

SNOWY OWL MIGRATION¹—1930—1931.

BY ALFRED O. GROSS.

(Plate XI.)

THERE was an unusual number of Snowy Owls reported during the winter of 1930-31. Because of the interesting relation the movements of these birds have with the cycles of life, especially of rodents, the chief food of the Owls in the north, makes it desirable to place this invasion of Snowy Owls on record. The last extensive migration occurred in 1926-27² when the visitors attracted wide attention from ornithologists as well as from the general public. At that time 2363 Snowy Owls were reported to us from the United States and this number represented but a fraction of those which made up that remarkable invasion. The bulk of the records of the 1926-27 migration came from the Great Lakes region, south-eastern Canada, New England and south along the Atlantic coast to Long Island, New Jersey and Maryland. The migration during the past winter 1930-31 was not as great in magnitude at least in the numbers which crossed the borders of northern United States. However, 1313 Snowy Owls were reported to us this year from southern Canada and United States, whereas ordinarily there are but comparatively few records.

Dr. Ralph E. DeLury has found what appears to be a definite relationship of the eleven year sunspot cycle to rainfall, numbers of certain species of animals, annual growth of trees, etc. He has also called our attention to a four year period which he states is possibly related to the periodic fluctuations in mice and lemmings. It is interesting to note that this migration 1930-31 represents a four year period from the last migration and there is also a great probability that these migrations are prompted at least in part by the scarcity of mice and lemmings in the north. In reviewing the dates of Snowy Owl migrations that have been recorded it is seen that in many instances they have followed intervals of four or five years or multiples of that length of time. In this connection it is

¹ Contribution from the New England Ruffed Grouse Investigation.² Gross, A. O. *Auk*, Vol. XLIV, No. 4, pp. 479-493. 1927.

extremely interesting to compare the dates of Snowy Owl invasions with those of the years of greatest abundance of Arctic foxes, animals which are also chiefly dependent on mice and lemmings for their existence. Mr. Charles Elton of Oxford, England, who has been gathering statistics of fur bearing animals in connection with special investigations conducted for the Hudson's Bay Company,

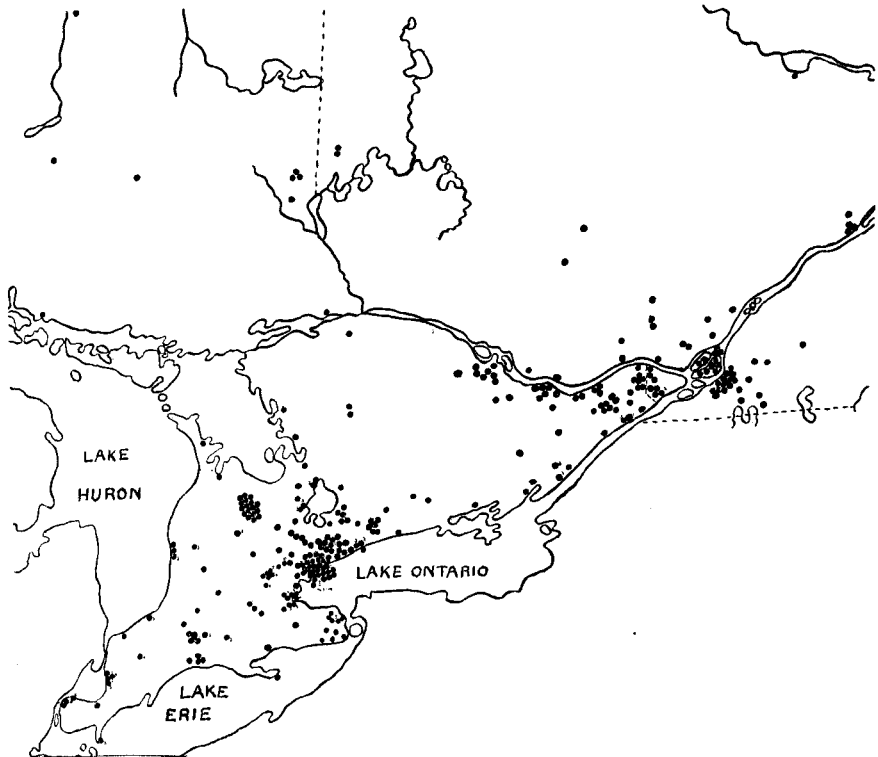


Fig. 1. Snowy Owl Records for Canada, 1930-1931.

From drawing by James H. Norton.

has kindly consented to give us the use of unpublished records of dates of maximum numbers of Arctic foxes collected at the Hudson's Bay Post at Fort Chimo. The years for maximum numbers of Arctic foxes shown in the following table, are according to Mr. Elton not the actual years in which returns were made but refer to

the previous year, the time of biological production. Since both the foxes and Snowy Owls are largely dependent on lemmings it is interesting to note to what a remarkable degree the dates of the Snowy Owl invasions and fluctuations in numbers of Arctic foxes synchronize.

<i>The years of periodic maximum numbers of Arctic foxes</i>	<i>Dates of Snowy Owl invasions as recorded in 'The Auk'</i>
1872	
1876	1876-77
1879	
1882	1882-83
1887	
1890	1889-90
1893	1892-93
1897	1896-97
1901	1901-02
1905	1905-06
1909	
1913	
1917	1917-18
1921	
1926	1926-27
1930	1930-31

In the above table the dates of maximum numbers of Arctic foxes at Fort Chimo as supplied by Mr. Elton are shown on the left and the dates of the Snowy Owl migrations as recorded in the Auk are given in the second column. It is possible that in the years when there were no Snowy Owl invasions corresponding to the Arctic fox four year maximum that a migration on a smaller scale occurred which did not attract sufficient attention of ornithologists to be put on record as a whole. This assumption is borne out to a certain extent by individual records of Snowy Owls published by newspapers and various ornithological journals in those years.

The four year cycle of the abundance of Arctic foxes and the corresponding regular periods of migration of the Snowy Owls are suggestive that some extraordinary influence is at work. The invasions of the Snowy Owls as well as the numbers of Arctic foxes are apparently dependent on the fluctuations of mice and lemmings and the latter in turn dependent on some regular cyclic condition

which might possibly be sun spots which affect the relative amount of ultra-violet light rays. Whether sun spots directly or indirectly affect the life of these rodents, through an influence on growth, reproduction or disease, is yet to be proven before it will be safe to state that sun spots are a basic cause of Snowy Owl migrations. At present it is merely an interesting theory.

Reports from Mr. P. A. Taverner and Mr. Bert Lloyd state that there were very few mice and lemmings in the vicinity of Churchill and Chesterfield on Hudson Bay during the summer of 1930. Mr. Taverner states, that the tundra in places was filled full of lemming holes but they were all old and of some hundred or so carefully examined not one was inhabited. He did not see a rabbit or hare during the entire summer and remarks that the Raptors had slim pickings on mammals in that section. The following notes contained in a letter from Mr. George Miksch Sutton concerning conditions on Southampton Island located at the northern end of Hudson Bay on Hudson Strait are of interest in the present migration,—“During the late summer and fall of 1929 these Owls were rare in the South Bay region, though a few nesting pairs were encountered in the Cape Low section. During the following winter (1929-30) however, the birds became extremely abundant—more so, in fact, than most of the Eskimos had ever known them to be—and we all thought this must be due to the great abundance of lemmings. Arctic foxes also were very common, and both foxes and Owls preyed upon lemmings to the almost absolute exclusion of Ptarmigan or other possible prey.—Dozens of nests were found or reported about the post. At one time I must have had twenty nests under more or less constant observation. All this was, I feel sure, a direct result of the abundance of mice. These mice on Southampton are now (1930-31) probably gone and the Owls have had to rove elsewhere in finding sufficient food.” A peak in abundance of lemmings means a successful breeding season with a resulting increase in the number of Snowy Owls. If the peak of abundance of lemmings is followed by a sharp decline then the Owls are forced to wander long distances to the southward to secure food for their maintenance.

According to several correspondents the weather was very mild and comparatively light snows prevailed in southern Canada.



SNOWY OWL CAUGHT AT ITHACA, N. Y. PHOTOGRAPHED BY O. S. PETTINGILL, JR.
EYES IN LOWER FIGURE RETOUCHEE BY G. M. SUTTON.

These conditions were perhaps a factor in halting the southward migration so that fewer of the Owls than would otherwise have been the case crossed over to the states south of the Great Lakes. A very complete report of Snowy Owls killed or observed in Ohio has been received from Mr. Lawrence E. Hicks, Research Ornithologist of the Ohio Division of Conservation. He has obtained records of 126 individuals of which 51 were killed or captured. These records represent 82 localities and 34 out of 88 counties of the state. According to Mr. Hicks the 1930-31 invasion as represented in Ohio was about two-thirds as large as that which occurred in the 1926-27 invasion. It is evident from this report that the concentration of Owls in Ontario extended to a certain extent across Lake Erie to Ohio, chiefly to the counties directly south and southeast of the lake. Mr. Taverner voices the opinion that few of the eruptive birds that periodically come down south, ever return to their home grounds. If this be true the thousands of birds which migrated southward in 1926-27 and which were killed or failed to return so depleted the total Snowy Owl population that we could hardly expect a recovery to their former numbers in such a short period of time. The present migration though not represented by as large numbers nevertheless is just as important when considered from the standpoint of its basic causes and the correlation such a movement may have to cycles of life in the far north.

The New England Ruffed Grouse Investigation is greatly indebted to the Conservation Commissions who coöperated with us in gathering information by sending questionnaires to all of their wardens and to the more than one hundred independent observers who have sent in records and notes on the Snowy Owls and the migration. It is greatly regretted that mention cannot be made of each contributor who has aided in this report. I am especially grateful to Mr. Harrison Lewis, Chief Federal Migratory Bird Officer of Ontario and Quebec, who has sent us detailed records including dates and exact locations of 258 birds killed or observed in Ontario and Quebec, Canada. His records form the basis of the distribution map of that region. I am indebted to Mr. James Norton for assistance in compiling the records and for making the maps.

The first information that was received concerning the Snowy

Owl migration of 1930-31 was in a letter from Mr. B. W. Cartwright who announced the arrival of the birds at Winnipeg, Manitoba. The first Owl made its appearance there on November 2

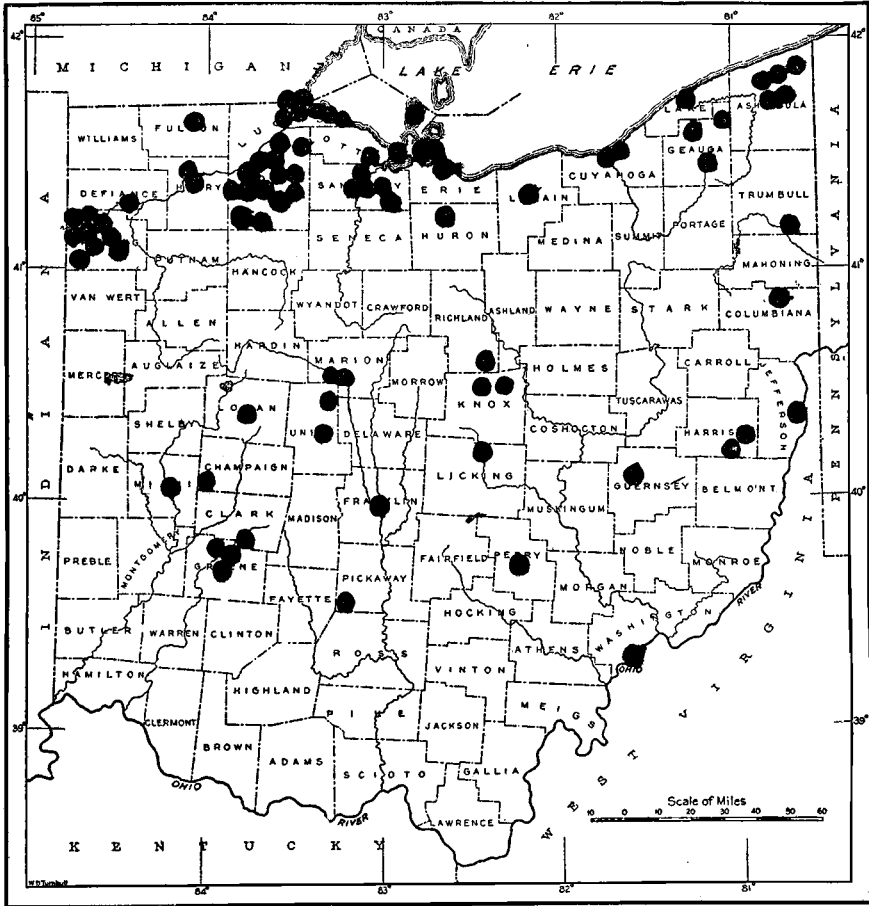


Fig. 2. Snowy Owl Records for Ohio, 1930-1931.

and on the next day 30 were seen on the delta of the Red River. On November 10 about one hundred were reported on Lake Manitoba. There were 536 records from the provinces of Manitoba

and Ontario which was the center of the concentration of the present migration. To the westward, from Alberta province there were fifty-two and from Saskatchewan only thirty-three records. In the other direction we have sixty-nine records from the Province of Quebec and only twenty-two from New Brunswick and Nova Scotia indicating a rapid thinning out of numbers toward the eastern portions of Canada. A few individuals (4) were seen in Newfoundland and according to Professor Alexander Meek a pair of Snowy Owls came aboard a ship two hundred miles beyond Belle Isle on November 2, 1930.

According to Mr. Hugh M. McLaughlin of Lewvan, Saskatchewan the first Owl appeared in that vicinity on November 8, 1930. The prairie about Lewvan has no natural trees and the Owls resort to straw piles which serve not only as observation posts but provide them with an abundance of mice. According to Mr. McLaughlin all of the Owls examined by him were extremely fat and practically all of the stomach contents consisted of the remains of mice. However, he observed the Owls chasing prairie chickens and in one instance a prairie chicken was followed to his dooryard and was so overcome with fright that it allowed itself to be captured and carried into the house.

Mr. C. L. Broley of Winnipeg, Manitoba also mentions the habit of the Snowy Owls making straw stacks their home during their winter visits to southern Canada. He writes that there are literally hundreds of mice about the stacks especially if the stacks are situated near a granary. He relates that he has frequently seen Prairie Chickens and Sharp-tailed Grouse fly past the Owls perched on the stacks but the Owls paid not the least bit of attention to them. Mr. Broley states that the Snowy Owl may kill Jack Rabbits when pressed for food but more often merely chases, plays or torments them out of pure mischief with no intent to kill. Mr. Broley examined 440 Snowy Owl pellets taken from the tops of straw stacks where the Owls were stationed and found the following: one pellet contained a foot and tarsus of a Short-eared Owl; three contained weasels; one pellet contained parts of a Ruffed Grouse; four the remains of gophers; one contained duck feathers but the vast majority (412) contained mice of various species which he did not identify. Mr. Broley sent me a number of pellets taken from

the same source. In one there were feathers and bones of a Canada Jay and in about thirty-five others there were fifty-three skulls and parts of the Northern Field Mouse *Microtus drummondii*, thirty-one skulls and parts of the White-footed Mouse *Peromyscus maniculatus* and a skull of the rare Least Weasel *Mustela vison* identified for us by Dr. Glover Allen of the Museum of Comparative Zoology, Cambridge, Massachusetts.

Mr. George M. Sutton writes that he found Snowy Owls living almost entirely on mice during the winter at Southampton Island but during the nesting season remains of a few small birds such as Snow Buntings and Horned Larks were found about the nests. Mr. Sutton never found the remains of a hare or Ptarmigan in the stomach or pellet contents of the species. On one occasion he noted a Snowy Owl killing a fox caught in a trap.

Mr. Cartwright sends the results of the examination of six specimens received by him which are as follows:

Age	Sex	Weight	Stomach Contents	Locality
Imm.	Male	3½ lbs.	3 mice and feathers of Ptarmigan	Manitoba
Imm.	Male	3¾ lbs.	5 mice, muskrat fur	Stonewall, Manitoba
Imm.	Male	4 lbs.	Empty, but very fat	Pigeon Lake, Man.
Adult	Female	4¼ lbs.	Rabbit's leg and foot	Bruno, Saskatchewan
Adult	Female	4⅝ lbs.	Ruffed Grouse feathers	Sioux Lookout, Ont.
Adult	Male	3¾ lbs.	Mouse fur	Winnipeg, Manitoba

Reports from Long Island and other points along the Atlantic coast state that the Owls have been observed to prey upon decoy Ducks and Ducks that had been wounded. From Wisconsin comes a report that thirty Snowy Owls were trapped on pole traps at the game reservation which is indirect evidence that they were there to obtain game concentrated at that place. These reports indicate that the Snowy Owls, will, under the pang of hunger, attack game birds when they arrive from the north but it should be emphasized that cases of destruction to birds are in the great minority. Their chief food consists of rodents and in the far north mice and lemmings are the very basis of their existence. When the supply of rodents fails the Owls are forced to migrate to the southward.

The tabulation of records reported to the New England Ruffed

Grouse Investigation reveals that the distribution covers an area similar to that included in the migration of 1926-27 but the concentration of birds was in central southern Canada and Ohio and

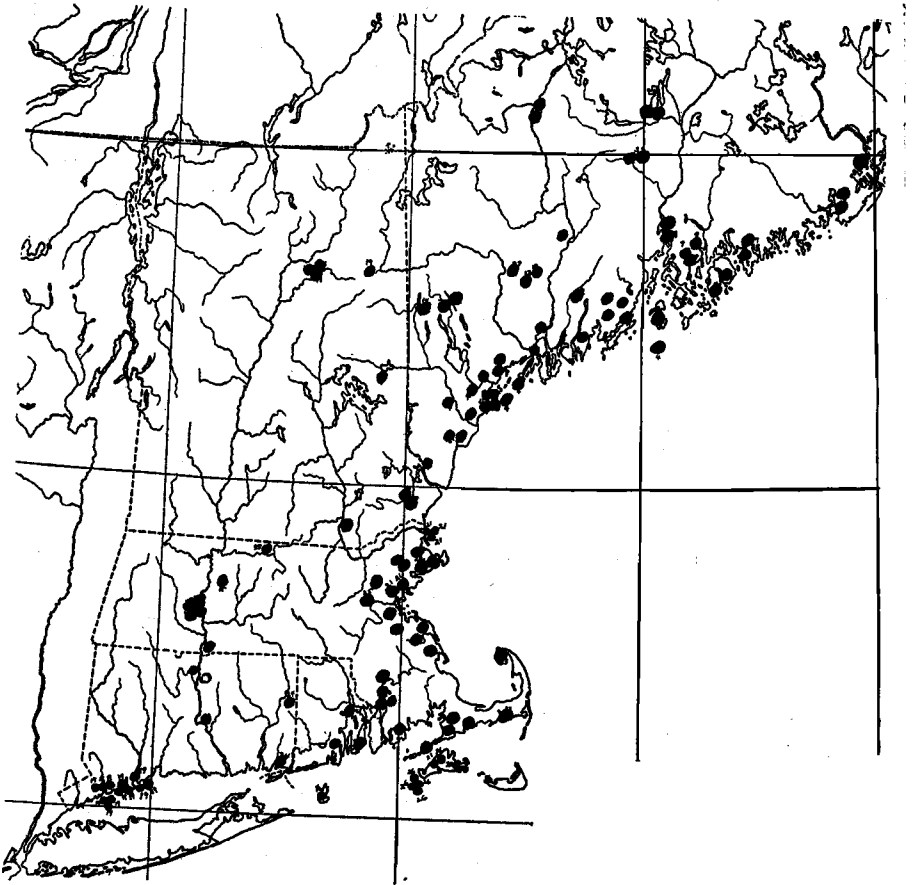


Fig. 3. Snowy Owl Records for New England, 1930-1931.

there were much smaller numbers in eastern Canada and in the eastern United States. The number of observers and similar sources of information were relied upon in obtaining records for the

1930-31 migrations as was used in 1926-27 hence the comparison of numbers is of some significance. In 1930-31 there were 2363 records from the United States whereas this year there are only 497 records of Snowy Owls, or one fifth as many. Mr. Harrison Lewis makes the suggestion that smaller numbers of Snowy Owls have been sent to taxidermists to be mounted during the 1930-31 migration than there were in 1926-27 because of the financial depression. Since taxidermists constitute one of our chief sources of records he concludes the numbers of records are much smaller than would otherwise have been made. The number of records from the southern states were greater than numbers reported from this region in 1926-27. There were two records from North Carolina, one from South Carolina and two from Georgia. Mr. Earle R. Greene reported one from Hall County, Georgia, December 31, 1930 and Ivan R. Tomkins shot one at Cockspur Island, Georgia, on February 8, 1931. These two records represent the southern limit of the present migration. An unusual flight of a Snowy Owl to Bermuda about 700 miles off the coast of South Carolina is also deserving of special mention. This Owl was first seen by Mr. L. L. Mowbray on December 28, 1930 and was again seen at Government House on January 28, 1931, during the reception given to the Prince of Wales. This is the third record for Bermuda according to Mr. Mowbray who took two birds, a male and a female in January, 1907.

DATES OF THE RECORDS OF SNOWY OWLS.

There were 756 records in which exact dates were given which were distributed as follows:

September	0	February	107
October	12	March	40
November	239	April	13
December	186	May	0
January	159		

As in the case of the 1926-27 migration it will be seen that in 1930-31 the largest number of Snowy Owls made their appearance during the month of November.

TABULATION OF RECORDS OF SNOWY OWLS 1930-31:

Canada

Ontario.....	262
Manitoba.....	274
Quebec.....	69
Alberta.....	52
Saskatchewan	33
Nova Scotia.....	17
New Brunswick.....	5

Total..... 712

Newfoundland

Newfoundland.....	4
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United States

Ohio.....	126
Wisconsin.....	81
New York.....	63
Maine.....	59
Massachusetts.....	53
Minnesota.....	44
Michigan.....	29
Connecticut.....	16
New Hampshire.....	7
Pennsylvania.....	5
Rhode Island.....	3
Georgia.....	2
North Carolina.....	2
South Dakota.....	2
Maryland.....	1
New Jersey.....	1
North Dakota.....	1
South Carolina.....	1
Tennessee.....	1

Total..... 497

Bermuda

Bermuda.....	1
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Grand total..... 1214 records.

Bowdoin College, Brunswick, Maine.