

MIGRATION OF RESIDENT AND MIGRANT CANADA GEESE BANDED AT NECEDAH NATIONAL WILDLIFE REFUGE

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INTRODUCTION

The migration of Canada geese through the north central states has been investigated by a number of authors (Hanson and Smith 1950, Vaught and Archer 1965, and Bellrose 1968). Necedah National Wildlife Refuge, located in central Wisconsin, has both a resident flock and spring and fall migrant geese. The resident flock of approximately 320 is a descendent of 43 Great Basin Bear River Refuge geese (*Branta canadensis moffitti*) introduced to Necedah in 1939. Migrant geese (primarily *Branta canadensis interior*) are part of the Mississippi Valley population.

Through 1969, 3,716 migrant Canada geese and 72 resident geese have been banded at Necedah with 738 (20.2%) migrant recoveries and 41 (56.9%) refuge flock recoveries. An analysis of these recoveries indicated a different migration route for the resident flock than for the migrant geese. A color marking project in 1968 verified a distinct fall southwest migration route for the refuge flock similar in direction to the migration route of Bear River Canada geese. Fall migrant geese from the North move primarily southeast from Necedah following the migratory pattern of the Mississippi Valley population.

METHODS

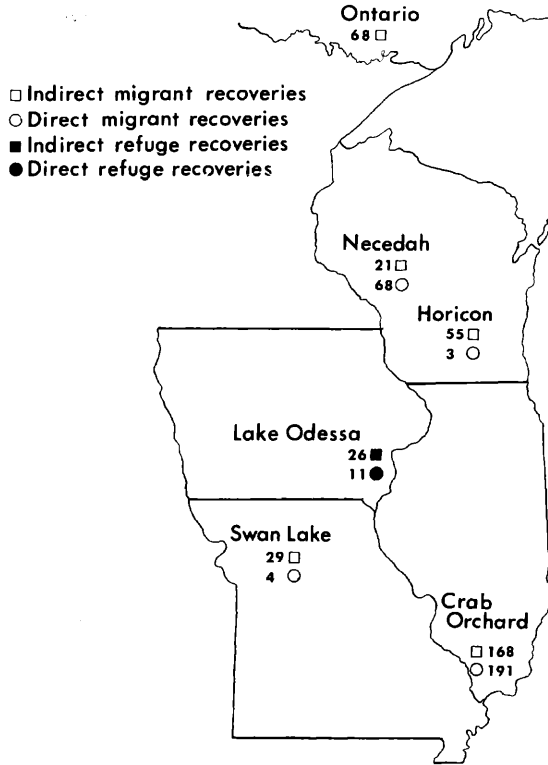
Band Analysis. Geese banded from June 1 to September 1 were considered to represent the refuge flock. Most were captured while flightless by drive trapping. All other geese banded were considered migrants and were captured by cannon or rocket netting. Each recovery was recorded on a McBee punch card. The refuge flock recoveries were separated from migrant recoveries and both categorized according to the recovery coordinates.

Color Marking. In 1968, 19 Canada geese were captured by rocket netting during August and color marked with 1-inch, numbered yellow leg bands. Loafing sites were selected as banding sites as the rockets and banding nets are easily transported. Observations were made daily to determine when the local flock would migrate.

RESULTS

Table 1 summarizes the band recoveries including both recaptures and hunting mortality by state for both the refuge flock and migrant geese. The refuge flock recoveries from Iowa and Illinois were (35) within coordinates of 410 or 411-0910 or 0911 and two within coordinates of 403 or 404-0911 (all near Lake

Figure 1 Principal Recovery Areas



Odessa, Iowa) (Fig. 1). No migrant recoveries were within these coordinates. The two Wisconsin recoveries were from the Necedah area. The Missouri recovery in January 1969 was near Kansas City which may indicate a further late winter movement by the flock. The higher rate of recovery (56.9%) reflects heavy hunting pressure in a public hunting area at Lake Odessa, Iowa, the primary fall and wintering area.

Over 46.1 percent of the migrant recoveries were from the Horse Shoe Lake, Union County and Crab Orchard refuge areas including close Kentucky and Missouri recoveries. Wisconsin migrant recoveries were primarily near the Necedah (89) or Horicon (58) refuges. Ontario accounted for 68, Quebec 10, Manitoba two, Saskatchewan two, and Northwest Territories one, indirect recoveries. The Swan Lake refuge area had four direct and 29 indirect recoveries. These recoveries may represent the Eastern Prairie population of Canada geese rather than the Mississippi Valley population as suggested by Vaught and Kirsch (1966).

To determine when and to substantiate where the refuge flock

TABLE 1. SUMMARY OF RECOVERIES BY STATES

	*Direct Recoveries	**Indirect Recoveries	Total Recoveries	Percent of Total Recoveries
Migrant Geese				
Illinois	211	134	345	44.3
Wisconsin	89	118	207	26.6
Canada		89	89	11.4
Missouri	11	33	44	5.6
Kentucky	17	10	27	3.5
Minnesota		5	5	.6
Tennessee		4	4	.5
Indiana		3	3	.4
Michigan		2	2	.3
North Dakota		2	2	.3
Iowa		2	2	.3
Penn., Ark., Ohio		6	6	.7
Texas, Ala., Va.				
Unknown		2	2	.3
Refuge Geese				
Iowa	11	26	37	4.7
Wisconsin		2	2	.3
Illinois		1	1	.1
Missouri		1	1	.1
	339	440	779	100.0

*Direct Recovery: A recovery during the banding year.

**Indirect Recovery: A recovery during years following the banding year.

was migrating, 19 were color marked during the summer of 1968 with numbered, yellow plastic leg bands. Observations of the geese at Necedah combined with observations and recapture of color marked geese by the staff of the Louisa Unit of the Mark Twain National Wildlife Refuge during early September indicated that the refuge flock had left prior to the arrival of migrant geese at Necedah. Spring observations of color marked geese in 1969 indicated that the refuge flock also returned prior to the arrival of other migrant geese.

DISCUSSION

Hamilton and Hammond (1960) in describing an oriented northward overland migration route of pinioned Canada geese during the spring suggested that the geese were using celestial cues rather than remembered land marks or mimetic mechanisms for orien-

tation as suggested for some waterfowl (Hochbaum 1955). Bellrose (1963) also reported that Canada geese used celestial cues in determining migration direction. The direction (azimuth 196°) of migration of Necedah's goose flock and the direction (azimuth 196°) from the Bear River refuge to the Great Basin Canada goose wintering area along the lower Colorado River are similar. A possible explanation for this similarity could be the use by the Necedah flock of the same celestial cues which could dictate a similar direction as used by the original parent stock from the Bear River refuge. Familiarity with terrain features cannot be considered as an explanation for the similarity or mimetic behavior as Necedah's flock migrates prior to the arrival of migrant geese.

SUMMARY

An analysis of band returns of geese banded at Necedah National Wildlife Refuge indicated a distinct migration route for the resident flock different from the migrant geese. A similarity exists in migration direction between the Necedah flock and the Great Basin Bear River geese from which the Necedah flock was obtained. The use of celestial cues could explain this.

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