most of the yearlings to leave the coast staging areas progressively as the season advanced, leaving an increasing proportion of adults to contribute to the hunters' bags. However, there is no evidence

TABLE 1.
Summary of recoveries of banded Lesser Snow Geese by 10-day periods throughout the hunting season in four zones of the Mississippi and Central flyways. Yearlings (Local first, year indirect) are compared with adults (AHY first-year indirect).

Zone I	Sept.		Oct.		Oct. 11-				
	1-20	21-30	1-10	11-20	Nov. 20				
Yearling	20	13	6	14	←				
Ratio	0.95:1	3.15:1	5.67:1	1.36:1	←				
Adult	19	41	34	19	←				
Zone III	Sept. 21-		Oct.		Nov.		Jan.		
	1-20	Oct. 10	11-20	21-30	1-10	11-30	11-20		
Yearling	2 ¹	54	83	48	28	8			
Ratio	1 ¹	1.67:1	1.87:1	1.81:1	1.50:1	1.63:1	←		
Adult		90	155	87	42	13	1 ¹		
Zone IV	Oct.		Oct.		Nov.		Nov.	Dec.	
	1-10	11-20	11-20	21-31	1-10	11-20	21-30	1-31	
Yearling	15	22	17	17	5	12	7	12	
Ratio	2.23:1	2.23:1	2.59:1	2.80:1	2.80:1	0.58:1	1.29:1	1.25:1	
Adult	35	49	44	44	14	7	9	15	
Zone V	Oct.		Oct. 11-		Nov.		Dec.	Dec.	Jan. 11-
	1-10	11-20	11-20	Nov. 10	11-20	21-30	1-10	21-31	Jan. 1-10
Yearling	2 ¹	28	14	28	35	20	38	50	9
Ratio	1 ¹	1.50:1	2.43:1	1.51:1	1.51:1	2.75:1	1.83:1	1.66:1	2.05:1
Adult		42	34	34	53	55	83	83	78

¹Omitted in the calculations because the season was closed during these periods. The reporting date and/or location of recovery may have been in error.

from Zone III and IV of a high proportion of yearlings arriving before the breeding adults. Indeed there is evidence to the contrary.

In Zone III recoveries of adults outnumber those of yearlings throughout the season, and no evidence of trend or change toward an increased proportion of yearlings exists. In Zone IV adult recoveries outnumber yearlings by an even greater amount than in Zone III throughout October and the first third of November. However, in mid-November a significant change takes place and yearlings outnumber adults by a substantial margin.

This change, which first shows up in the period of 11-20 November, prevails for the rest of the season in Zone IV. The ratios recorded in the periods 21-30 November and 1-31 December do not differ (ns) from the ratio of 11-20 November. Furthermore, the total ratio obtained from 11 November to 31 December differs ($P < 0.05$) from the total ratio that prevailed from 1 October to 10 November.

This ratio change, first appearing in the period 11-20 November, could be caused by the exodus of breeding adults into Zone V. However, the rise in proportion of adults in Zone V in this period is not significantly different (ns) from the ratio that prevailed during the previous three 10-day periods.

What is the possibility of a strong influx of yearlings into Zone IV about 11 November? The last of the yearlings leave the Hudson Bay coast in late October and James Bay at the end of the first week in November. It is possible that some of these birds overfly or move fast through Zone III and arrive in Zone IV about this time without significantly altering the Zone III ratios. In view of the numbers of birds involved, it is likely that a combination of the exodus of adults and influx of yearlings is responsible for the changes observed.

There is a possibility that combining all years, as has been done in Table 1, may obscure a phenomenon that occurs only intermittently. The data summarized in Table 1 have been examined by year of banding and by zone to detect differential migration in any individual year (Table 2).

Most of the sample sizes for single years are extremely small. A dividing date between early and late periods for each Zone was chosen to split the samples into more or less equal parts.

Thus for Zone I the samples are separated between 30 September and 1 October, Zone III is divided between 20 and 21 October, Zone IV between 31 October and 1 November and Zone V between 10 and 11 December. A total of 48 comparisons is possible. In only three instances do yearlings outnumber adults significantly in the kill. These were in 1969 in Zone III and in Zone V in 1952 and 1959. These data do not support the hypothesis that yearlings now migrate to the Gulf States earlier than breeding-age adults.

The banding of Lesser Snow Geese on the breeding grounds is not likely to determine whether the early migrating birds are a discrete group with this tradition. These early migrating birds can be marked for further study only in the Gulf States in October.

TABLE 2.
Summary of recoveries during the early and late part of the hunting season in four zones of the Flyways. Yearlings (Local first-year indirect) are compared with adults (AHY first-year indirect).

Zone		I		III		IV		V	
Year		Early ¹	Late ¹	Early	Late	Early	Late	Early	Late
1970	Yearling	12	5	23	17	10	14	12	19
	Adult	4	4	12	16	6	7	11	14
1969	Yearling	0	2	8	1	3	4	2	13
	Adult	0	0	7	6	4	1	5	14
1968	Yearling	0	1	7	8	0	1	5	5
	Adult	1	1	7	8	2	3	2	10
1967	Yearling	0	0	7	4	2	2	0	4
	Adult	1	0	1	4	3	0	5	8
1966	Yearling	1	0	3	1	1	0	2	2
	Adult	5	0	19	3	5	0	10	8
1965	Yearling	1	2	9	4	3	1	6	9
	Adult	3	1	29	14	14	3	29	28
1961	Yearling	1	0	2	1	2	0	0	3
	Adult	15	17	40	18	19	2	25	25
1960	Yearling	2	2	42	28	17	6	15	18
	Adult	6	3	34	23	15	4	22	20
1959	Yearling	0	0	0	2	2	2	10	2
	Adult	0	1	1	3	2	0	10	17
1954	Yearling	0	0	1	1	0	0	6	5
	Adult	0	1	4	0	0	0	4	4
1953	Yearling	3	2	27	11	7	0	28	25
	Adult	9	1	55	20	25	1	36	44
1952	Yearling	9	0	1	1	1	2	21	17
	Adult	5	0	3	4	3	0	4	14

¹See text for definitions.

SUMMARY

Band recoveries of Lesser Snow Geese were examined to determine whether yearlings differed from adults in the timing of their migration to the Gulf States. The data suggest that yearlings arrive on their first staging areas on the coasts of James and Hudson bays before productive adults and some yearlings tend to leave after the majority of breeders have left. In Zone IV (chiefly the states of Iowa, Missouri, Nebraska, and Kansas) adults outnumber yearlings in the kill until the period 11-20 November, during and after which a significant increase in the proportion of yearling recoveries takes place.

There is no evidence that in recent years yearlings migrate earlier to the Gulf States than successful breeding adults.

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