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Articles

The Ontario Great Gray Owl Irruption of 2004-2005: Numbers, Dates and Distribution

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Introduction

The Great Gray Owl (*Strix nebulosa*) occurs throughout the boreal forest region of Canada (Bull and Duncan 1993). During some winters, when rodent prey is scarce in the boreal forest, Great Gray Owls move southward into southern Canada and the northern United States (generally referred to as "irruptions"), sometimes in considerable numbers, until they locate an area with sufficient food resources (Bull and Duncan 1993). During the winter of 2004-2005, such an irruption occurred in northeastern North America, with record numbers occurring in both southern Quebec (Bannon et al. 2005) and Minnesota (Granlund 2005). The situation was similar in Ontario, with a record number of Great Gray Owls reported.

Regionally, many Ontario birders began accumulating records and actively tracking observations. In some areas, coordinated one-day surveys were conducted. Birders and photographers from other parts of Ontario, as well as from neighbouring states and beyond, travelled to areas with concentrations of owls to witness and photograph the spectacle. The media and the general public took great interest in the irruption, with many local newspapers and television and radio stations running stories on the invasion and many curious observers making trips specifically to look for owls.

As in previous irruptions, unfortunately, many owls were found dead, most often as a result of collisions with vehicles, and were brought in to local Ontario Ministry of Natural Resources (OMNR) offices where they were issued with a "Certificate of Reporting". In addition, many injured birds were captured and brought to rehabilitation centres, and some of these owls subsequently died. More details on mortality during this irruption can be found in the article by Peck and Murphy on page 122 in this issue of *Ontario Birds*.

This article summarizes the number of owls involved in the Ontario irruption, the timing of movements in various areas, and the main distribution of over-wintering birds. This summary is based on records from all of the above mentioned sources as well as reports

sent to ONTBIRDS, the electronic mailing list service maintained by the Ontario Field Ornithologists that notifies birders of interesting Ontario bird sightings.

Initially, I attempted to compile and map all of Ontario's Great Gray Owl records from the winter of 2004-2005. However, due to the sheer number of records, the fact that many reports had vague dates and locations, and the extreme difficulty in avoiding duplicate counting, I decided that I would examine patterns and trends in the timing of movements and focus in on summarizing numbers for areas that had well-coordinated survey efforts.

Departure from Northern Ontario

The first hint that a movement of Great Gray Owls might be occurring came during the summer of 2004. In the Thunder Bay area, there were many more sightings of Great Gray Owls than usual, from the Canada-US border in the southwest, to Caramat in the east, and north to Armstrong (Nick Escott, pers. comm.). The first report was on 19 April, with four reports in May, eight in June and 13 in July. All were single birds except for two on 15 July, and there was no evidence of breeding (Nick Escott, pers. comm.). Interestingly, then there were no reports in the Thunder Bay area until mid September. From 20 September to 29 October, there were, however, 25 Great Gray Owl sightings in the Heron Bay area, near Marathon (Nick Escott, pers. comm.), further evidence that some kind of movement might be occurring. Nearby in the Atikokan area (Rainy River District), a similar movement was observed, with birds first being noted in late September and increasing dramatically into mid November (Dave Elder, pers. comm.).

Meanwhile, a similar situation was happening in the Hearst area (Cochrane District) where by mid September, Great Gray Owls were noted moving out of their boreal forest habitat into abandoned agricultural fields and roadsides (Marc Johnson, pers. comm.). Numbers began building in the Hearst area and peaked in mid October (Marc Johnson, pers. comm.).

Back in the Thunder Bay area, peak numbers occurred in November, with a total of 44 reports (Nick Escott, pers. comm.). December was quieter, with only 14 reports in total, including 24 Great Gray Owls on 12 December during a survey of rural areas around Thunder Bay (Nick Escott, pers. comm.). By mid December, most of the owls present in the Atikokan area had left (Dave Elder, pers. comm.). By January, most birds had disappeared from the Thunder Bay area, although a few were still being seen in January and February, mostly within the Thunder Bay city limits (Nick Escott, pers. comm.). A repeat of the 12 December survey route on 6 March turned up no Great Gray Owls (Nick Escott, pers. comm.).

Figure 1: Great Gray Owl in typical scrubby field habitat in the Hearst area on 26 November 2004. Photo by *Marc Johnson.*

The above pattern of movement is also evident when examining the records of dead owls turned in to local OMNR offices for Certificates of Reporting. In Thunder Bay District alone, a staggering 63 dead Great Gray Owls were reported to those offices between 29 October and 7 December, with only an additional eight for the remainder of December, four in January, and only one in each of February and March (OMNR 2005). In Rainy River District, the pattern was similar—the majority of their dead birds (23 of 31) were reported between 6 November and 6 January, with an additional four in the remainder of January, and only one each in February and March (OMNR 2005). By examining these Certificates of Reporting, therefore, it seems quite possible to piece together relatively accurately the timing of movements of Great Gray Owls during these irruptions. However, it should be noted that although the date the bird was found is recorded on the Certificates of Reporting, this date can be erroneous if the person reporting the bird does not provide accurate information. Even though persons reporting a bird are required to do so within three days of finding it, this is not always the case. Birds recorded as having died

on a particular date may have actually been found many days or even weeks earlier, and then kept in a freezer until it was convenient to visit the local OMNR office. Therefore, the date of death sometimes corresponds more closely to the reporting date (i.e., within three days of the reporting date) rather than the actual date of death.

Although I received no reports of live Great Gray Owls from Kenora District, the timing of the movement there was probably very similar to that experienced in Thunder Bay and Rainy River districts. There were 26 dead Great Gray Owls reported from Kenora District between October 2004 and May 2005, the bulk of which (18) occurred between 22 October and 2 January (OMNR 2005), which probably corresponds with the peak of the movement through that area. In Rainy River District, immediately south of Kenora District, the pattern was similar—the majority of their dead birds (23 of 31) were reported between 6 November and 6 January (OMNR 2005). Like the Thunder Bay area, some birds obviously also stayed in Kenora and Rainy River districts through the winter months as dead birds continued to be brought in to local OMNR offices in January, February and March.

In contrast to Thunder Bay, Kenora and Rainy River districts, in the Hearst area, virtually no birds appeared to over-winter, with the last bird noted on 17 December (Marc Johnson, pers. comm.) and only one dead bird reported to local OMNR offices in Cochrane District after December, one from the Lowther area on 27 February (OMNR 2005).

Farther southeast, in Algoma District, peak movements appeared to be between 13 November and 22 December, when 18 dead Great Gray Owls were reported (OMNR 2005). In the Massey area (Sudbury District), numbers increased substantially from the end of October, when the first was reported, until they peaked during mid to late November, when it was estimated by Erwin Meissner that at least 60 birds were present along Highway 17 between Thessalon, Algoma District and Nairn Centre, Sudbury District (Lemon 2005). In contrast, in the Greater Sudbury area, only 80 km to the east of Massey, the first bird was not noted until 9 November and the peak did not occur until mid December (Lemon 2005). On 14 December, 10 birds were found within sight of each other along a stretch of road west of Sudbury, and appeared to be on the move as none were found in the same area on the following day (Lemon 2005). Like Kenora, Rainy River, and Thunder Bay districts, some birds appeared to be present all winter long in Algoma and Sudbury Districts, but the bulk appeared to have moved farther southward.

On Manitoulin Island, the first Great Gray Owl was not reported

until 15 November, with numbers building through December and January, with a total of 27 sightings in January, although some of these were likely of the same bird or birds (Lemon 2005). Numbers on Manitoulin Island remained constant through February and March (Lemon 2005).

Pattern in Central and Southern Ontario

The first Great Gray Owl reported in the southern portion of the province was a single bird at Midhurst, Simcoe County, on 27 October (Bob Bowles, pers. comm.). The majority of owls, however, arrived much later.

A distinct movement of Great Gray Owls was noted through Algonquin Provincial Park, with a total of 11 records between 1 November and 7 January, all of which seemed to involve birds that were present for a day only as they continued to move southward in search of food (Ron Tozer, pers. comm.).

By late November, Great Gray Owls had reached other districts and counties in central Ontario, including Parry Sound, Muskoka, and Renfrew (Figure 2 and Table 1). Remarkably, single birds had also reached areas as far south as the Charleston Lake area on 14 November (Ron Weir, pers. comm.)

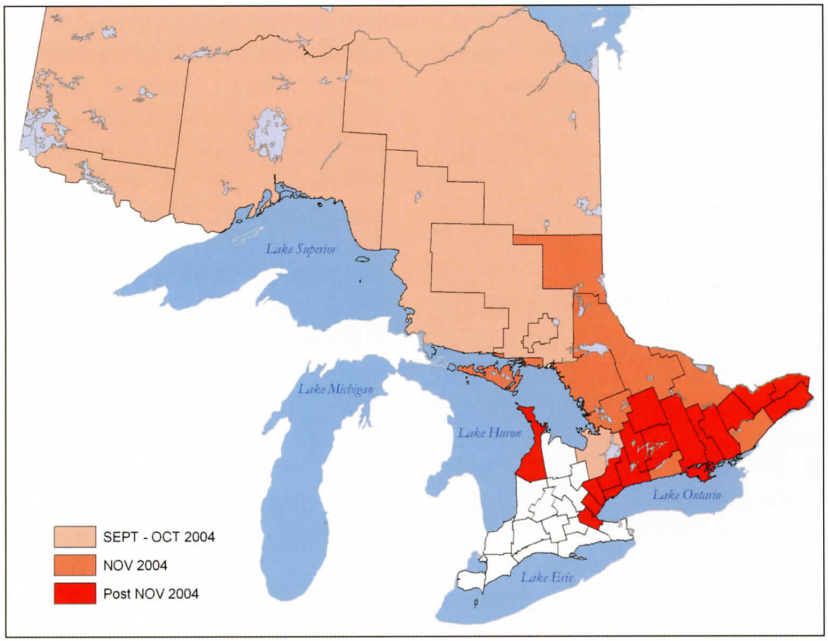

Figure 2: Map of Ontario (excluding the far north) indicating the timing of the first Great Gray Owl record by county and district for the irruption of 2004-2005.

Table 1: Date of the first Great Gray Owl record by area during the irruption of 2004-2005. The source of each record is indicated within brackets following the date. TOC = Toronto Ornithological Club Database.

AREA	DATE OF FIRST OCCURRENCE
Bruce County	4 January 2005 (TOC)
Cochrane District	mid September 2004 (M. Johnson)
Durham Region	27 December 2004 (TOC)
Frontenac County	20 December 2004 (TOC)
Halton Region	2 February 2005 (TOC)
Hamilton	2 January 2005 (TOC)
Hastings County	22 December 2004 (TOC)
Kenora District	22 October 2004 (OMNR 2005)
Lanark County	6 January 2005 (OMNR 2005)
Leeds & Grenville County	14 November 2004 (R. Weir)
Lennox & Addington County	1 January 2005 (OMNR 2005)
Manitoulin District	15 November 2004 (Lemon 2005)
Muskoka District	26 November 2004 (A. Sinclair)
Nipissing District	1 November 2004 (R. Tozer)
Northumberland County	26 November 2004 (TOC)
Ottawa	12 December 2004 (C. Lewis)
Parry Sound District	24 November 2004 (B. Bowles)
Peel Region	29 December 2004 (TOC)
Peterborough County	19 December 2004 (D. Monkman)
Prescott & Russell County	11 December 2004 (C. Lewis)
Rainy River District	late September 2004 (D. Elder)
Renfrew County	12 November 2004 (C. Michener)
Simcoe County	27 October 2004 (B. Bowles)
Sudbury District	27 October 2004 (Lemon 2005)
Thunder Bay District	20 September 2004 (N. Escott)
Timiskaming District	26 November 2004 (ONTBIRDS)
Toronto	27 December 2004 (TOC)
Victoria County	17 December 2004 (TOC)
York Region	29 December 2004 (TOC)

Table 2: Date of the last Great Gray Owl record by area during the irruption of 2004-2005. The source of each record is indicated within brackets following the date. Caution is necessary when evaluating the dates of records associated with Certificates of Reporting (OMNR 2005), as noted on page 108. TOC = Toronto Ornithological Club Database.

AREA	DATE OF LAST OCCURRENCE
Bruce County	9 June (J. Haselmayer); also 26 June (J. Miles)
Durham Region	22 April 2005 (TOC)
Frontenac County	30 April 2005 (R. Weir)
Haliburton County	16 May 2005 (OMNR 2005)
Halton Region	12 February 2005 (TOC)
Hamilton	12 March 2005 (TOC)
Hastings County	10 May 2005 (OMNR 2005); also one into the first week of July (T. Dyson)
Lanark County	11 April 2005 (B. Di Labio)
Leeds & Grenville County	23 March 2005 (M. Peck)
Lennox & Addington County	11 March 2005 (TOC)
Manitoulin District	mid June (Lemon 2005)
Muskoka District	9 April (A. Sinclair); also 18 April 2005 (OMNR 2005)
Nipissing District	29 April 2005 (R. Tozer)
Northumberland County	3 April 2005 (OMNR 2005)
Ottawa	13 April (C. Lewis); also 17 May 2005 (OMNR 2005)
Parry Sound District	18 April 2005 (M. Peck)
Peel Region	21 February 2005 (TOC)
Peterborough County	18 April (T. Dyson); 12 May 2005 (OMNR 2005)
Prescott & Russell County	26 March 2005 (OMNR 2005)
Prince Edward County	5 June 2005 (TOC)
Renfrew County	12 April 2005 (C. Michener)
Simcoe County	19 June 2005 (B. Bowles)
Sudbury District	21 April 2005 (OMNR 2005)
Thunder Bay District	7 May 2005 (N. Escott)
Timiskaming District	5 May 2005 (OMNR 2005)
Toronto	13 March 2005 (TOC)
Victoria County	18 April 2005 (OMNR 2005)
York Region	1 April 2005 (OMNR 2005)

and Port Hope on 26 November (fide Margaret Bain, ONTBIRDS, 27 November 2004).

Through December, Great Gray Owls began being reported from most of the counties in southern Ontario, north of Lake Ontario (Figure 2). A summary of the first known records for each county is provided in Table 1. Concentrations began to build through December and into January, especially in agricultural areas immediately south of the Canadian Shield from Simcoe County east through southern Peterborough County and across to Ottawa. By February, in many areas, most birds seemed to have settled in for the winter. There were fewer numbers over-wintering in areas north of the concentration zone. For example, there were only 27 records throughout the season from Renfrew County (Chris Michener, pers. comm.) and 25 from Muskoka District (Al Sinclair, pers. comm.), several of which represent birds passing through and not actually over-wintering at these locations. By March, most areas in southern Ontario were reporting lower numbers or that birds were becoming more active (i.e., moving around more) and it was obvious that birds had begun to fly northward again. By mid April, owls had completely vacated most areas, although a few birds lingered into May and even June in some locations (see Table 2).

While it is difficult to estimate the number of Great Gray Owls present throughout southern Ontario during the winter of 2004-2005, some regional studies provide some insight into numbers. These regional accounts also provide some further insight into the timing and patterns of movement.

In Simcoe County, for example, one of the areas with a particularly large concentration, Bob Bowles actively tracked reports, and plotted movements on a map (attempting to keep track of duplicate records), as well as performing several one-day counts. Although the first bird was reported on 27 October, the next confirmed report was not until 9 December (Bob Bowles, pers. comm.). On 22 December, Bowles felt that there were nine individual owls in Simcoe County (Bob Bowles, ONTBIRDS, 22 December 2004). In less than two weeks, the number increased to at least 50 birds (Bob Bowles, ONTBIRDS, 4 January 2005) and by 12 January to 130 (Bob Bowles, ONTBIRDS, 12 January 2005). More and more birds began arriving through the month of January and by the end of the winter, more than 400 Great Gray Owls were recorded in Simcoe County (Bob Bowles, pers. comm.)! Single day counts in Simcoe County provided the following results: 59 on 28 January (Bob Bowles); 35 on 5 February (Bob Bowles and four others); 34 on February 11 (Bob Bowles and friend); 82 on February 20 (10 teams of over 20 observers), as reported by Bob Bowles (ONT-

BIRDS, 21 February 2005). By 25 March, numbers in Simcoe County were still felt to be stable, although it was noted that they seemed to be moving around more than earlier in the season (Bob Bowles, ONTBIRDS, 25 March 2005). Numbers continued to be stable until 29 March, then they suddenly dropped (Bob Bowles, ONTBIRDS, 2 April 2005). By 9 April, there were still 16-20 Great Gray Owls present in Simcoe County (Bob Bowles, ONTBIRDS, 9 April 2005). Five individuals were reported up until the first week of June (Bob Bowles, pers. comm.) and another bird was present near Penetanguishene on 19 June (Andrew Promaine, Simcoe County Bird and Nature Board, 20 June 2005).

The southern half of Peterborough County (south of the Canadian Shield) was also a noted hotspot for over-wintering Great Gray Owls, with significant numbers building from about Christmas time through January. I coordinated a one-day survey of the southern half of the county on 9 January 2005. Twenty-two participants were involved in the survey and I estimate that 75-80% of the roads were driven. At least 13 other people, who were not involved in the formal survey, participated by submitting additional records from both the 8th and 9th of January. In total, 96 individual Great Gray Owls were reported and mapped (Figure 3). Considering that 20-25% of the road network was not covered, and that many owls would not have been visible from the roads, the actual number of owls present must have been significantly higher.

Tim Dyson invested a tremendous amount of time studying the Great Gray Owls in a portion of southern Peterborough County and adjacent Northumberland County, and his studies provide further insight into the calculation of a county-wide estimate. For example, in places where he would see only four or five from the road, a walk through the property between the roads would reveal that there were actually 17 present (Tim Dyson, pers. comm.). At least 105 individual Great Gray Owls were present in his study area (bordered by Lakefield in the northwest, Keene in the southwest, Campbellford in the southeast and Round Lake in the northeast), and based on this total, he estimated that over 500 Great Gray Owls were present in Peterborough County (Tim Dyson, pers. comm.). As was the case in Simcoe County, numbers appeared to be stable through February, but in March the owls seemed to be moving around more (Tim Dyson, pers. comm.). By mid April, virtually all of the birds had left Peterborough County. Tim Dyson's last observation was, for example, a single bird on 18 April (Tim Dyson, pers. comm.). However, a dead individual was reported to have been hit by a vehicle on 12 May near Young's Point (OMNR 2005).

The Ottawa area also was well

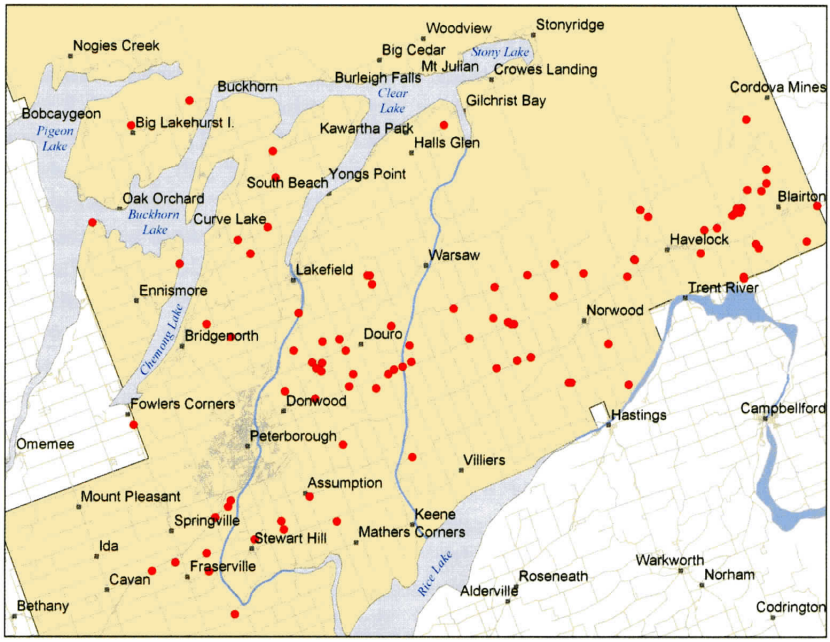

Figure 3: Map of the southern half of Peterborough County indicating the location of the 96 Great Gray Owls recorded during an organized survey on 8-9 January 2005.

known to have a large concentration of Great Gray Owls. By the end of February, within 50 km of Ottawa, at least 111 individuals were present on the Ontario side, with an additional 90 on the Quebec side (Bernie Ladouceur, pers. comm.). Bruce Di Labio tallied the highest one-day count in the Ottawa area when, on 9 January, he found 46 southwest of the city (Bruce Di Labio, ONTBIRDS, 9 January 2005). As was the case in other areas, numbers seemed to be more or less stable through February. By 9 March, a definite drop in the number of Great Gray Owls present in the Ottawa area was noted (Bruce Di Labio, ONTBIRDS, 9 March 2005), although on 23 March, significant numbers were once again observed in the same area (Bruce Di Labio, ONTBIRDS, 23 March 2005), perhaps indicating that a movement was occurring. Most had left the Ottawa area, however, by the end of March, although a few were reported as late as 9 April (G. Gray, ONTBIRDS, 9 April 2005).

In Durham Region, three one-day counts of Great Gray Owls were performed, with totals of 31 (16 January), 40 (13 February) and 32 (13 March) present (Rayfield Pye, pers. comm.). It was noted on the last survey that many of the regular locations where owls were

present all winter had none (Rayfield Pye, ONTBIRDS, 13 March 2005). The owls seemed to be concentrated in certain areas, and noticeably lacking in others. For example, in central Durham Region, the area between Brooklyn and Sunderland did not have any owls until March, despite persistent checking by local birders (Rayfield Pye, pers. comm.). The small mammal population in that area was presumably low. The highest concentration of Great Gray Owls in Durham Region was on Halls Road, Whitby (just north of Lake Ontario) where up to 15 Great Gray Owls spent the winter (Rayfield Pye, pers. comm.). The last record in Durham was one on 22 April (Rayfield Pye, pers. comm.).

The southern limits of Great Gray Owl records in Ontario were as follows. In Toronto, a few birds were present through the winter, mostly within parkland where small mammals could be found. Southwest of Toronto, there were only three records: two from Halton Region, both of which occurred in February (Cheryl Edgecombe, ONTBIRDS, 10 and 17 February 2005); and, a single bird in Hamilton at the Dundas Valley Conservation Area, that was present between at least 2 January and 12 March (Cheryl Edgecombe, ONTBIRDS, 3 January, 10 February, 10 and 17 March, 2005). Birds were present along the north shore of Lake Ontario east to Prince Edward County, where at least nine birds were recorded, and Amherst Island, where one bird spent the winter (Terry Sprague, pers. comm.). The Kingston area reported that 100 birds had over-wintered (Ron Weir, pers. comm.). Far fewer birds were reported from counties bordering the St. Lawrence River, especially the United Counties of Stormont, Dundas & Glengarry, where only one dead bird was reported (OMNR 2005) and no records of living owls were received.

There were lower numbers over-wintering in areas north of the concentration zone, e.g., Renfrew County (Chris Michener, pers. comm.) and Muskoka District (Al Sinclair, pers. comm.).

The Return Passage

As is usually the case with Great Gray Owl irruptions, the return passage of birds northward in the spring was nowhere near as noticeable as the movement south in the early winter.

It seems plausible, however, that the increased movement of owls witnessed in March in both Peterborough and Simcoe counties, as well as the shift in numbers noticed in Ottawa during the same time period, may have corresponded with birds moving back northward from over-wintering sites farther south. This is further supported by the absence of birds from sites in the south where they had been present in January and

February (e.g., Durham Region, as well as in the Kingston area; Ron Weir, pers. comm.). The movement north, therefore, seems to have begun sometime in March. In the Hearst area (Cochrane District), after being absent all winter, the first returning bird was noted on 29 March (Marc Johnson, pers. comm.). Birds apparently continued to travel northward through the month of April as the records from Algonquin Provincial Park and nearby would indicate. No birds were thought to have spent the winter there, but there were 10 records between 2 and 29 April, with none thereafter (Ron Tozer, pers. comm.). In the Thunder Bay area, a movement in April through early May seems to have occurred. Despite the fact that only three reports of live birds were received (one on 6 April from Pukaskwa National Park, six in Sleeping Giant Provincial Park on 23 April and one near Jellicoe on 7 May; Nick Escott, pers. comm.), there were an additional four records of dead birds in April and two more in early May from Thunder Bay District (OMNR 2005). Interestingly, unlike the situation in the summer of 2004, when there were more sightings of Great Gray Owls than usual in the Thunder Bay area, no owls could be found in the summer of 2005 despite searching several times (Nick Escott, pers. comm.). Birds appeared to have returned to more remote sections of the boreal forest.

Lingering Birds

Although in most areas of Ontario, south of the usual breeding range of the Great Gray Owl, most of the birds that were present in significant numbers all winter were gone by the end of April, a few lingered into May, June and even July. As mentioned earlier, five lingered until the first week of June in Simcoe County, with another report on 19 June near Penetanguishene. In Bruce County, two birds were present until the last week of May (Ethan Meleg, pers. comm.), a single bird was seen on 9 June at Cove Island (John Haselmayer, pers. comm.), and one bird was found on the Crane Lake Road on 26 June during the OFO Bruce Weekend (John Miles, ONTBIRDS, 27 June 2005). On Manitoulin Island, a bird was present near Sheguiandah on 21 May (Lemon 2005). Also on Manitoulin, a possible pair was present in Billings Township, but one was hit by a car on 9 May, while the other bird was regularly seen in the area until mid June (Lemon 2005). It is possible that any of the above birds could have bred, as breeding records in Ontario have occurred as far south as Algonquin Provincial Park (Forbes et al. 1992) and Barrie Island, Manitoulin District (Whitelaw 1998). Perhaps the most noteworthy lingering bird was one reported by a property owner northeast of Belleville, Hastings County, into the first week of July (fide Tim Dyson, pers. comm.)!

Total Number of Birds

Although in this analysis, for the reasons mentioned in the introduction, it was not practical to perform an actual count of the number of birds involved in the irruption of 2004-2005, it is possible to provide a rough estimate, based on the summaries and estimates from the few areas highlighted above. We do know, for example, that there were over 400 Great Gray Owls recorded from Simcoe County, an estimate of approximately 500 individuals from Peterborough County, as well as at least 111 birds in the Ontario portion of the Ottawa 50-km circle. We also know that based on records of both living and dead owls in-between these three locations, Great Gray Owls were present (potentially in the same kind of concentrations) throughout the entire zone roughly corresponding to the marginal farmland along the southern edge, and immediately south of, the Canadian Shield. In addition, significant numbers were present in certain areas south of this zone, especially east of Toronto (e.g., Durham Region, Northumberland County, Prince Edward County, and the Kingston area). We also have documentation for a total of 501 dead Great Gray Owls throughout Ontario, during the irruption of 2004-2005 (see the article by Peck and Murphy on page 122). A significant number of owls (double? triple?) must have met a similar fate to the 501 dead birds actually found and reported. Based on the above information, therefore, the number of Great Gray Owls actually involved in the 2004-2005 Ontario irruption must have numbered in the thousands.

Comparisons with Other Irruptions

Previously, the largest recorded irruption of Great Gray Owls in Ontario took place during the winter of 1995-1996, with a significantly large "echo" flight the following winter. Sadler (1998) reported more than 330 different Great Gray Owls in 1995-1996 and 265 in 1996-1997, from an area including all of Peterborough County, west to Lake Simcoe, the Kawartha Lakes, and north and eastward into Haliburton and Hastings counties. A conservative estimate of the total number of Great Gray Owls present across southern Ontario in March 1996 was over 600 birds (Ridout 1997).

It is difficult to directly compare the irruption of 1995-1996 with that of 2004-2005, since we do not have numbers for each irruption from the same geographic areas. In addition, the estimate of over 600 birds in 1995-1996 was a conservative one; the actual numbers recorded might have been much larger if more information had been readily available. With the age of the internet and electronic communicating and reporting (such as ONTBIRDS), it has become much easier and quicker to collect and compile information. I think that it is safe to say that the Great Gray Owl irruption of 2004-2005 was at least equal to the

irruption of 1995-1996, and probably bigger. It will be interesting to see if a similar "echo" flight occurs again this winter.

The timing of the advance southward in 2004-2005 was very similar to that witnessed in the 1983-1984 irruption, when birds in small numbers were seen across northern Ontario in October, followed by a build-up in the Sudbury area in November, with a few birds reaching as far south as Simcoe County (James 1989). In 2004-2005, most areas in the south did not receive their first owls until toward the second half of December, similar to both the 1978-1979 and 1983-1984 irruptions. Unlike the 1983-1984 irruption, however, when the movement of owls seemed to come to a stop by early January (James 1989), the number of birds continued to build through to the end of the month in 2004-2005 and was then more or less stable through February. During the 1978-1979 irruption, the movement south continued through February, and in the 1995-1996 and 1996-1997 irruptions, most owls didn't appear to arrive until February, with reports building through March. In most of the previous irruptions, the owls quickly retreated northward in early March (James 1989). The 2004-2005 irruption, however, was much like that of 1995-1996 and 1996-1997, when many birds lingered into April, with a few even persisting into May and June (Sadler 1998). Overall, the 2004-2005 irruption differed in the timing from other irruptions in that the owls were present in southern Ontario over a much longer time period, arriving relatively early and persisting relatively late.

As far as the distribution of over-wintering owls is concerned, the main concentrations were in areas where concentrations have occurred in the past (e.g., Simcoe County, Peterborough County, and the Ottawa area), specifically in somewhat marginal farmland, interspersed with forest, along the southern edge of the Canadian Shield. There was a significant movement south of this zone, however, during the irruption of 2004-2005, which has not occurred in all past irruptions. This may have been related to the sheer number of owls involved

(i.e., in order to avoid competition for food, some individuals may have moved farther south where there were fewer owls). In northern areas, including Rainy River, Thunder Bay, Algoma, Sudbury and Manitoulin districts, although a significant movement was noticed in the early winter, most owls moved on to other areas with only a few actually over-wintering.

Summary

The Great Gray Owl irruption of 2004-2005 was undoubtedly one of the largest irruptions to have occurred in Ontario. A total of 501 documented cases of dead birds, combined with regional counts and estimates in the hundreds equate to an overall estimate numbering in the thousands. The movement was detected early, when birds became obvious in both Thunder Bay and Cochrane Districts in September. Numbers began to build and movement peaked in the northern districts during November and December. By the end of December, most counties in southern Ontario had begun to witness the irruption, with numbers gradually building in the south through January. Numbers of over-wintering birds became stable through February. The main area of concentration extended from Simcoe County, across the southern edge of the Canadian Shield to Ottawa, with significant numbers also found in many areas to the south of this, south to Lake Ontario. Smaller numbers over-wintered in parts of central and northern Ontario. By March, some kind of movement appeared to be taking place, although slowly. Numbers remained high through most of March but by the end of the month and through April, most of the birds returned northward. A few birds lingered in areas south of their normal breeding range into May, June and even July, but no reports of breeding were received. In many ways, this irruption was similar to that of 1995-1996, when the following year, an "echo" flight occurred that was nearly as large as the irruption the previous year. Will we see a similar echo flight of these beautiful and charismatic birds in 2005-2006 or will we have to wait a few years for the next irruption?

Acknowledgements

Many individuals compiled records on a regional basis during the winter of 2004-2005 and submitted the records or summaries from their area to me for inclusion in this article, and/or commented on the summary that I had pieced together for their area, including: Nick Escott (Thunder Bay); Dave Elder (Atikokan), Marc Johnson (Cochrane District); John Lemon (Sudbury); Ron Tozer (Algonquin Park); Chris Michener, Lauren Trute and Daryl Coulson (Renfrew County); Al Sinclair and the Muskoka Bird Board (Muskoka District); Christina Lewis, Bernie Ladouceur and Bruce Di Labio (Ottawa); Bob Bowles (Simcoe County); Ethan Meleg and John Haselmayer (Bruce County); Tim

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The Ontario Great Gray Owl Irruption of 2004-2005: Mortality, Sex, Molt and Age

Mark K. Peck and Glenn B. Murphy

Introduction

Large scale and irregular irruptions of Great Gray Owls (*Strix nebulosa*) have been reported many times in Ontario and throughout eastern North America (Nero 1980, James 1989a, Bull and Duncan 1993). These irruptions often occur during periods when northern small mammal populations are low, causing Great Gray Owls to leave their boreal forest breeding grounds in the autumn and wander south in search of food.

During the fall of 2004 and the first half of 2005, Great Gray Owls moved into southern environs in high numbers. It was undoubtedly one of the largest irruptions ever recorded. According to reports in *North American Birds* (Bannon et. al. 2005, Currie 2005, Granlund 2005, Koes and Taylor 2005), this massive influx moved into Minnesota, Wisconsin, Ontario and Quebec, with large numbers of owls being found at the edge of the boreal forest in Alberta, Saskatchewan and Manitoba also.

Within Ontario, Great Gray Owls were first documented in September in northern Ontario, and continued their southward movement, concentrating in several sites throughout southern Ontario by early 2005. The distribution and movement of the Ontario birds are detailed in the associated *Ontario Birds* article by Jones (2005). The irruption was reported on television and radio, and was written-up in several local and national newspapers. Daily reports were found on the ONTBIRDS listserv. Birders and non-birders alike were provided with the wonderful chance to observe birds in open rural sites, urban parks and even in backyards. Initial observations included attempts to sex and age the birds in the field, with many birders using the information provided by Pittaway and Iron on the Ontario Field Ornithologists' website (www.ofo.ca). An updated version is presented elsewhere in this issue (Pittaway and Iron 2005).

The irruption provided a unique opportunity to investigate the mortality, sex, molt and age of owls moving south also. Along with observations, there was considerable human contact. Owls were banded, rehabilitated, accidentally killed, mounted and prepared as specimens, resulting in valuable data being collected. This article summarizes the information collected from the following sources:

Ontario Ministry of Natural Resources (OMNR) Certificates of Reporting: Persons possessing a mount or specimen of a specially protected raptor species must obtain a Certificate of Reporting from an OMNR district office. Ministry staff kindly provided summaries of **444 Great Gray Owls** registered in the autumn of 2004 and the first half of 2005 (Table 1).

OMNR Peterborough: Lorraine Norris, Senior Fish and Wildlife Technical Specialist, obtained weight, wing chord and photographs of spread wings from **57 Great Gray Owls.** Primary coverts were also collected from most of the owls and were given to the Royal Ontario Museum (ROM) where they will be added to the permanent collections.

Taxidermists: After obtaining Certificates of Reporting, many owls were taken to taxidermists for mounting. Ken Morrison, Jim Vogel, Ron Armstrong, Jim Jackson and Rick Poulin saved carcasses or kept detailed notes on **30 Great Gray Owls** during the mounting of specimens. Unfortunately, 12 additional carcasses were destroyed during a freezer breakdown and were unavailable for analysis.

Bird banding: During the fall of 2004 and winter of 2005, Nigel Shaw (Innisfil area), Brian Ratcliff (Thunder Bay area), Myles Falconer (Perth area) and John Lemon (Sudbury area) banded **100 Great Gray Owls**. Age and sex information on the owls was generously made available to the authors.

Wild Bird Clinic, Ontario Veterinary College, University of Guelph: Dr. Katharine Welch provided data from **14 Great Gray Owl** autopsies performed at the clinic.

Wildlife Centres, Humane Societies and the Society for the Prevention of Cruelty to Animals (SPCA): Injured birds taken to animal care facilities were nursed back to health and released or, if euthanized, were returned to the nearest OMNR office. The ROM received **28 Great Gray Owls** from wildlife care facilities.

Royal Ontario Museum (ROM): With the assistance of OMNR staff and the ONTBIRDS listserv, the authors at the ROM requested any unwanted dead owls, hoping to add specimens to the ornithology permanent collections. The request was answered by numerous individuals, resulting in an additional **39 Great Gray Owls** being turned in to the OMNR or sent directly to the ROM (Figure 1). Birds were prepared as study skins, skeletons and spread wings. Tissue and feather samples were collected and have been added to the permanent collections also. Upon request, all specimens will be made available for morphometric, molecular and/or isotopic signature research.

Table 1: Area summaries of Great Gray Owls obtained from Certificates of Reporting, Ontario Ministry of Natural Resources (2005).

	2004			2005					
AREA	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**TOTAL**
Unknown location					1			1	**2**
Algoma District		5	13	5	3	3			**29**
Bruce County						1			**1**
Cochrane District	1	4	1		1			4	**11**
Durham Region				7	4	5			**16**
Frontenac County				1	3	1	1		**6**
Haliburton County					1			1	**2**
Hastings County				11	10	15	3	1	**40**
Kenora District	1	10	6	1	4	2		2	**26**
Lanark County				10	4	4			**18**
Leeds & Grenville County				2	2	3			**7**
Lennox & Addington County				2	1				**3**
Manitoulin District				1	3	1	1		**6**
Middlesex County		1							**1**
Muskoka District			1	1			2		**4**
Nipissing District				1					**1**
Northumberland County				2	2	3	1		**8**
Ottawa				9	6	1	1	1	**18**
Parry Sound District				1					**1**
Peterborough County				13	5	6	1	1	**26**
Prescott & Russell County				3		1			**4**
Rainy River District		9	13	5	1	1		2	**31**
Renfrew County			1		1	3	1		**6**
Simcoe County			1	9	13	13	4		**40**
Stormont, Dundas & Glengarry County					1				**1**
Sudbury District	1	6	6	3		4	3		**23**
Thunder Bay District	2	46	23	4	1	1	4	2	**83**
Timiskaming			1					1	**2**
Kawartha Lakes				3	4	5	2		**14**
York Region				5	5	3	1		**14**
TOTAL	**5**	**81**	**66**	**99**	**76**	**76**	**25**	**16**	**444**

MORTALITY

Certificates of Reporting

Most of the known Great Gray Owl casualties were first reported to district offices of the OMNR. Each office tracks all specially protected raptor species, determining cause of death, date of acquisition, location where the specimen was found and other associated data. Table 1 summarizes the date and area where each owl was found.

Many of the northern districts had their greatest mortality reported during November and December 2004. Birds continued to move south, with increasing mortality reported in southern counties and regions in January, February and March 2005. During the first few months of 2005, mortality in the northern districts quickly decreased, suggesting birds were leaving the north and moving south in a concentrated fashion.

In the north, mortality was greatest in Algoma, Rainy River and Thunder Bay, and may be a reflection of higher human interaction/populations in those areas. Southern Ontario mortality was highest in Hastings, Peterborough and Simcoe counties, all areas where owls had concentrated in large numbers (Jones 2005), suggesting that food resources were plentiful and starvation was not a major cause of mortality.

Figure 1: Glenn Murphy on 19 April 2005 with some of the Great Gray Owls donated to the Royal Ontario Museum by private individuals, animal welfare organizations and the OMNR. Photo by *Brian Boyle, ©ROM.*

Additional Specimens

Kay McKeever of The Owl Foundation in Vineland admitted 43 Great Gray Owls from November 2004 through June 2005. Six of the birds subsequently have been released in western Manitoba with the assistance of Jim Duncan, Biodiversity Conservation Section, Manitoba Conservation. Eight of the birds have died and 29 remain in the care of The Owl Foundation staff (Kay McKeever, pers. comm.). The Wildbird Care Centre in Ottawa admitted 23 birds, released four and had 19 succumb to their injuries. Sue Meech of the Sandy Pines Wildlife Centre in Napanee took in 16 birds. Two of the birds were sent on to The Owl Foundation, one was released and 13 died. An additional 30 owls were reported from the University of Guelph or were turned in directly to the ROM without Certificates of Reporting.

In total, there is documentation for 541 Great Gray Owls being injured (40) or killed (501) during the irruption. How many of these owls died and went unreported is impossible to determine. This is considerably more than the 51 dead birds noted during the 1983-1984 irruption (James 1989b).

In Minnesota, 750 owls were reported to have died in 2005 and an as yet undetermined number perished in Wisconsin (Granlund 2005). Jim Duncan (pers. comm.) reported lower than average numbers were killed in Manitoba in 2004-2005.

Cause of Death

There were 414 Great Gray Owls found dead along roadsides in Ontario. Many were observed in collisions with vehicles, and birds found dead on roadsides with no additional information were presumed to have met a similar fate. Six were found dead in traplines, nine died of starvation, five died in collisions with trains, two were window kills, one died from Aspergillosus, one expired from pulmonary congestion, and one was presumed electrocuted after it was found dead under a hydro line. In addition, one bird flew into a tractor, another died after it flew into a parked truck and a third owl was reported "just falling out of the sky"! Cause of death for 59 birds was undetermined.

There were no reports of owls being shot in Ontario, but the Associated Press reported four men in Minnesota had been charged with poaching over a dozen Great Gray Owls in that state.

SEX

Table 2 details the number of males and females sexed internally, using gonads, from ROM specimens and donated carcasses. Females outnumbered males almost two to one. This is consistent with findings elsewhere that suggest females tend to wander more widely while males remain more sedentary (Duncan 1987, James 1989b). Males may also have migrated later as is suggested by their higher March mortality

Table 2: Number of male and female Great Gray Owls sexed from ROM specimens and carcasses donated by taxidermists.

	2004			2005						
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Unknown	TOTAL
Females	0	2	3	17	17	10	2	0	14	65
Males	0	0	1	5	2	11	1	0	15	35

number. Results are consistent with earlier findings from Manitoba and northern Minnesota (Bull and Duncan 1993). We also found that many of the early female mortalities were second winter birds, suggesting that young females may move out of the north first.

During the preparation of specimens, individual owls were weighed and measured (Table 3). Owls were weighed with an electronic balance to the nearest gram. Six females weighing between 696 and 943 g were later determined to have died of starvation. Captive and emaciated birds were not used in the sample. Weights from all other owls were within the ranges reported by Bull and Duncan (1993), with the exception of one male that weighed 1435 g. This bird was considered an outlier, and removed from the sample. Minimum weights in both males and females of these Ontario owls were approximately 150 g higher than had been reported previously (Bull and Duncan 1993).

Unflattened wing chord, tarsus and foot pad lengths were also recorded. Wing chord measurements were similar to measurements taken in Manitoba (Duncan 1992). Foot pad length was measured from the base of the talon of the halux to the base of the talon on the middle toe. Tail length was not measured because of extensive feather wear or damage to many of the specimens (Figure 2). Measurements originally were taken to determine sex of unknown birds from banding results using a discriminant function analysis developed by Duncan (1996). However, lack of tail and foot pad

Table 3: Great Gray Owl minimum and maximum weight and measurement values obtained from birds turned in to the ROM.

	Weight (g)		Wing (mm)		Tarsus (mm)		Footpad (mm)	
	Female	Male	Female	Male	Female	Male	Female	Male
Number	47	18	37	14	37	13	30	15
Minimum	1051*	845*	400	390	46	44	59.15	58.5
Maximum	1664	1135**	455	425	57	55	72.25	63.8

* captive and emaciated birds were removed from the sample

** one male outlier weighing 1435 g was removed from the sample

measurements in owls of known and unknown sex prevented us from completing the study. Measurements were included in this article to allow for future comparisons.

Using weight and wing chord measurements from banding results and owls processed by OMNR (Lorraine Norris, pers. comm.), we estimated sex of birds using range values provided by Duncan (1992) and the minimum weight value obtained from ROM prepared specimens (Table 4). Overlapping range values between sexes does not allow for complete segregation in Great Gray Owls. Flattened wing chord measurements taken during OMNR processing were compared with values obtained by Johnsgard (1988). ROM birds were included in the table to show the amount of overlap in owls of known sex.

Measurements taken during OMNR processing and during banding programs also suggest a strong bias toward females in all areas of the province (Table 4). Very few known males weighed less than 900 g (reported minimum value of females) and we do not believe this weight accurately represents the males in our sample. Specimens prepared at the ROM showed no overlap between the sexes at weights less than 1051 g, with the exception of the emaciated females mentioned above. We believe birds weighing less than 1051 g may be designated males,

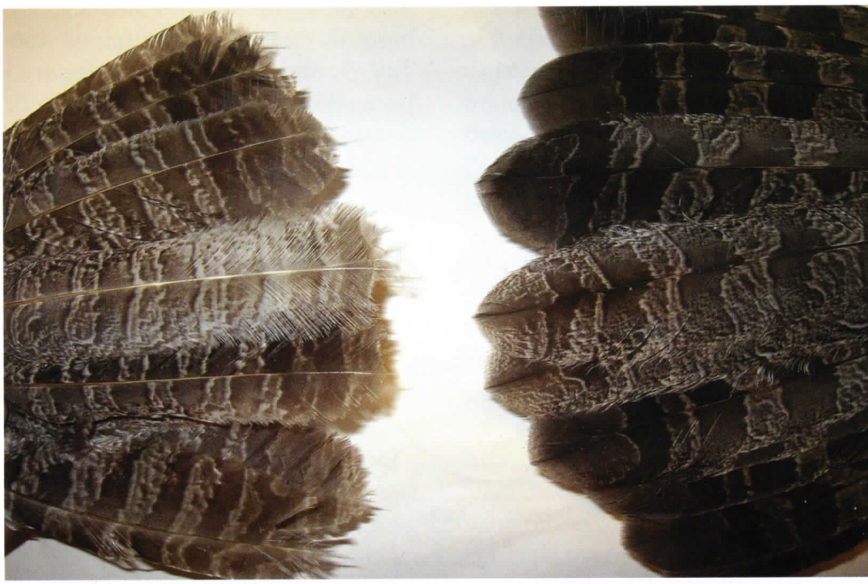

Figure 2: Great Gray Owl rectrices. The heavily worn, faded rectrices of a second winter (HY 2003) are presented on the left. The juvenile feathers have not been molted. The white tips normally seen on these feathers have been worn off. Recently grown adult rectrices are presented on the right. Photo by *Mark K. Peck, ©ROM.*

providing a more accurate representation of the male to female ratio found in Ontario.

Unflattened wing chord also appeared to underestimate male numbers. The flattened wing chords provided by Norris better represented the male to female ratios found elsewhere. Additional study is required to confirm these findings.

PREY ITEMS

Stomach contents from ROM specimens, carcasses from taxidermists and two pellets brought to the ROM were analyzed by the authors, with additional confirmation of skeletal material provided by Bill Kilburn, University of Toronto. All prey items were removed from the crop and gizzard, and cleaned of fur and tissue, both manually and using Dermestid beetles in the bug room of the ROM. Sixty-five stomachs were dissected, of which 31 were empty. Meadow Vole (*Microtus pennsylvanicus*) was the most common prey item found in 30 of the remaining 34 gizzards. Both pellets also contained Meadow Vole skulls. In addition to Meadow Voles, other prey items found in gizzards included: Star-nosed Mole (*Condylura cristata*) in four, Hairy-tailed Mole (*Parascalops breweri*) in one, Short-tailed Shrew (*Blarina brevicauda*) in five, Common Shrew (*Sorex cinereus*) in four and House Mouse (*Mus musculus*) in two. Evidence of larger prey items was not found in any of the stomachs. A search of Great Gray Owl reports in the 2004/2005 ONTBIRDS archives failed to reveal any other prey items being noted.

Granlund (2005) reported Great Gray Owls in Minnesota and Wisconsin pursuing doves, rabbits, squirrels, small dogs and cats and even a fur hat. In the Ontario irruption of 1983-1984, James (1989b) reported several larger prey items

Table 4: Weight and wing chord measurements from Great Gray Owls of known sex (ROM). Estimates of sex using banding results (Shaw, Ratcliff, Falconer and Lemon), and owls processed at OMNR (Norris). Sample size in brackets.

	Weight			Wing chord unflattened		Wing chord flattened	
	<900 g	<1051 g (ROM)	>1200 g	<391 mm	>429 mm	<430 mm	>447 mm
	male	male	female	male	female	male	female
ROM	3 (24)	17 (24)	39 (47)	1 (14)	25 (38)	NA	NA
Shaw	0 (47)	9 (47)	25 (47)	0 (47)	33 (47)	NA	NA
Ratcliff	1 (32)	11 (32)	10 (32)	0 (32)	22 (32)	NA	NA
Falconer	0 (13)	1 (13)	10 (13)	0 (13)	8 (13)	NA	NA
Lemon	0 (4)	0 (4)	3 (4)	0 (9)	7 (9)	NA	NA
Norris	1 (56)	13 (56)	33 (56)	NA	NA	7 (57)	28 (57)

also, including a possible Ermine (*Mustela erminea*), a Snowshoe Hare (*Lepus americanus*), an Eastern Cottontail (*Sylvilagus floridanus*), and a Beaver (*Castor canadensis*). Avian prey items included a domestic chicken and a Northern Goshawk (*Accipiter gentilis*).

SUBCUTANEOUS FAT

Many banded birds, carcasses and specimens were examined for subcutaneous fat. Most owls were determined to be healthy, with considerable fat deposits at the time of banding/death. Of the 55 female owls checked, three were described as having light fat, four had moderate fat and 42 were described as having heavy or extremely heavy fat. The remaining six birds had no fat, and all were reported to have died of starvation. Of the six females that died of starvation, two were from the Toronto area, two were found near Lake Simcoe and individual birds were picked up in Tobermory and Ottawa.

A similar pattern was found in male owls. Twenty-one birds were described as having heavy fat, one had moderate fat, three had light fat and one bird had no fat. Interestingly, the latter bird was found dead along the roadside, with three voles in its stomach.

ESTIMATING AGE

Internal

Museum specimens and taxidermy carcasses were aged internally by examining skull ossification, long bone ossification, and the presence or absence of the bursa of Fabricius, a small organ located near the cloaca. The bursa is grown during the nestling stage and regresses as the bird reaches maturity, usually disappearing by April following the first year in other owl species. It is commonly used for ageing museum specimens, and has been successfully used to age Great Horned Owls (*Bubo virginianus*; Weller 1965), Snowy Owls (*Bubo scandiaca*; Josephson 1980) and Ural Owls (*Strix uralensis*; Pietiainen and Kolunen 1986). Completeness of skull ossification and the ossification of long bones were checked by the authors, with a supplemental examination by Kevin Seymour, Department of Natural History, ROM. Using these criteria, no first winter birds were found in the ROM specimens. However, preparations of skeletons did allow for easy identification of starved birds. Starved owls had very little fat left in the bones, causing skeletal material to appear greaseless, pale and dry.

External

Great Gray Owls do not molt their primaries (P), secondaries (S), primary coverts (PC) or tail feathers (rectrices) during the first prebasic molt (Pyle 1997). Most juvenal feathers are easily distinguished from adult feathers by their light beige/white tips. Molt of flight feathers begins in early to late summer, follows a regular pattern, but is partial, and may take several years to complete. This incomplete molt

has been used in Europe as an effective technique for ageing Great Gray Owls (Pyle 1997). Nero and Copeland (1997) have suggested that Great Gray Owls may show an inhibited molt of flight feathers if inadequate nutrition during the summer months does not allow for the necessary energy requirements of feather replacement.

Using banding results, photographs and specimens brought in to the ROM, we examined flight feathers on Great Gray Owls to assess molt pattern and age structure. Rectrices in younger birds and roadside casualties often showed heavy wear or extensive damage (Figure 2) and were not used in our study. In field situations, heavy wear of rectrices may assist in ageing younger birds (Pittaway and Iron 2005).

First Winter (HY [Hatch Year] 2004): Juvenal flight feathers are grown in May and June and are retained during the first prebasic molt. All primaries (with the exception of P10), secondaries and rectrices are white-tipped and more heavily barred than adult feathers. The white tips on some of the feathers may be slightly worn but the feathers should still be dark and should not show much evidence of fading. Compared to adult feathers, the rectrices are narrower, more pointed and may be slightly frayed by spring of the following year. Juvenal feathers may be of slightly poorer quality and will show some wear and fading, but should still be darker than juvenal feathers grown in previous years (Jim Duncan, pers. comm.). Only one owl was confirmed as a first winter bird (Myles Falconer, pers. comm.). This owl was banded in the Perth area on 23 February 2005.

Second Winter (HY 2003): Second winter owls retained all or most of their white-tipped juvenal feathers, but the primaries, secondaries and rectrices were heavily worn. The feathers also showed heavy fading, appearing a lighter brown, when compared to adult feathers. In this age class, newly molted feathers, when found, were usually at the inner secondaries, S9 or S10 (Figure 3). Ageing of the innermost secondaries, S11-S13, often referred to as tertials in passerines, is difficult and often problematic. These feathers are different in appearance from the other secondaries, lacking the white tip, and often show less fading than other flight feathers. Darker coloration in adult feather rachis (central shaft) often provided a useful character that can be easily checked. After the innermost secondaries have been molted, the molt moves outward toward the tip of the wing. During the second winter, molted feathers do not appear to extend beyond S8.

Third Winter (HY 2002): In the third winter, supplementary molt centres are usually found at S5 and at P5 (Figure 4). Secondary molt continues to move distally from the innermost secondaries toward the

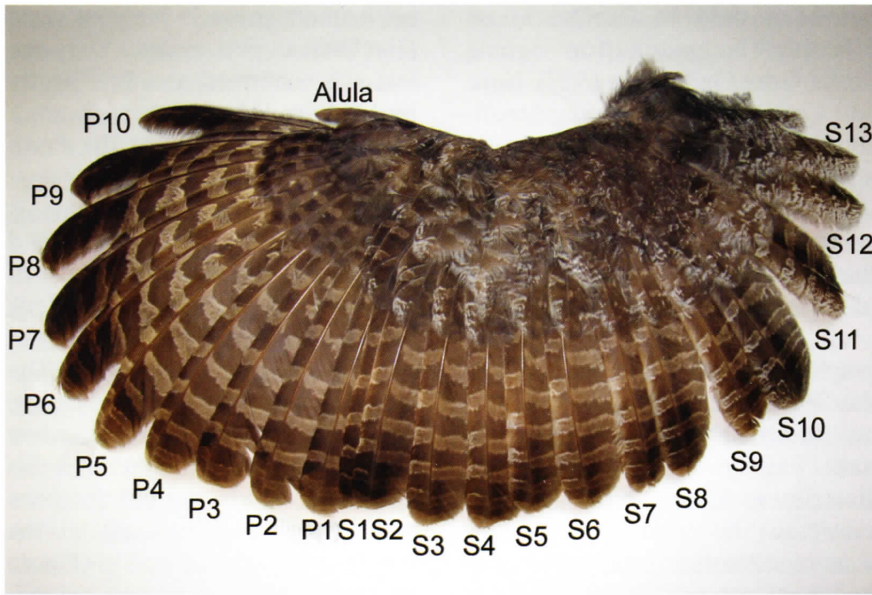

Figure 3: Spread wing of a second winter (HY 2003) Great Gray Owl showing the numbering of primaries and secondaries. P1-P10 and S1-S9 have retained their juvenal "white" tipped feathers and show considerable wear and colour fading. S10 is a newly molted feather. S11-S13 are juvenal feathers but are different in appearance, lacking the white tips, and are difficult to score accurately. Photo by *Mark K. Peck, ©ROM.*

primaries. A second secondary molt centre begins later at S5 and also moves distally toward the primaries. Primary molt is centrifugal, progressing in both directions, usually beginning at P5, but initiation at P4 and P6 was also recorded. By the end of this molt cycle, one to three primaries had been replaced. Primary coverts appear to molt prior to the primaries and are readily distinguished between adult (PC5-PC7) and juvenile plumages.

Fourth/Fifth Winter (HY 2000/2001): Many of the juvenal feathers have now been replaced with dark-tipped adult feathers (Figure 5). Pattern of molt corresponds with the details noted in third winter birds, with three to nine primaries having been replaced by autumn.

> Fourth Winter (HY earlier than 2001): All juvenal feathers have now been replaced with adult feathers (Figure 6). P5 and P6 may sometimes show fading at the tips due to wear and care must be taken to avoid confusion with juvenal feathers. The pattern of the wing molt is still evident due to the colour fading of older feathers. From the limited information we had on this age class, there is a suggestion that adult molt may not follow the same pattern

Figure 4: Spread wing of a third/fourth winter (HY 2001/2002) Great Gray Owl. New feathers are found at P5, P6, S5 and S9 – S13. Flight feather molt in young Great Gray Owls is not completed annually but does follow a regular pattern. Primary molt is centrifugal, progressing in both directions, usually beginning at P5. Secondary molt starts at the innermost secondaries and moves distally toward the primaries. A second secondary molt centre begins later at S5 and also moves distally toward the primaries. Primary coverts appear to molt prior to the primaries and are distinguishable between the adult (PC5-PC7) and juvenile plumage. Photo by *Mark K. Peck, ©ROM.*

observed in younger birds. It is possible that adults may replace specific flight feathers as they become worn rather than in a regular pattern as is seen in younger birds.

It is important to note that flight feather molt may vary considerably depending on the nutrient resources available during the molting period, confirming the findings of Nero and Copeland (1997). In years when northern small mammal numbers are low, molt may be minimal or even completely inhibited, thus increasing the difficulty of ageing birds accurately. Variation in individual fitness, sex, age and raising of young could all impact molt strategies for Great Gray Owls.

Although difficult, estimating age classes of Great Gray Owls provides valuable information on the population structure of this species and may also provide insight into northern breeding conditions. In 2004, several Ontario Breeding Bird Atlas field crews reported on the low numbers of small mammals in the north (Don Sutherland, pers. comm.; Glenn Coady, pers. comm.). According to Jim Duncan (pers.

Figure 5: Spread wing of a fourth/fifth winter (HY2000/2001) Great Gray Owl. Juvenal feathers have now been replaced at P1-P7, S5 and S7-13. Pattern of molt corresponds with the details noted in Figure 3. Photo by *Mark K. Peck, ©ROM*.

Figure 6: Spread wing of a > fourth winter Great Gray Owl. All juvenal feathers have now been replaced. The pattern of the wing molt is still evident due to the colour fading of older feathers. P8, P4-P6, P1, S1, S2, S4, and S8-S13 all appear to be recently molted, suggesting older birds may not follow the same molt pattern observed in younger birds. Photo by *Mark K. Peck, ©ROM*.

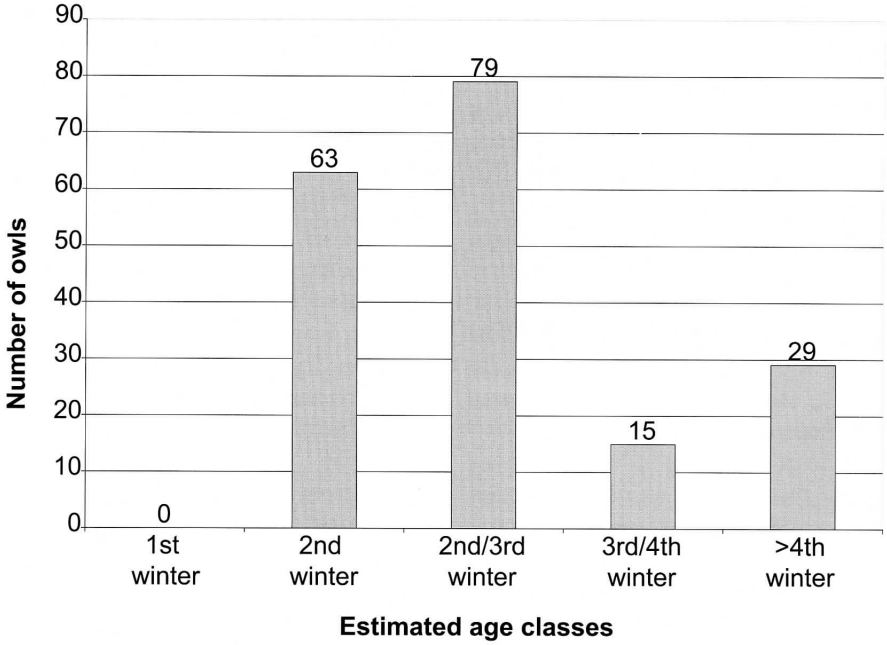

Figure 7: Great Gray Owl age class totals, estimated from wing molt.

comm.), Great Gray Owls in his Manitoba study area had little or no productivity in 2004 also. This would account for the lack of juveniles found in the 2004-2005 irruption (Figure 7) and may have been the trigger for the southward movement of the owls. Juvenile birds were not reported in Manitoba or Minnesota as far as we have been able to determine (Jim Duncan, pers. comm.; Nigel Shaw, pers. comm.).

Second and third winter birds made up the majority of the birds found in our sample. This suggests that productivity in the north was high in those two years, with many younger birds successfully surviving through to the autumn of 2004. It is unlikely that these numbers accurately reflect the age structure of all Great Gray Owls in the north of Ontario and Manitoba. Juvenile and younger age class birds wandering or moving out of suboptimal habitat is probably the usual situation during invasions and provides further evidence for food stress as the likely cause for the irruption (Duncan 1987). Older, more experienced birds, occupying optimal habitat, would be more likely to survive and stay in the north.

SUMMARY

During the Great Gray Owl irruption of 2004-2005, information on mortality, sex, molt and age was col-

lected from owls brought in to the Ontario Ministry of Natural Resources, taxidermists, bird banders, wildlife rehabilitators and the Royal Ontario Museum. There were 541 owls found dead (501) or injured (40) throughout Ontario. The majority of birds were found dead along roadsides. Other causes of death included starvation, traplines, trains, and windows. Most owls appeared healthy, with considerable subcutaneous fat deposits at the time of banding/death.

In a comparison of known sex owls, females outnumbered males, 65 to 35. Sexing of unknown owls using weight and wing chord values also pointed to a greater number of females moving south during the irruption.

Estimates of age classes were obtained using internal examinations and flight feather molt patterns. The only first winter Great Gray Owl found was banded in the Perth area, indicating poor productivity in the north in 2004. Molt patterns suggested most Great Gray Owls, 142 of 186, were second or third winter in age.

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Ageing and Variation of Great Gray Owls

Ron Pittaway and Jean Iron

Introduction

Here we describe how to distinguish two broad age classes, adult and first year, of the Great Gray Owl (*Strix nebulosa*) in the field. A third age class (second year) is described because sometimes it can be recognized in the field. We also discuss plumages and molts, subspecies, morphs, albinism, melanism, and telling males from females. We hope that birders and researchers will find this information useful in understanding the age classes and variation observed during irruption years and when encountering individuals in non-irruption years. This article revises our post to ONTBIRDS and the OFO website in January 2005.

Plumages and Molts

Juveniles undergo a partial first prebasic molt into first year plumage by late September. After September, young of the year and older birds are similar in appearance. First year birds retain the juvenal primaries, secondaries, tertials and tail for a year or more. The first annual molt of flight feathers starts at about 13 months of age (Bull and Duncan 1993). Not all primary and secondary feathers and often lesser secondary coverts are molted annually, so after about 1.5 years of age, Great Gray Owls usually show a mix of old and new flight feathers. A few juvenal primaries and secondaries may be retained for 3-4 years. Year-old and older Great Gray Owls normally molt all tail feathers annually (Bull and Duncan 1993), but Pyle (1997) on page 88 stated that they often keep juvenal tail feathers for two years, so such birds would have substantially abraded tails. More study is needed. Most second year and probably older birds from the 2004-2005 irruption showed an abnormal plumage because they retained many old feathers, which normally would have been molted. The retention of considerable old feathering indicated an inhibited or partially skipped molt and probably resulted from food stress during the molt period before these owls irrupted southward. Nero and Copeland (1997) reported a similar inhibited molt during the 1995-1996 irruption. We postulate that heavily worn birds with much retained old plumage may be typical of many irruption years.

Adults

We arbitrarily define adults as birds in their second fall and older. The folded wingtips are dark brown without pale tips and contrast with the paler gray tertials above and paler tail below, as shown in Figures

1 and 3. Some adults have one or two new grayer secondaries among contrasting older brownish secondaries on the folded wing panel (Figure 3). Other adults have the entire visible secondary panel brownish, indicating no recent molting. In first year birds, the secondary panel is more uniformly gray and less contrasting. The overall plumage of adults (not all) in 2004-2005 showed a greater mix of older browner feathers (probably due to an inhibited stress molt) contrasting with newer gray feathering. Even normally molting adults often retain brownish lesser wing coverts, which is a good indicator of age.

First Year

A first year owl is a bird during its first fall, winter and spring. First year birds have distinctly fresh pale-tipped primaries on the folded wingtips, as shown in Figures 1 and 2. The tail feathers of first year birds usually have tiny sharp points where the juvenal down (mesoptile) adhered to the tips of tail feathers. These tips remain into January or February. Figure 1 shows a comparison of first year and adult tails. Also see the photo of a first year bird on page 243 in Duncan (1996). *Caution*: Do not confuse the pointed tail tips of first year birds with the exposed quills on the tails

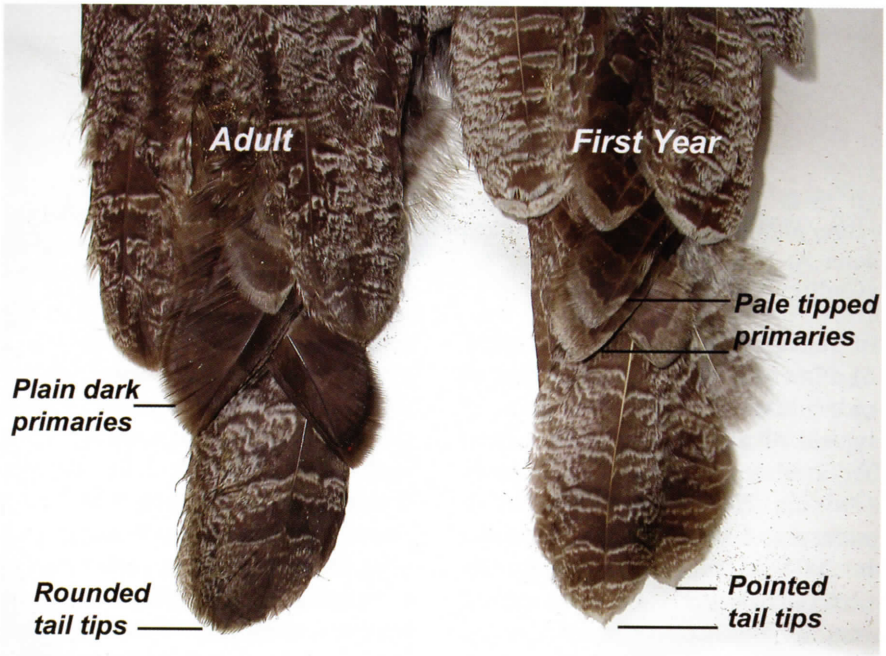

Figure 1: Comparison of adult and first year Great Gray Owls in the Royal Ontario Museum showing differences in folded wingtips and tail tip shape which can be used to age birds in the field. Photo by *Jean Iron*.

Figure 2: First year Great Gray Owl showing all fresh pale-tipped folded primaries and rather uniform grayish plumage. Illustration by John A. Crosby from *The Birds of Canada* (Godfrey 1986).

of heavily worn older birds (Figure 5). First year birds lack the mix of older browner feathers, which is typical of many but not all adults. We saw no first year Great Gray Owls in 2004-2005, indicating a widespread failed breeding season in 2004, as reported by Pittaway (2005). However, we did see second year birds whose retained juvenal folded primaries suggested first year birds, as in Figure 4. These birds did not molt normally. They differed from first year birds in having retained two-year-old frayed tails and variable amounts of contrasting old brown feathering.

Second Year

Sometimes, this age class can be recognized in the field. Second year birds that have molted normally usually show a mixture of pale primary tips and darker adult tips. Some third year birds are similar, but most should have more adult primaries. Most second year birds in 2004-2005 had retained old brown feathering similar to that described by Nero and Copeland (1997). They stated, "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." Figure 4 shows a second year bird with first year folded wingtips and a mix of old and new feathers elsewhere. This molt contrast indicates that it is not a first year bird. Figure 5 shows heavily abraded tail feathers, suggesting a

Figure 3: Adult Great Gray Owl showing contrasting dark folded wingtips lacking pale tips, and mixture of new gray and old brown secondaries. 5 January 2005, Cranberry Marsh, Whitby, Durham Region, Ontario. Photo by *Jean Iron*.

second year bird or possibly an older bird with a retained juvenal tail. See *Caution* under the heading First Year above.

Subspecies

There is one subspecies (race) in North America, which is the first named or nominate subspecies, *S. n. nebulosa*. The Great Gray Owl was described in 1772 from a specimen from the Severn River in northern Ontario (AOU 1998). There is very little geographical variation in size and plumage colour across North America, probably because its nomadic behaviour allows outcrossing and gene flow among populations. The Great Gray Owl is one of the few bird species described first from the New World that also occurs in the Old World. A second subspecies, *S. n. lapponica*, occurs across northern Eurasia. The three Royal Ontario Museum specimens of *lapponica* are slightly paler overall with more distinct long streaking below. A third subspecies, *S. n. elisa-*

Figure 4: Second year Great Gray Owl told by its retained old faded juvenal pale-tipped wingtips, contrasting new gray and old brown secondaries, and mix of gray and brown coverts. This individual's plumage is abnormal due to an inhibited molt. 3 January 2005, Thickson's Woods, Whitby, Durham Region, Ontario. Photo by *Jean Iron*.

bethae, described from Mongolia, is not recognized by most authorities (Michel Gosselin, pers. comm.).

Morphs

There are no morphs of the Great Gray Owl, but some birds are grayer or browner than others due to individual variation, age, wear, and amount of retained older faded feathers. Fresh first year birds with all new feathers often appear more uniform gray in the field. It is important to keep in mind that the same bird will appear different depending on light, time of day, and background. Observers seeing the same individual in the morning and then in the afternoon often think they have seen two different birds. A Great Gray Owl's true colours and patterns often are altered in photographs.

Albinism

Albinism is more frequent in Great

Figure 5: Badly frayed "skeletonized" tail of Great Gray Owl showing exposed quill tips, suggesting a second year bird having retained its tail for two years due to an inhibited or missed stress molt. Do not confuse this tail with that of a first year bird's pointed tail tips where the down once adhered. 1 January 2005, Thickson's Woods, Whitby, Durham Region, Ontario. Photo by *Jean Iron*.

Gray Owls than in other owls (Alaja and Mikkola 1997). A male bird with white plumage that mated with a normal bird in Idaho produced normal young (Whitfield and Kelley 1995). It was considered an incomplete albino because its eyes and toes were not pink. Many partial albinos with some white feathers and a few leucistic birds with diluted or muted feather coloration have been recorded.

Melanism

Great Gray Owls exhibit varying degrees of melanism (Pittaway 2005). Figure 6 shows a partially melanistic individual from the irruption in 1995-1996, with more information in the caption. A slight-

Figure 6: Partially melanistic Great Gray Owl. Note overall darker plumage colour, darker loral area, larger black chin spot "black knot" and shorter white bowtie. The worn tail tips suggest at least a second year bird. 19 February 1996, near Newmarket, York Region, Ontario. Photo by *Albert Kuhnigk*.

ly melanistic individual along Halls Road in Whitby, Durham Region, during January and February 2005 was intermediate between Figure 6 and normally-coloured birds. An almost solid black individual was photographed in Minnesota in November and December 2004 (see photo in Alt 2005).

Male or Female

Females are larger than males, but there is considerable overlap (Bull and Duncan 1993). Judging size in the field is deceptive and unreliable. If several birds are seen together, one might "guess" that an extremely small individual is a male or an extremely large one is a female, but not with certainty. It is impossible to tell males from females by appearance in the field on winter range (Pittaway 2005).

Ethics and Photos

Please allow Great Gray Owls the space they need to hunt and rest. To age them, a scope is essential. If you are taking photos of perched birds to determine age, the best photos are of the sides and the back, showing the wingtips, secondaries, wing coverts and tail.

Conclusion

The above information on ageing Great Gray Owls in the field is preliminary. Some will be difficult if not impossible to age in the field. We recommend using our information in combination with the paper by Peck and Murphy (2005) in this issue.

Acknowledgements

Mark Peck and Glenn Murphy allowed us to examine and photograph specimens in the Royal Ontario Museum. We thank Michel Gosselin of the Canadian Museum of Nature for advice. We thank Albert Kuhnigk for use of his photograph of a partially melanistic Great Gray Owl. Ron Tozer made many helpful suggestions.

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Notes

Circumstantial Evidence for Golden Eagle Predation of a Red Fox

Al Sandilands

On 3 February 2005, I completed a winter wildlife survey on a site above the Niagara Escarpment in the Town of the Blue Mountains (Grey County) near Collingwood, Ontario. I noticed tracks of a Red Fox (*Vulpes vulpes*) that ended abruptly in a meadow, about 10 m outside a small copse of trees that it had walked though after crossing another old field.

Upon closer examination, I observed that there were two very large wing prints in the snow, one about a metre in advance of the fox's last front footprint, and the other that would have been over the broadside of the fox. There was no evidence of blood or a struggle. The tracks were relatively fresh, having been made in the last one or two days, and were still very clear.

Approximately half an hour before this, I had seen a Common Raven (*Corvus corax*) harassing a low-flying adult Golden Eagle (*Aquila chrysaetos*). The logical explanation appeared to be that the eagle had struck the fox and carried it off as prey.

The Golden Eagle has a highly variable diet and usually eats animals that weigh 10-5,800 g, but occasionally larger items are eaten; about 75% of prey consists of mammals weighing 500-2,000 g (Snyder and Wiley 1976, Kochert et al. 2002). Lumsden (1964) reported remains of two Snowshoe Hares (*Lepus americanus*) at a nest in the gorge between Sutton and Hawley Lakes, Ontario. The Snowshoe Hare, other large rabbit (Leporidae) species, and squirrels (Sciuridae) are staples of the Golden Eagle's diet. It has occasionally been documented killing larger prey such as young ungulates (rarely adults) and domestic pets (Kochert et al. 2002). Carrion is frequently consumed, so that it is often difficult to determine if the food item was killed or scavenged.

There are few references to members of the dog family (Canidae) being taken as prey by the Golden Eagle. In Ontario, Snyder (1947) reported that Red Fox carrion was found among the contents of four stomachs he examined, but Kochert et al. (2002) stated that groups of Golden Eagles occasionally hunted cooperatively in winter for large prey, including Red Foxes and ungulates. They also mentioned that Domestic Dogs

(*Canis familiaris*) occasionally are consumed.

This observation suggests that live Red Foxes occasionally may fall victim to the Golden Eagle in Ontario.

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Ron Pittaway: Distinguished Ornithologist

Bob Curry

This note is based on remarks by Bob Curry at the presentation of the Distinguished Ornithologist Award to Ron Pittaway at the OFO Annual Convention in Leamington, Ontario, on 10 September 2005.

Surely every member of Ontario Field Ornithologists (OFO) is familiar with the impact of this year's distinguished ornithologist. Whether you are reading *OFO News*, *Ontario Birds*, ONTBIRDS on the net, or attending OFO field trips or annual conventions like this, you will know that Ron Pittaway is an integral part of what this organization is about. But while it is tempting to conclude that Ron's contributions have only been to OFO, this is far from true. Ron's sphere of influence in the scientific, naturalist and conservation community is much wider. Let me give you some background into Ron's life with birds, his passion, his achievements and impact, and his goals.

As a very young boy in the 1950s during the first three or four school grades, Ron began by collecting bird eggs. He, his brother Rick and several school friends were in fierce competition to find birds' nests. They identified the eggs using the big old *Birds of America*, edited by T. Gilbert Pearson (1936), which had several plates illustrating eggs of about 110 species. Then, Ron had an epiphany. Why don't we identify the adult birds and then we'll know the eggs for sure! This is how Ron became a birder at a very early age.

Ron's contemporaries as a teenager were people like Monty Brigham, Dan Brunton, Don LaFontaine, Brian Morin and Ken Ross, all of whom are prominent professional biologists or naturalists today. Distinguished Canadian journalist John Bird wrote a weekly Saturday column in the *Ottawa Journal* that featured local bird sightings. The boys delighted in seeing their names in print. This made them famous and impressed their teachers, their parents and other adults.

Ron's father managed a photography store in Ottawa habituated by professional Ottawa scientists and naturalists. His Dad asked famed Canadian Arctic biologist and explorer-photographer Stewart Macdonald of the National Museum if Ron could accompany him on the 1964 Ottawa Christmas Bird Count (CBC). In the late 1950s, Ron first met National Museum Curator and *The Birds of Canada* author W. Earl Godfrey at the Victoria Museum. In later years at the museum, Earl and Henri

Figure 1: Ron Pittaway (right) receives the Distinguished Ornithologist Award, presented by Bob Curry during the OFO Annual Convention in Leamington, Ontario, on 10 September 2005. Photo by *Jean Iron*.

Ouellet would look at study skins and talk birds with Ron. With them, he studied the collections and began to learn the intricacies of taxonomy, subspecies, morphs, plumages and molts. Godfrey impressed on him the importance of critical, careful examination and identification of birds. What a group of mentors to help mould Ron into what he is today!

On another Ottawa CBC in December 1970, Ron met Dan Strickland, the world Gray Jay expert and Chief Naturalist of Algonquin Park at the time. By the summer of 1971, Ron was a seasonal naturalist at Algonquin and worked there until 1980. He earned a diploma in forestry at Algonquin College in 1972. During this period, he also worked with Paul Pratt at Rondeau Provincial Park. Ron hitchhiked across Canada in 1968 and travelled the continent in the 1970s, learning much about North America's birds.

Ron also participated in ornithological studies in the Canadian North with Queen's University on Snow Geese at Churchill, Manitoba in 1970, and with the Canadian Wildlife Service on Red Knots and Ruddy Turnstones on Ellesmere and Axel Heiberg Islands in 1975.

When Ron lectured at Algonquin Park, academics asked him where he had earned his Master's degree! The upshot was

that he was accepted into third year at The University of Waterloo where he graduated with an Honours Bachelor of Environmental Studies degree in 1979.

From January 1981 until retiring as education coordinator in July 2003, Ron taught resource management at the Leslie M. Frost Natural Resources Centre, Ontario Ministry of Natural Resources, near Dorset. There, he influenced countless young people and mentored other instructors.

He has been a teacher at every level. Ron is extremely proud that members of the very accomplished Ottawa birding gang that followed a few years behind him—people like Bruce Di Labio, Tom Hince, Bruce Mactavish and Michael Runtz to mention just some—often gave tribute to him when they made presentations or received awards.

And now we come to OFO. Ron was a founding life member of OFO in 1982, and has been a leader on the Ontario Bird Records Committee, serving as a member, as secretary and as chair for a total of 12 years. His contributions to our organization really took off in 1993. It was then that he met Jean Iron. The resulting synergy has been a boon to us all.

Ron is most proud of pulling OFO out of the deep dive that it was in at the time. He, Bill Crins and Ron Tozer became editors of *Ontario Birds* in 1991, and still are. The journal needed writers, so "Pitt" set an example with a fast-paced production of learned papers. So successful were these writings that Jean and Ron launched *OFO News* in 1994.

He has authored more than 140 articles in journals such as *Trail & Landscape*, *The Canadian Field-Naturalist*, *Ontario Field Biologist*, *The Blue Jay* (Saskatchewan), *Birders Journal*, and of course, *Ontario Birds* and *OFO News*. His papers include recognizable forms, identification, behaviour, taxonomy, plumage and molt, conservation and preservation, book and product reviews, bird quizzes, and memorials.

Ron's publications encompass a great variety of aspects of bird study. In some, he has advanced our understanding of the identification of difficult species pairs. Read, for example, the brilliant paper in *Birders Journal* titled "The identification and migration of breeding plumaged dowitchers in southern Ontario", which he co-authored with Alvaro Jaramillo and Peter Burke in 1991. Ron has produced many more identification pieces covering small grebes, loons, shrikes, crows and ravens and others.

Plumage and molt terminology has been a particular passionate project of Ron's for many years. Remember Peter Burke's gray, bronze, cinnamon and purple illustrations and Ron's explication of the Humphrey and Parkes system to describe and categorize plumages and molts? I believe that no clearer explanation of terms such as first prebasic molt, definitive prealternate molt, supplemental plumages and so

forth exists in print.

Other papers deal with recognizable forms, such as Cory's Least Bittern, redpolls, Horned Larks, Red-tailed Hawks, jaegers, and Iceland Gull. These articles encourage and compel us really to look closely at birds.

Taxonomy is most often the purview of professional ornithologists. Undaunted, Ron waded right into the morass of the Thayer's Gull controversy in a 1999 *Ontario Birds* article, and elicited a detailed and bristly response from Richard C. Banks, the chair of the American Ornithologists' Union Committee on Classification and Nomenclature.

Ron is a true student of birds. He is a recognized bird identification expert in North America and consultant to the British Bird Records Committee. He contributes learned opinions regularly to BirdChat, ID-FRONTIERS, and of course, to ONTBIRDS. What is most impressive is that Ron doesn't just name and describe birds. He always asks questions and then hypothesizes in true scientific tradition. Consider northern owls, for example. In one note, Ron debunked the widely held view that the boreal forest owls came south as a result of deep snow in the north woods. In a recent note, he asks why don't Great Gray Owls breed east across the boreal forests of Quebec, and why is it that last winter's Great Gray irruption comprised many two-year olds? His answers may be found in his June 2005 paper in *OFO News*.

But Ron's passion extends beyond the intellectual and sporting aspects of birding. He loves birds in a meaningful and productive way. For example, he has taken a particular interest in Loggerhead Shrikes and their habitats. From 1991 to 1995, he was the Ontario Government's representative on the Loggerhead Shrike National Recovery Team. Subsequent to his 1991 study of these shrikes on the Carden Alvar, his *Birder's Guide to the Carden Alvar* created widespread international interest and encouraged financial contributions that helped in the preservation of the Cameron and Windmill Ranches there. Few birders will leave such a legacy of preservation.

But, of course, we expect and want a lot more from Ron in the years to come. We'll continue to learn from Ron because he will ask the questions that we never thought of and he will either answer them or encourage us to seek those solutions.

Ron has a goal. He wants to write a guide to field recognizable subspecies and morphs of Canadian birds. We wish him every success in this endeavour, as it will enrich our understanding of and pleasure in birds.

We are all privileged to benefit from Ron's passion, experience, intelligence and insight into the lives of our birds. He is a most worthy recipient of the Ontario Field Ornithologists' Distinguished Ornithologist Award for 2005.

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Nikon

Photo Quiz

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Figure 1

December 2005 Quiz

Glenn Coady

You are walking along a local beach when you notice a bird taking flight directly away from you. Even with the bird flying away from you, with no opportunity to adequately examine its head and breast, a good look at the field characters revealed in this photograph (Figure 1) should permit a correct identification of the bird.

The combination of this bird's long and pointed wings, light silvery-gray mantle, predominantly white tail, and webbed feet, narrows the possibilities down to one of the Laridae (gulls and terns). Even most novice birders would have come to this conclusion instinctively.

One of the most striking features of this bird is the strongly marked dark blackish-brown "M" pattern across its outer primaries and primary coverts, with a wide-banded carpal bar through the lower and outer lesser secondary coverts, most of the median secondary coverts, and innermost greater secondary coverts. This pattern allows us to age this bird as a first basic individual, and effectively eliminates any of the terns from further consideration, as first basic terns do not demonstrate such a strongly marked "M" pattern.

Identification of our quiz bird is therefore limited thus far to a selection of the small and medium-sized first basic gulls with a distinct dorsal "M" pattern, that includes Little Gull, Bonaparte's Gull, Black-headed Gull, Ross's Gull, Sabine's Gull and Black-legged Kittiwake.

A juvenile or first basic Black-legged Kittiwake is easily ruled out since our quiz bird obviously has decidedly reddish-pink legs and feet, has far too pale a mantle for a Black-legged Kittiwake, and lacks any hint of the black nape marking found on juvenile and most first basic Black-legged Kittiwakes.

Sabine's Gull is a very long distance migrant to the southern hemisphere and consequently the molt from juvenal to first basic plumage is delayed until they reach their winter range, so that most individuals retain juvenal plumage until late December or January, which is well beyond the latest dates of occurrence in Ontario. Since first year birds remain in the southern hemisphere in their first summer, immature Sabine's Gulls that occur in Ontario are exclusively juveniles in fall. Juvenile Sabine's Gull has a much browner and more scalloped mantle and inner wing than our quiz bird, and it completely lacks a contrasting dark carpal bar. It has grayish-flesh legs, nowhere near as vividly reddish-pink as in our quiz bird. Sabine's Gull can thus be confidently ruled out.


Figure 2

Another thing that is striking about our quiz bird is the obvious pink wash to the visible flank. Although this is a typical field mark commonly associated with being nearly the rule in Ross's Gull, individuals of many of the small North American gulls (Little, Black-headed, Bonaparte's, Sabine's, Franklin's, for instance) can show a bright pink wash like this due to feather staining by preen gland oil and/or a crustacean-rich diet, and so it is not a definitive or even particularly useful character in the analysis of our quiz bird.

Another striking feature of our quiz bird is the extensively white trailing edge to the wings, with all-white secondaries and inner primaries in a pattern similar to juvenile Sabine's Gulls and Black-legged Kittiwakes. First basic Black-headed Gulls show a very well-defined dark secondary bar and all-dark inner primaries. Similarly, first basic Bonaparte's Gulls also show a distinctly dark secondary bar as well as dark-tipped inner primaries. Both of these species also show dark terminal tail bands that involve all the rectrices, unlike our quiz bird which shows dark tips only involving the central rectrices. We can thus confidently eliminate Bonaparte's Gull and Black-headed Gull from further consideration.

First basic Little Gulls routinely show a distinctly dark-capped crown. What little portion of the crown we are able to see here appears completely white. They also show a grayish secondary bar (although this may


Figure 3

be faint in some individuals), and the pale trailing edge of the wing does not extend into the outer primaries, as it does in this quiz bird. They also do not show the "M" pattern of the dorsal wing surface being joined across the lower back as we see on the quiz bird. Structurally, Little Gull has a shorter, more rounded wing, and a shorter, square-cut tail with a dark tail band involving all the rectrices (though beware of summer birds in active tail molt). Conversely, our quiz bird shows a long, wedge-shaped tail with dark tips only on the central rectrices. Thus, our quiz bird is clearly not a Little Gull. All of these field characters are therefore consistent with an identification of this quiz bird as a first basic **Ross's Gull**.

Fortunately, other photographs of this bird were obtained which allow us to review other aspects of Ross's Gull identification. The photograph of the bird in flight (Figure 2) allows us to see the entirely white crown (unlike first basic Little Gull), the uniformly medium gray wing lining (but beware that this may appear closer to black as in Little Gull in both harsh and low lighting conditions), the very wide white trailing edge to the underwing, the longer central tail feathers (which impart a diamond-like shape to the spread tail; see Figure 1), and the exceedingly short bill (the shortest bill of any gull species). The photograph of the standing bird with folded wings (Figure 3) shows us how the combination of the rounded head, large eyes accentuated by a characteristic dark eye patch, short bill, puffy chest and long attenuated rear end give

the Ross's Gull a gentle, Mourning Dove-like appearance. Ross's Gulls appear more "pot-bellied" than the other small gulls. The closed wing shows broad white primary edges (particularly the inner primaries) and usually shows isolated dark primary spots, as this bird does—a pattern not seen on the other small gulls. This contrasts markedly with first basic Little Gull, which shows a completely dark outer edge to the closed wing. Note that the Ross's Gull at rest shows a whitish area on the primaries extending just between the tip of the tertials and the dark wingtip formed by the dark outer primaries. Note also the pale, smudgy gray on the lower nape and breast sides, typical of first basic Ross's Gull.

Keep in mind a few behavioural traits of Ross's Gulls that might make them easier to pick out of a large flock of Bonaparte's Gulls. When walking on the ground, they often show a pronounced pigeon-like, head-bobbing gait. When feeding, they often land in the water and pick prey from the surface while spinning in circles much like a phalarope. An adult Ross's Gull on the Niagara River in 1995 was easy to pick out among hordes of Bonaparte's Gulls in the flypast due to its deeper and faster wingbeat, as well as its all-gray underwing linings.

This Ross's Gull was photographed at Point Pelee National Park on 17 May 1999 by Steve Pike. For additional photographs of this bird, see: http://www.stevepike.com

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