

A Comparison of Five Consecutive Snowy Owl Invasions in Wisconsin

By CHARLES SINDELAR, JR.

The Snowy Owl (*Nyctea scandiaca*) can be seen in Wisconsin nearly every winter. Some areas attract many more than others. Why?

If one notes the recent so-called invasion years in Wisconsin (Table 1), it is not apparent that the big Snowy Owl invasions occurred on the average of every four years as Gross (1946) states, although it is commonly believed they are cyclic. It has been shown (Gross, 1931) that the years having large numbers of Snowy Owls in the far north also have large numbers of arctic fox (*Alopex lagopus*). Both animals rely upon the lemming as a main staple (Grossman and Hamlet, 1964). The peak of the well known lemming cycle correlates with the big Snowy Owl years.

Table 1

Winter of	No. of Snowy Owls Reported
1960-61	162
1961-62	55
1962-63	26
1963-64	104
1964-65	76

For both the Snowy Owl and the Arctic Fox it seems that numbers increase when the lemmings increase. Then the lemming population drops. Is this why the owls move south? Another possibility is that the invasion of owls into the south follows a year of peak production of young.

Now keeping in mind that the Snowy Owls apparently come here in search of food, let's look at where they go.

The methods of getting Snowy Owl reports have been mainly an appeal to members of the Wisconsin Society for Ornithology to report owls, through newspaper (Milwaukee, Green Bay, Fond du Lac, and Oshkosh) and radio publicity (Bob Ellerson's "Radio of the Air" on the state network), and through the efforts of Operation Snowy Owl. O.S.O. is a group of Wisconsin researchers who have pooled efforts, driven thousands of miles on frozen lakes in bitter cold, and spent hundreds of their own dollars to study the Snowy Owl.

I believe that the information so obtained is somewhat biased for several reasons. O.S.O. was more apt to check out a distant report if the report was for more than one owl; thus, scattered single birds were less

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often checked out than were concentrations of birds. The more densely settled areas have a higher percentage of bird clubs, and, therefore, more WSO members and, thereby, more reports. Last of all, Green Bay has one of the most active bird clubs in the state. This would tend to make the Green Bay Snowy Owl population estimate more accurate, and the rest of the state perhaps underestimated. Nevertheless, enough time was spent in Green Bay, Oshkosh, and Fond du Lac, for example, to show that the Green Bay concentration was the largest of the three in most of the winters of this study. In the winter of 1960-61, 162 owls were reported in Wisconsin. It has been shown that they were concentrated

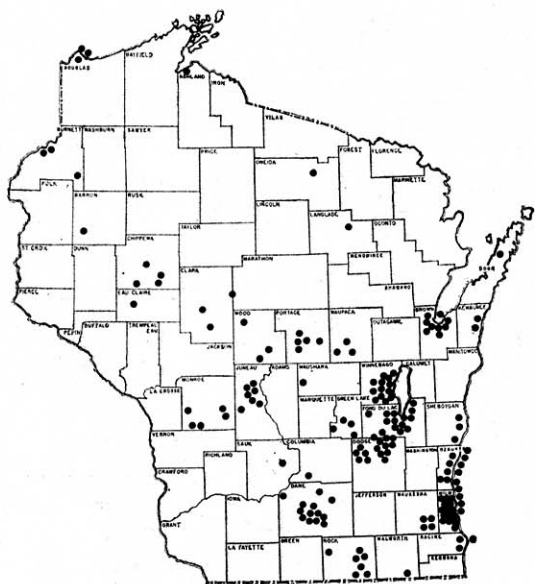


FIGURE 1. SNOWY OWLS REPORTED FOR THE WINTER OF 1960-1961. (EACH DOT REPRESENTS ONE OWL IN ALL FIGURES).

in large cities near lakes, on the frozen lakes themselves (Hamerstrom, 1962 (Figure 1). One exception was noted—at Horicon Marsh (north central Dodge county). That year there were numerous runner rats, that is, muskrats (*Ondatra zibethica*) that are pushed out of their home territory in search of food due to abnormally thick ice. Runner rats run on top of the ice in search of food where they are exceptionally vulnerable to predators. Such an abundant source of food may be a reason for that owl concentration.

The reasons for the city concentrations are more complex. Do the ranch-style homes in suburbia resemble the barren tundra homeland of this arctic visitor (Hamerstrom, 1962), or are the cities and lakes merely an easy food source? Snowy Owls often frequented city dumps, perhaps to crop the surplus of rats (*Rattus norvegicus*). Snowy Owls are known to eat rats (Fisher, 1893, Bent, 1938, and Grossman and Hamlet, 1964). The lakes often had an adjacent muskrat marsh which offered a possible food source. Where the water stays open in part and holds a number of winter-

ing ducks, they are another possibility. A third possibility is fish—presumably fish discarded by ice fishermen. Although Bent (1938) quotes Audubon to show that Snowy Owls prey on free-swimming fish, O.S.O. in many miles of driving on ice, saw no evidence of such use.

The winter of 1961-62 presented a remarkably similar distribution to 1960-61 (Figure 2) with far fewer owls (55 were reported). During the winter of 1962-63 the reports were scattered and mostly singles; twenty-six owls were reported (Figure 3). No concentrations of owls were noted with the possible exception of Green Bay for which five owls were re-

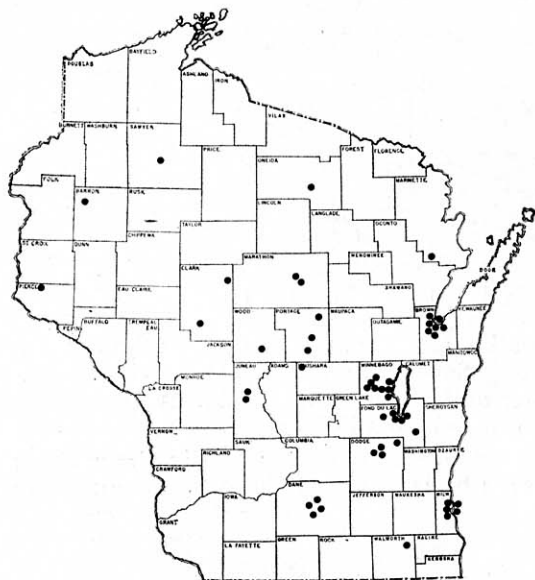


FIGURE 2. SNOWY OWLS REPORTED FOR THE WINTER OF 1961-62

ported. Then came the winter of 1963-64. There were 104 Snowy Owls reported in Wisconsin (Figure 4). That year Horicon Marsh did not have numerous runner rats and there were very few Snowy Owls on Horicon Marsh.

Some of the large cities that had had a high Snowy Owl concentration in 1960-61 had few in 1963-64 (Figure 4). One city (Racine), which in 1960-61 had held only three owls, now held eight. There were only four areas of concentration in 1963-64—Green Bay, Milwaukee, Racine, and Superior.

Another way that 1963-64 differed from 1960-61 is that the Snowy Owl reports were more evenly distributed throughout the state.

The winter of 1964-65 appeared even more strange (Figure 5). Seventy-six Snowy Owls were reported in Wisconsin. However, the only areas that held a concentration were Green Bay and Oshkosh. The number of Snowy Owls in Green Bay was the largest noted during this study.



FIGURE 3. SNOWY OWLS REPORTED FOR THE WINTER OF 1962-63.

We were walking the ice at the mouth of the Fox River while trapping and banding Snowy Owls with bal-chattris (Berger and Mueller, 1959, and Berger and Hamerstrom, 1962), using starlings (*Sturnus vulgaris*) and pigeons (*Columba livia*) as bait.

While assisting Operation Snowy Owl in Green Bay on January 10, 1965, on a trip led by Dr. Fran Hamerstrom of Plainfield, Wisconsin, I

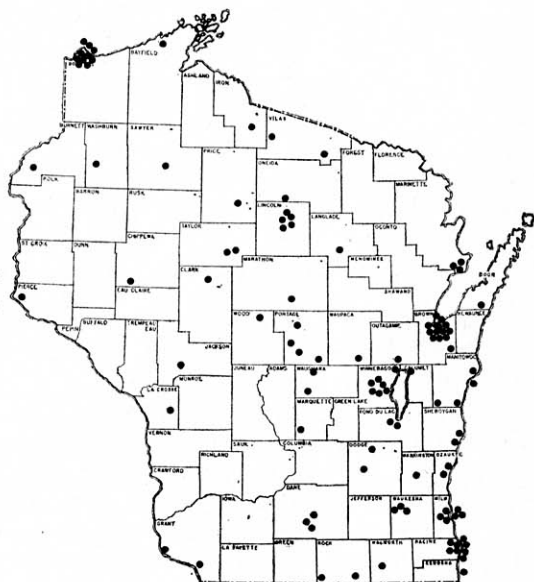


FIGURE 4. SNOWY OWLS REPORTED FOR THE WINTER OF 1963-64

became aware of an interesting situation.

On the ice we picked up 22 intact Snowy Owl pellets (castings) and nine broken pellets. As these wintering Snowy Owls are highly territorial (Keith, 1964), it seems likely that the pellets I picked up are from only a few (probably about six) of the 19 Snowy Owls present in Green Bay at that time. We also saw many meadow voles (*Microtus*) dead and frozen on the ice, and picked up a sample of nine. Some were as much as $\frac{1}{4}$ mile (estimated) from any possible cover.

In the 22 complete pellets and the nine broken pellets, estimated to be about $\frac{1}{2}$ original size, I found evidence of 118 meadow voles. Only

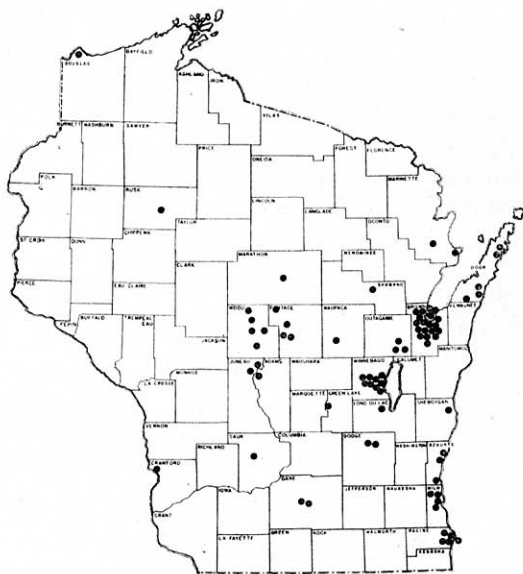


FIGURE 5. SNOWY OWLS REPORTED FOR THE WINTER OF 1964-65.

one pellet contained remains other than meadow voles (and no meadow voles). This odd pellet contained avian prey digested beyond recognition.

In the 21 complete pellets plus the nine approximate halves that contained remains of meadow voles, I found evidence of 118 individuals. This is about $4\frac{1}{2}$ meadow voles per pellet.

These pellets and dead meadow voles were picked up on the ice at the mouth of the Fox River in Green Bay. There was open water, holding a number of wintering ducks less than a mile away. The dead meadow voles, the high degree of meadow vole predation as indicated by pellet analysis, and lack of predation on waterfowl suggests a high meadow vole population. This perhaps explains the Green Bay Snowy Owl concentration for the winter of 1964-65.

Watson (1957) has records of one male and two female captive Snowy Owls eating an estimated 320, 240, and 240 grams per day respectively. Another captive Snowy Owl (sex unknown) ate 30-35 meadow

voles in four days, "probably about 150-260 grams per day" (Beamer, 1937).

Burt's (1946) average figure for meadow vole (*Microtus pennsylvanicus*) weights for Michigan is 20 grams. It seems likely this would also hold true for Wisconsin. Watson (1957) states that a Snowy Owl in winter should eat slightly more than 10% of its body weight per day. The mean weight of 100 wintering Snowy Owls (males and females) trapped in Wisconsin from 1960-65 is 2,054 grams (trapped by Operation Snowy Owl). 10% of 2,054 would be about ten meadow voles per Snowy Owl per day.

It appears that most Snowy Owls that invade Wisconsin tend to be located in the southern and eastern portions of the state. Few owls are reported in the west and north. I believe that the hills in the west and the forests in the north don't offer suitable habitat, being much different from the homeland of this wintering visitor.

Although they seemed to prefer open, flat land, the areas where they concentrated varied considerably. This appears to be due to available food. Whether Wisconsin has few or many wintering Snowy Owls, situations having an abundant food supply simply attract Snowy Owls. This perhaps explains concentrations of owls.

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