Sex and Age Composition of Great Gray Owls (Strix nebulosa), Winter 1995/1996

Robert W. Nero and Herbert W.R. Copland [1]

Abstract.—In winter 1995/1996, a nearly continent-wide movement of Great Gray Owls (Strix nebulosa) occurred. A sample of 126 owls examined during this period, mainly from northeast of Winnipeg, included a large number from the 1994 hatch-year. If our assumptions regarding molt are correct, 51 birds were from this age class. An inhibited molt condition found in this group suggests a state of inadequate nutrition prior to or during the normal 1995 molt period. We think that a large 1994 hatch and a subsequent food shortage may be factors partly accounting for the 1995/1996 irruption.

The unusually severe winter of 1995/1996 will be remembered by numerous birders and casual observers, both in Canada and the United States, for the numbers of Great Gray Owls (Strix nebulosa) that appeared. One enthusiast stated: "...hordes of those ghosts from the Great [sic.] Boreal Forests...invaded southern and central Ontario. There can be no doubt that many hundreds, even thousands, of Great Gray Owls were involved" (Henshaw 1996). Several sources (e.g., Grieef 1996) reported owls in southern Minnesota and Wisconsin, in southern Ontario and Quebec, and a few even in the Maritimes, Iowa, New York, and Massachusetts. The actual numbers of owls involved in this irruption are unknown, but we believe that in Manitoba there were several hundred birds. Duncan (1996) refers to this winter irruption as "one of the largest documented...in central and eastern Canada and the adjacent United States." Korducki (1996) notes for Wisconsin: "While the numbers of Great Grays did not approach the winter of 1987-1988, this year was unique in the magnitude of their wandering."

ONSET OF MANITOBA MOVEMENT

Owls began making an appearance in our area as early as 27 October 1995, when a road-kill was found. In November, seven reports were received; in December, nearly 50. Daily counts included a high of 23 seen on 29 December by one family driving from Powerview to Manigotagan, a stretch of 71 km. On our last outing 13 April, we saw at least 18 on that same road. We went out on 36 days, during which we drove 20,600 km. Our success in finding owls depended on reports from other observers, plus our familiarity with areas likely to be frequented by owls, and our knowledge of their habits. Unlike many previous winters, owls were scarce southeast of Winnipeg. A few birds occurred west of Winnipeg and at least one spent several weeks in Winnipeg, but the largest numbers occurred northeast of Winnipeg within about 135 km.

BANDING OPERATIONS

This was the winter in which we banded more Great Gray Owls than ever before, surpassing our earlier record of 88 owls (winter 1978/1979) (Nero et al. 1984) to a surprising 115. All except two, which we banded in northwestern Minnesota, were taken north and northeast of Winnipeg. Also, we have data from one banded by J.R. Duncan, and 10 other owls found dead or injured. Our capture techniques have already been amply described (Nero 1980). In addition to banding and attaching an individual identification tag to each bird, we recorded four measurements and the state of molt of flight feathers (see Duncan 1996). On one exceptional day we banded and processed 13 owls (3 April 1996). The 115 owls we banded were taken as follows: November - 1, December - 8, January - 5, February - 19, March - 45, and April - 42. Inasmuch as we ceased trying after 13 April, when we found 18

[1] Wildlife Branch, Box 24, 200 Saulteaux Cr., Winnipeg, MB R3J 3W3; and Manitoba Museum of Man & Nature, 190 Rupert Ave., Winnipeg, MB R3B 0N2, respectively.

that we failed to capture, the April success rate—42 owls in 5 days, was high. The lack of success on 13 April may have been due to greater availability of prey; the gradual disappearance of snow on highway rights-of-way increased the vulnerability of small mammals. Of the 126 owls that came to our attention, none was a bird previously banded (though a Northern Hawk Owl (Surnia ulula) captured by us at Ft. Alexander on January 6, 1996 had been banded 8 1/2 years earlier in northern Minnesota by Jim and Patsy Duncan). The number of older unbanded Great Grays captured, or found, may mean that these birds originated from outside the Manitoba main study area. Inasmuch as we have several times recaptured birds banded by us in the same winter, we are assuming that birds banded in previous years should be obtainable if present. Our failure to capture any of the many owls banded at nests by the Duncans may simply be due to the larger number of emigrants.

SEX AND AGE

In all, there were 94 females and 32 males. We did not attempt to apply the formula devised by Duncan (1996) to identify the sex of birds, relying instead mainly on measurements. In our experience, males are usually identifiable even before taking their measurements, their smaller feet in the hand being fairly evident. (For dead birds, internal sex organs were checked for verification). The high female sex ratio is not unexpected, given the greater tendency of the females to wander (J.R. Duncan, pers. comm.). We assume that males are as vulnerable to our capture techniques as are females, though nesting males are shy, compared to their mates. Also, there is some possibility that females, needing to build up fat reserves well in advance of the breeding season, may be more actively seeking prey, and hence may be more readily taken.

The basis for aging a Great Gray Owl (apart from a banded one of known age) rests in the distinctive flight feathers (wings and tail) of the juvenile bird (see Duncan 1996). Thus, one can always identify a juvenile, that is, a bird hatched in the previous summer. The nature of molt in this species is such that normally not all of the juvenal feathers are replaced, some being retained for one or two or more successive years. As long as a juvenal feather is present it is possible to estimate that bird's age. The gray tip that distinguishes the juvenal feather, however, is subject to wear, especially on the longer primaries (no's. 4-9). Once that tip is worn away, it may no longer be possible to recognize the juvenal feather. (The no. 10 primary, it should be noted, unlike any of the other flight feathers, lacks the gray tip altogether). Given that adult-type feathers also are not all shed in any one year, older birds will bear feathers that show, by degree of newness, fading and abrasion, three or more age classes, hence presumed years. Usually, older birds can be aged by this means up to 3-4 years. In the absence of a juvenal feather, however, such birds can only be considered old adults, that is, more than 3-4 years of age.

Only four birds in our sample were juveniles, birds hatched in summer 1995. In that year, the Duncans checked 126 nesting platforms, none of which was in use (pers. comm.), thus it is not surprising to find so few birds from that season. Usually, we identify owls as either adults or juveniles, regardless of sex. Some adults, still bearing one or more juvenal feathers, could be considered adults 3-4 years of age, or, in the absence of any juvenal feathers, "old" adults. In winter 1995/1996, however, we soon recognized a third class which we considered to be 2-year-old birds, a group not previously recognized (probably overlooked). Fifty-six of the birds we examined had hatched in summer 1994 (if our assumptions regarding molt are correct). In that season, the Duncans recorded seven active nests out of 103 platforms checked (pers. comm.). These 2-year-old birds (more correctly, 1 1/2 years old) had mainly juvenal flight feathers, and at first glance one might suppose them to be juveniles, that is, less than 1 year old. The presence of adult-type or non-juvenal innermost secondaries, however, pointed to what we presumed to be their correct age. In their first major molt period, in summer 1995, these birds had replaced only a fraction of the number of flight feathers normally renewed. (Note that we are dealing here mainly with flight feathers, the general contour feather molt being more complicated than this suggests). A tame, captive bird ("Lady Grayl") of known age (and on a steady diet) had, by its second winter, replaced 41 out of 58 juvenal flight feathers (12 rectrices, 9 primaries, 20 secondaries). By contrast, many of the 2-year-old birds we captured had replaced only a dozen feathers or even less. Several of these birds had also retained from

one to five presumed juvenal undertail coverts; these were so badly worn that only a bare shaft remained. These feathers, to use Kay McKeever's aptly descriptive term, were "skeletonized" (pers. comm.). These skeletonized feathers supply the additional confirmation of age; it seems unlikely that such severe wear could occur in 3-6 months or less (from completion of molt to winter). No other explanation seems plausible, in our opinion, for the condition of these 2-year-old birds. Eighteen of these supposed 2-year-old birds also had replaced one or both no. 5 primaries; a few had replaced primaries no. 4 and 6.

The variation in numbers of replaced flight feathers may reflect variable nutritional levels and/or energy demands. In a study of the Tawny Owl (Strix aluco), Petty (1994) related inhibited molt to nesting activity, that is, with an abundance of prey there was increased nesting activity and those birds shed fewer feathers than usual. However, as pointed out by Jim Duncan (pers. comm.) few Great Gray Owls breed in their second summer. Hence, it is likely that our surmise regarding molt and nutrition in these 2-year-old birds is correct. This is further substantiated by the scarcity of young from summer 1995 in our sample (four). The inhibited molt shown in these 2-year-old birds was presumably the result of a nutrient shortage (lack of sufficient food) in winter 1994/1995, and/or spring and summer 1995. As a result, these birds had retained much plumage that was more than 1 year old, hence largely worn and faded, thus giving them a strongly brown color overall. Often such birds could be identified at a distance, whether perched or in flight. Wherever these birds originated, and they could have come from many hundreds of km northwards, presumably they had faced a severe shortage of prey. The same nutritional stress factors that inhibited molt in the 2-year-old birds, presumably also affected older birds. But inhibited molt in such birds, especially in the absence of any juvenal feathers, would be less apparent.

CONDITION OF BIRDS

Although body weight has only limited value in assessing the condition of birds, there is a suggestion that as winter progressed, many birds in our sample either lost weight or failed to gain adequately. Adult female weights from November 1995 through February 1996, with one exception, ranged from 1,200-1,500 gms. During March and April, however, 34 birds were handled that weighed less than 1,200 gms. Presumably, increased difficulty obtaining prey, owing either to prey declines, increased snow depth or a combination, played a role. Also, it was during this period that a few obviously thin and weak birds were found.

MOVEMENT DATA

A bird that we banded north of Pine Falls on 24 February 1996, was found dead on 22 March more than 150 km to the southeast in the Moose Lake area (ironically, the capture and banding of this bird had been shown earlier on the CBC-TV program "Coleman & Co."). The bird was found on a well-travelled snowmobile trail, and it had presumably been hit by one of those vehicles. An adult female (one of the 2-year-olds), its weight had dropped by 475 gms. If that weight loss occurred before its accidental collision, then it must have been having difficulty finding food. This band recovery indicates that in late February, owls were still moving southwards. Other, later records, suggest a northward movement, as if birds were returning to their place of origin. For example, an old adult female owl (no juvenal flight feathers) banded on Maple Creek Road west of Lac du Bonnet on 28 December 1995, was recaptured in the same place on 5 April 1996; on 9 April, however, we found this bird (identified by its tag) about 50 km to the north.

CONCLUSION

The indication of failing food supply in summer 1995, as suggested by the molt condition of 56 2-year-old birds, is supported by the scarcity of young in our sample (4 out of 126). Thus, we can suggest a vole shortage, through winter 1994/1995 and summer 1995, over much of the region. This, in itself, could have triggered the movement or irruption of owls in winter 1995-1996. According to Jim Duncan (pers. comm.) red-backed vole (Clethrionomys gapperi) populations in southeastern Manitoba and adjacent Minnesota were moderately high in 1993, crashed in 1994 and remained low through 1995 and 1996; meadow vole (Microtus pennsylvanicus) populations were very low in 1995, then rose sharply in 1996. Thus, the nature of the 1995/1996 Great Gray Owl irruption, and perhaps earlier ones as well, might be ascribed to levels of prey populations and owl productivity, coupled with severe

winter conditions, though the weather factor may be the lesser aspect.

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