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Seney National Wildlife Refuge

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UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife

KILL AND MIGRATION PATTERNS
OF THE
SENEY GOOSE FLOCK

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KILL AND MIGRATION PATTERNS OF THE SENEY GOOSE FLOCK*

INTRODUCTION

An intensive investigation into the limiting factors and behavior of the Seney Canada goose (Branta canadensis maxima--Hanson, 1965) flock was conducted from June, 1962 to August, 1965. A portion of the study findings, concerning kill and migration patterns, is reported here.

The 95,500 acre Seney National Wildlife Refuge is situated in the east-central sector of Michigan's upper peninsula, in the southwest quadrant of land formed by the junction of state highways M-77 and M-28. It is composed of four broad habitat types of which approximately 400 acres are cropland, 26,900 acres upland brush and timber, 61,000 acres marshland, and 7,200 acres open water. Twenty-one pools, ranging from 27 to over 1,000 acres in size, contain most of the open water acreage.

Seney is a part of, what was once known as, the Great Manistique Swamp. In describing the area, Halladay (1965) stated that "The region is characterized by vast expanses of lowlands, consisting of a black spruce bog condition interspersed with patches of sedge glade and strips of high ground which support white, red, and jack pine. . . the general topography is very flat with the natural drainage being from northwest to southeast with a constant gradient of from 5 to 10 feet per mile. . . the soil and subsoil is pure medium sand. Only a few inches of the surface layer have weathered and contain organic matter. Accumulations of peat and muck have formed throughout (most) of the bog and wet areas. (Peat) depths of from 3-8 feet cover the sub-surface sandplain which underlies the entire region. "

* This investigation was conducted while the author was employed with the Division of Refuges as a wildlife management biologist at the Seney National Wildlife Refuge.

Flock Size and Annual Production

Flock size and annual production figures for 1963 through 1965 are shown in Table 1.

Table 1. Flock Size and Annual Production Data, 1963-1965.

Year	Breeding Pairs	Nesting Success %	Goslings Hatched	Goslings to Flight	Fall Flock Size
1963	181	70	609	475	1100
1964	235	59	627	100*	800
1965	227	67	676	490	1000

* Die-off claimed approximately 500 goslings from June 3-10, 1964.

Annual Mortality Rate

Seney Refuge personnel banded 943 geese, from 1962 to 1965, for the purposes of this study (Table 2). An additional 528 geese were retrapped during the same period for a grand total of 1471.

Table 2. Seney Canada Goose Banding Data, 1962-1965.

Year	Number Banded	Number Retrapped	Total Trapped	Total Returns	Direct Returns	% Direct Return
1962	345	86	431	47	19	5.5
1963	219	155	374	36	15	6.8
1964	316	225	541	31	14	4.4
1965*	63	62	125			

* Incomplete

Band reporting rates for ducks run 40 to 50 percent (Geis and Atwood, 1961). Band reporting rates for geese were not known, but have been estimated to be at least as high, if not higher, than the rate for ducks.

Hunting season mortality figures (Table 3) were based on an assumed 50 percent band reporting rate, a 22.5 percent crippling loss rate (Green, Nelson, and Lemke, 1963), and on data presented in Table 2. The calculations were made, as follows, using 1964 as an example:

Thus:	14	= direct returns of 316 banded
	<u>x2</u>	= for 50% band reporting rate
	28	= geese shot of 316 banded
Then:	22.5	= % crippling loss
So:	$\frac{28}{77.5} \times 22.5$	= 8 = crippling loss
Then:	28	= 77.5% of total kill bagged
	<u>+8</u>	= 22.5% of total kill crippled
	36	= total kill from 316 banded
Further:	$\frac{36}{316}$	= 11.1% total 1964 kill rate
Thus:	800	= fall flock 1964
	<u>x11.1%</u>	= total 1964 kill rate
	89	= total 1964 kill from flock
So:	800	= fall flock 1964
	<u>-89</u>	= total 1964 kill
	711	= theoretically to return
But:	711	= theoretically to return
	<u>-550</u>	= actually return spring 1965
	161	= natural mortality loss
Therefore:	800	= fall flock 1964
	<u>-550</u>	= spring flock 1965
	250	= total mortality in flock
So:	$\frac{250}{800}$	= 31% flock mortality rate from fall 1964 to spring 1965
Of which:	11.1%	= total 1964 kill rate
	19.9%	= total 1964 natural mortality rate

From the foregoing and from data presented in Table 3, there was ample reason to suspect that the assumed 50 percent band reporting rate was too high. The validity of the suspicion was strengthened because of the Seney flock's relative isolation, small size, and associated reasonably accurate census figures, and high percentage of banded birds (about 50% of flock).

Note, too, from Table 3 that the natural losses appear to be considerably higher than one would suspect and possibly beyond reason for 1962-63, and 1964-65.

Table 3. Annual Total Mortality Rates of Seney Goose Flock, 1962-65.

Year	Fall	Spring	Kill*		Other Loss**		Total Loss	
	Population	Population	No.	%	No.	%	No.	%
1962-63	1200	700	170	14.2	330	27.5	500	41.7
1963-64	1100	750	196	17.8	154	14.0	350	31.8
1964-65	800	550	89	11.1	161	19.9	250	31.0

* Includes crippling loss.

** Includes disease, accidents, and predation.

It is believed that the band reporting rate should be more accurately placed in the 20 to 25 percent range. Additional studies on this subject are urgently needed.

Kill Distribution and Migration Patterns

Canada geese are lightly harvested in the Seney area. Yet, peak fall populations of Canada geese annually ranged from 4,000 to 8,000 of which 1,000 to 2,000 were Seney birds. An estimated 275 geese were shot locally in the fall of 1964. This was the highest take since 350 were bagged in 1956 (Table 4).

Table 4. Estimated Local Kill of Canada Geese Near Seney Refuge
1955-1964.

Year	Kill	Year	Kill
1964	275	1959	25
1963	150	1958	250
1962	100	1957	100
1961	150	1956	350
1960	150	1955	125

Refuge personnel have felt for some time, however; that the local kill consisted heavily of migrant geese. Band recoveries, observations, and weights and measurement comparisons conclusively proved this to be true.

The weight and measurement comparisons between Seney and migrant Canada geese showed some obvious differences. For example, culmen size averaged 52.8 mm. (sample size = 48) in the migrant birds, but 58.5 mm. (sample size = 50) among Seney geese. Also, the heaviest migrant weighed 9 pounds 10 ounces, whereas the largest Seney birds went to 16 pounds.

Fifty-three geese harvested locally in the fall of 1964 were examined, weighed, and measured. Only five were Seney geese, indicating that slightly over 90 percent of the local kill was composed of migrant geese (Branta canadensis interior).

Distribution of the hunting kill is shown in Figure 1. Note that the main pattern of migration for the Seney flock is a narrow band running nearly due south along the eastern shore of Lake Michigan, through western Indiana, thence down the Wabash River Valley and into the Tennessee-Kentucky Lake impoundment. Most of the geese winter on the impoundment on the Tennessee National Wildlife Refuge near Paris, Tennessee. Lands adjacent to this refuge constitute the major harvest area for Seney's flock.

A few Seney geese have continued down from the Tennessee Refuge to the Sardis Game Reserve near Oxford, Mississippi. Deepest southerly penetration noted came from a 1964 band recovery from Newton, Mississippi, less than 150 miles north of the Gulf of Mexico.



Figure 1. Distribution of Hunting Kill from Seney Banded Geese.

Biases in Seney Canada Goose Banding Data

Two sources of biases concerning Seney's banding program and related band recovery analysis were uncovered during the study. Segments of the molting population and migrant Canadas were involved in the confusion.

Evidence was accumulated, largely from observations of marked geese,* that proved that a number of yearling and non-breeding resident geese from the Lower Peninsula of Michigan annually migrated 150 to 400 miles north in early summer to molt at Seney.

It was then concluded that the band recoveries from geese shot in central and eastern Lower Michigan, southwestern Ontario, and the Ludington State Park Area of northwestern lower Michigan (Figure 1) were not really geese raised at Seney. They had simply been banded at Seney as molters, but were actually from local breeding flocks associated with the Shiawassee National Wildlife Refuge, Kensington Metropolitan Park, Ludington State Park, and other smaller areas in Lower Michigan. The mounting evidence to support this was, as follows:

1. Seven band bearing geese trapped in the molt at Seney (five in 1962 and two in 1964) were found to have been hatched and raised at Shiawassee National Wildlife Refuge in Michigan's Lower Peninsula, some 250 miles south of Seney.
2. Two geese, banded and marked with nasal discs and colored leg bands (Nos. 222 and 189) on July 5, 1962 at Seney were observed nesting in May, 1963 on Lobdell Lake about 20 miles south of Flint, nearly 300 miles south of Seney. They hatched and raised four goslings on the lake.
3. Two geese, banded and marked with orange collars V7 and R5 on July 3, 1963 at Seney, raised a brood of four in 1964 at Ludington State Park, about 160 miles south of the Refuge.
4. A goose marked at Seney with an orange collar (F7) on July 5, 1963, was later observed frequently in 1963 and 1964 in Washtenaw and Jackson

* Personnel of the Michigan Department of Conservation, Indiana Department of Conservation, Tennessee Game and Fish Department, and Tennessee National Wildlife Refuge were instrumental, through their observations of marked geese, in helping to solve these problems.

Counties of the Lower Peninsula. In 1965, F7 and an unmarked bird raised a brood of four on Bartig Lake in Jackson County, nearly 350 miles south of Seney.

5. None of the 16 marked family groups, containing 93 individually marked geese, were ever observed in southeastern Michigan, but 12 such individuals were sighted on the Tennessee National Wildlife Refuge.

6. Collar observations from Lower Michigan have, also, indicated that a small number of geese annually departed from Seney immediately following the molt. In 1963, the first marked bird turned up in Lower Michigan on July 31 after it had been marked at Seney on July 3. Similarly, in 1964, four marked birds were observed at Ludington State Park on July 29. They had been marked at Seney on July 1. Fifteen marked birds were involved in these early southward migrations. None ever returned to Seney, but of eleven in the 1963 migration, eight were again observed in Lower Michigan in 1964, and early 1965.

Observations of marked geese documenting the above, plus many other sightings, are shown in Figure 2.

The other source of confusion in interpreting band return data involved fall migrants. At times in the past, personnel have banded substantial numbers of geese in late September and October. As a result, data on the distribution and rate of kill for the Seney flock was erroneous because sub-specific differences between Seney and migrant geese had not then been worked out and little attempt was made to differentiate the two in banding records.

Consequently, band recoveries came in from Wisconsin, Illinois, Ontario, and scattered points in Michigan. These recoveries formed erroneous impressions as to the migration route and distribution and kill rate of the Seney Geese. In recent years, for example, geese banded at Seney have not been shot in the Fennville-Swan Creek area of southwestern Michigan. The reason is simply that Seney has not banded migrant geese for several years and the refuge flock by-passes that hunting area.

To adequately eliminate the two sources of confusion, it was concluded that the major banding effort should be carried out in August and early September. Since the Lower Peninsula geese depart immediately after the molt (late July) and as the migrants do not arrive until mid-September, the timing of such a banding effort would exclude geese which are not part of the Seney flock.

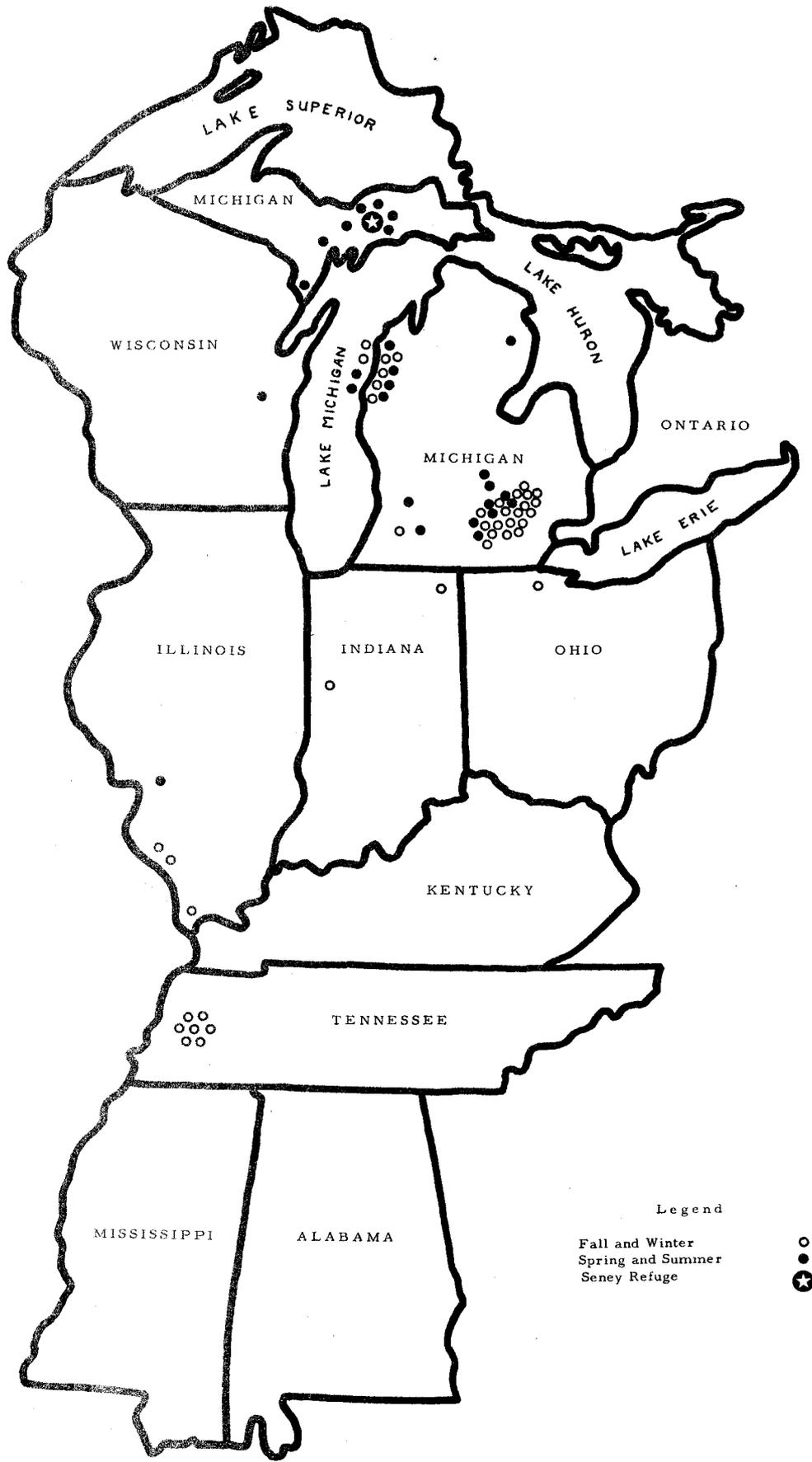


Figure 2. Reported Observations of Canada Geese Marked at Seney, 1962-1965.

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