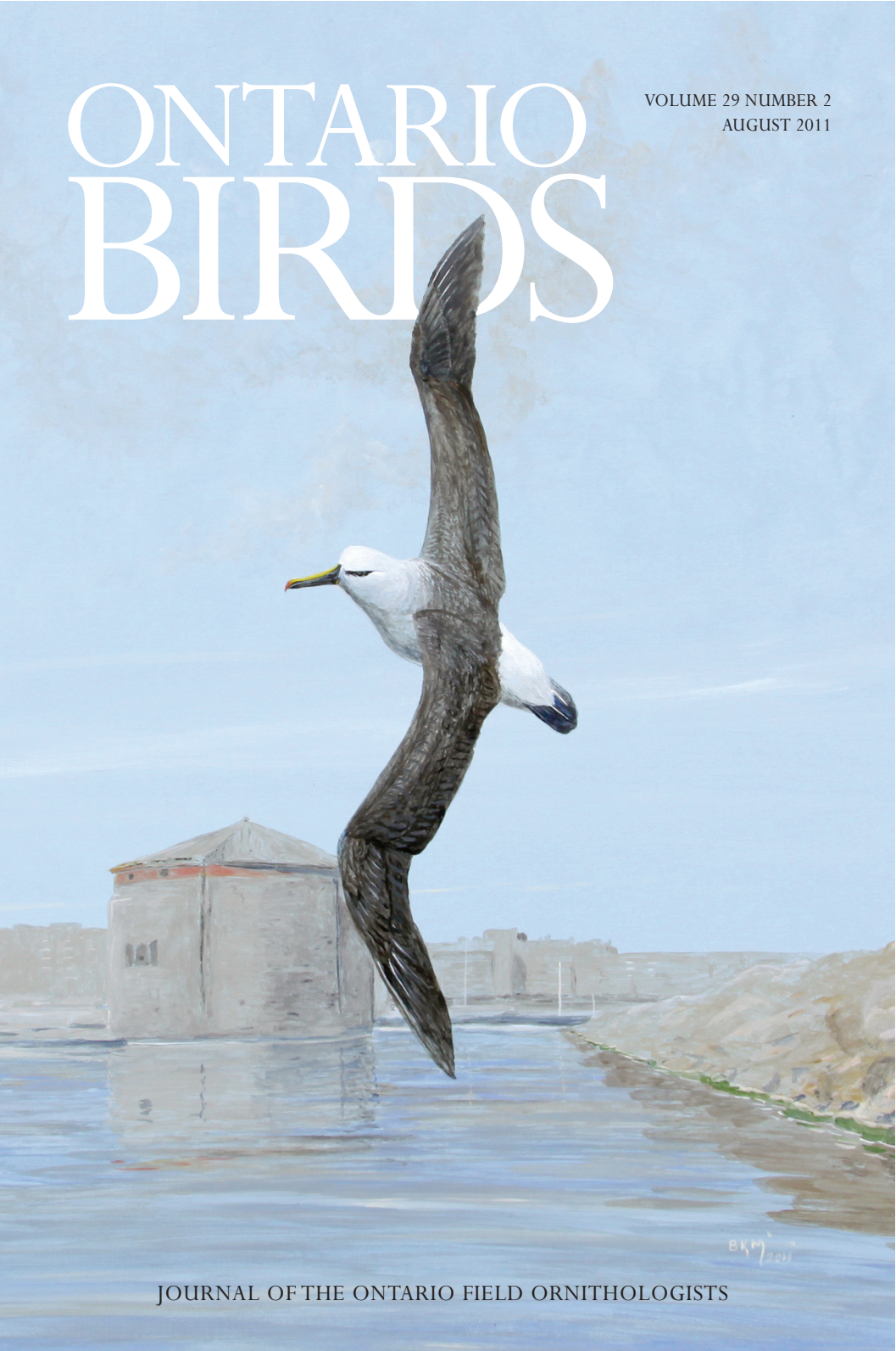
ONTARIO BIRDS

VOLUME 29 NUMBER 2
AUGUST 2011



JOURNAL OF THE ONTARIO FIELD ORNITHOLOGISTS

ONTARIO BIRDS

VOLUME 29 NUMBER 1
AUGUST 2011
PAGES 57— 104

ARTICLES

58 Yellow-nosed Albatross: New to Ontario
By Paul R. Martin and Bruce M. Di Labio

80 Eastern Gartersnake as a nest predator of American Redstart
By Michael Patrikeev

88 Nest site characteristics of Hooded Warblers at the northern edge of their breeding range
By Benjamin J. Walters and Erica Nol

Cover Illustration: *by Barry Kent MacKay*

ISSN 0822-3890
Publications Mail Agreement No. 40046348

Yellow-nosed Albatross New to Ontario

By Paul R. Martin and Bruce M. Di Labio

At 1145h on 4 July 2010, an adult-plumaged *Thalassarche* albatross was observed by Paul Martin (PRM) and his two-year old son, Sean Thomas Martin. The bird was flying low over MacDonald Memorial Park at the Kingston General Hospital helicopter pad and nearby smoke stack on the northeast shore of Lake Ontario at Kingston, Frontenac Co. The albatross was at the lakeshore, but flew over land the entire time observed, flying over a parking lot, sun bathers and dog walkers. The bird was as low as ~10 m above the ground and very close to the walking trail along the water's edge. The bird passed back and forth three times, sometimes with Ring-billed Gulls (*Larus delawarensis*) in pursuit. The bird was last seen circling upward above the smoke stack drifting eastward.

Conditions were breezy but sunny with temperatures 23.3 –24.3°C (humidex 29 – 30°C), relative humidity 68 – 71%, atmospheric pressure 100.33 – 100.36 kPa, and winds from the south-southwest (190 degrees) at 17 – 20 km/hr (Environment Canada 2010). Earlier in the day, wind had been more out of the west (210 – 260 degrees) (Environment Canada 2010). At the time of observation, the sky was mainly clear, the lighting conditions were excellent, with the sun slightly behind the observers. While the conditions were good for observation, PRM had no binoculars or camera, making detailed observations of plumage and bare part colouration difficult. The bird was observed for about five minutes in total as close as ~15 m. Below are observations summarized from PRM's notes from 4 July.

The bird was predominantly immaculate white, with contrasting black on the wings. The upper side of the wings

and back were uniform black. The black on the upper side of the wings extended across the entire wings, including the secondaries and primaries, without any white visible on the upper side. The undersides of the wings were striking, with an even-coloured and fairly even width black patch on the leading edge of the wing,

Figures 1. to 3. Adult Yellow-nosed Albatross (*Thalassarche chlororhynchos*) at Browns Bay, Wolfe Island, Frontenac Co., Ontario on 17 July 2010. Note the bill colouration that identifies this bird as an adult Yellow-nosed Albatross, and the extensive gray on the head and nape extending to the back, and the pronounced dark gray/black around the eye, that identify this bird as the "Atlantic" subspecies (*Thalassarche c. chlororhynchos*).
Photos by Emma K. Brown

extending from the body to the end of the primaries and around to the back edge of the wing. Other than the wings, the bird appeared entirely white from below. The underside of the tail may have been slightly dusky, but it did not stand out from below. The undertail coverts were white, as was the rump. The head appeared slightly dusky and a dark smudge or shadow was evident around the eye. The bill was heavy and dusky, and appeared to get darker toward the top of the bill forming some sort of edge or line. The colour of the top and tip of the bill was not visible.The shape and behaviour of the bird stood out as remarkable. The bird appeared large, with excessively long wings that were fairly even in width, somewhat thin for the size of the bird.

The wings tapered very gradually from both the leading and distal edges, forming a less asymmetrical tip compared with other birds (e.g. gulls). The body was stocky with a sizable head and heavy bill. The bill appeared somewhat swollen at the base. The bird appeared about 2.5 –3 x the size (wingspan) of the Ring-billed Gulls nearby, although they were usually diving at it, making comparisons difficult.

From head-on, the bird gave a giant dragonfly-like appearance, with stiff and shallow wing beats. Wing beats appeared somewhat fast for such a large bird (maybe slightly over one beat per second and fairly even on the up and down stroke), and occurred in pulses (maybe four or five at a time) interspersed with periods of gliding. Most striking was the shallow aspect of the wing beats and the stiff nature of the wings. When gliding, the wings were held in a broad sweeping arc.

PRM was unsuccessful in attempts to relocate the bird later in the day, and the bird went unreported for 12 days

Figure 4. Adult Yellow-nosed Albatross photographed in captivity at the Sandy Pines Wildlife Centre. Note the white feathers on the underwing that extend to the trailing edge of the wing. *Photo by Sue Meech.*

Figure 5. Adult Yellow-nosed Albatross photographed in captivity at the Sandy Pines Wildlife Centre. Photo illustrates the white undertail coverts and mostly obscured dark tail. *Photo by Sue Meech.*

Figure 6. Adult Yellow-nosed Albatross photographed in captivity at the Sandy Pines Wildlife Centre. Photo illustrates the head, bill and eye colour. *Photo by Sue Meech.*

thereafter. Based on the 4 July observations, the albatross was thought to be in the Yellow-nosed Albatross (*T. chlororhynchos*) group, but we could not definitively exclude Buller's Albatross (*T. bulleri*) as a possibility.

In the evening of 16 July 2010, Gregory R. Brown (GRB), Katherine E. Brown, and Emma K. Brown observed an unidentified bird fly over their cottage along the north shore of Wolfe Island, Frontenac Co. at Browns Bay. The bird initially drew their attention as unusual. The next morning, GRB found what appeared to be the same bird wading and apparently feeding in the shallow water, but the bird then disappeared. Later in the morning, he relocated the bird squatting in a couple inches of water along the shore. The bird appeared alert but very weak and tired, and small waves caused the bird to lose balance. GRB approached the bird, which appeared calm, even allowing him to touch it. The Brown family recognized that the bird was something special and was in poor health, so they moved the bird a few feet onto the shore and contacted Sue Meech at the Sandy Pines Wildlife Centre in Napanee, Lennox and Addington Co., Ontario. Emma Brown took several photos (Figures 1 – 3). The Brown family placed the bird in a large bin and transported it onto the Wolfe Island ferry to Kingston, where they were met by Sue Green. Sue Green then transported the bird to the Sandy Pines Wildlife Centre where the bird was identified as a Yellow-nosed Albatross.

We suggest that the albatross on Wolfe Island was the same individual as the albatross observed in Kingston for three reasons. (1) The Wolfe Island bird's appearance closely matched the individual observed on 4 July, including

Table 1. Records of Yellow-nosed Albatross (*Thalassarche chlororhynchos*) from the United States and Canada. We include only records that have been reviewed and deemed acceptable by regional experts and rare bird committees[1]. All records are of single birds.

Record[2]	Year	Month	Day	Prov./State	Location
1	1885	Aug	20	QC	Mouth of the Moisie River, Sept-Rivières Municipality
2	1913	Aug	1	NB/ME	off Grand Manan I. / Machias Seal I., Charlotte Co.
3	1934	Jul	~20	ME	East Fryeburg, Oxford Co.
4	1958	Jul	13	FL	32 km off New Smyrna Beach, Brevard Co.
5	1960	Mar	21	ME	off Monhegan I., Lincoln Co.
6 [A]	1960	May	29	NY	3 km off Jones Beach, Nassau Co.
7	1964	May	12	ME	off Monhegan I., Lincoln Co.
8	1968	Jul	12	NS	50 km off Yarmouth
9	1970	May	9	LA	Holly Beach, Cameron Parish
10	1971	May	7	MA	Bird I., Plymouth Co.
11	1972	May	14	TX	South Padre I., Cameron Co.
12	1975	Feb	1	MD	Baltimore Canyon, 92 km east of Ocean City
13	1976	Jun	14	MA	Cultivator Shoal, NW Georges Bank
14	1976	Aug	10	NY	Croton Point, Westchester Co
15	1976	Aug	20	NS	~70 km west of Yarmouth
16	1976	Aug	21	RI	Cox Ledge
17 [I]	1976	Oct	28	TX	South Padre I., Willacy Co.
18	1979	Aug	21	RI	Cox Ledge
19	1979	Dec	3	VA/MD	88 km from coast
20	1981	Nov	28	VA	Back Bay, Virginia Beach Co.
21 [A]	1983	Jul	3	FL	near St. Marks Light, Wakulla Co.
22	1989	May	28-29 [3]	NS	Seal I.

Latitude	Longitude	Plumage [4]	Record [5]	Reference
50.20	-66.07	imm	sp	McDaniel 1973, Godfrey 1986
44.70	-66.81		sp	McDaniel 1973, Christie *et al*. 2004
44.04	-70.87		sp	Norton 1934, McDaniel 1973
29.13	-80.60		sr	Stevenson 1958, Stevenson and Anderson 1994
43.76	-69.33		sr	McDaniel 1973
40.59	-73.50	ad	ph	Bull 1961
43.76	-69.33		sr	McDaniel 1973
43.79	-66.77		sr	Tufts 1986
29.77	-93.46	ad	ph	Imhof 1970
41.67	-70.72	sub	sr	Finch 1971, Veit and Peterson 1993
26.08	-97.17		sr	Webster 1972, Oberholser 1974
38.32	-73.87	sub	ph	Scott and Cutler 1975
41.50	-68.17	ad	sr	Veit and Peterson 1993
41.18	-73.89	ad	sr	Howe and Weissman 1976
43.80	-66.99	ad or sub	sr	Tufts 1986, Godfrey 1986
41.10	-71.17	sub	sr	Conway 1992
26.58	-97.30	ad	sp	Webster 1977, TOS 1995
41.10	-71.17	sub	ph	Vickery 1980, Conway 1992
38.02	-74.07	imm or sub	sr	Kain 1987
36.60	-75.97		sr	Kain 1987
30.07	-84.18		ph	Paul 1983
43.42	-66.62		sr	Maybank 1989, I. McLaren, pers. comm.

Record[2]	Year	Month	Day	Prov./State	Location
23	1992	May	27	FL	Key Largo, Monroe Co.
24	1993	May	24	NB	Dieppe/Moncton, Westmorland Co.
25 [A]	1997	Jul	11	TX	San Jose I., Aransas Co.
26 [A]	1999	Jul	6	ME	Matinicus Rock, Knox Co.
27 [A]	2000	Feb	5	NC	5 km east of Salvo, Dare Co.
28	2000	May	1	FL	50 km west of Tarpon Springs, Pinellas Co.
29 [A]	2000	May	9	MA	off Penikese I., Dukes Co.
30	2000	May	9	NY	Fire I., Suffolk Co.
31	2000	May	21-23	NJ	Cape May/Delaware Bay Shore, Cape May Co.
32	2003	Jun	2	MA	Cape Cod Bay, Eastham, Barnstable Co.
33 [I]	2003	Sep	26	TX	80 km east of Port Isabel, South Padre I., Cameron Co.
34	2004	Apr	11	NC	Cape Hatteras, Dare Co.
35 [A]	2005	May	29	MA	Tuckernuck I., Nantucket Co.
36	2006	Apr	11-late	NC	Cape Hatteras, Dare Co.
37	2006	May	14	MA	Sandy Neck, Barnstable Co.
38	2006	Jun	6	MA	Andrews Point, Essex Co.
39	2006	Jun	6	NH	Hampton Beach, Rockingham Co.
40	2006	Jun	11	ME	Yarmouth, Cumberland Co.
41	2006	Jul	16-20	ME	Old Orchard Beach, York Co.
42 [A]	2007	Apr	28	ME	Cape Neddick, York Co.
43	2007	May	26	NS	~ 60 km southeast of Shelburne
44	2008	Aug	24-25	ME	Seal I. and Matinicus Rock, Knox Co.
45	2009	Jun	6	MD	Assateague I., Worcester Co.
46	2010			FL	24 km SW of Key West, Monroe Co.
47 [A]	2010	Jul	4-17	ON	Kingston, Frontenac Co.

[1] NF = Mactavish *et al.* (2003); B. Mactavish, pers. comm., 2011; NS = Tufts (1986); I. MacLaren, pers. comm. 2011; NB = Christie *et al.* (2004); QC = M. Gosselin, pers. comm., 2011; ME = Maine Bird Records Committee; NH = NHRBC (2010); MA = Veit and Peterson (1993); Massachusetts Avian Records Committee; NY = New York State Avian Records Committee and published photographs (Bull 1961; Buckley and Schairer 2000); NJ = NJBRC (2011); VA = Virginia Avian Records Committee; MD = MOS (2011); RI = Conway (1992); NC = Carolina Bird Club Records Committee; FL = Stevenson and Anderson (1994); Florida Ornithological Society Records Committee; LA = Louisiana Bird Records Committee; TX = Texas Bird Records Committee

Latitude	Longitude	Plumage [4]	Record [5]	Reference
25.18	-80.37	sub	sp	Stevenson and Anderson 1994
46.10	-64.72	ad	ph	Mactavish 1993, Christie *et al.* 2004
28.00	-96.93	ad	sp	Lasley *et al*. 1997
43.79	-68.85	ad	ph	Peterson 1999
35.54	-75.47	sub	ph	Tove and Patteson 2002
28.18	-83.36		ph	Pranty 2000
41.45	-70.92	ad	ph	Perkins 2000
40.67	-73.05	ad	ph	Buckley and Schairer 2000
38.96	-74.93	ad	ph	Burgiel *et al*. 2000, NJBRC 2011
41.83	-69.97		sr	Peterson 2004
26.07	-96.35	ad	ph	Lockwood 2004
35.22	-75.53		ph	Davis 2004
41.30	-70.26	ad	ph	Perkins 2005
35.22	-75.53		ph	Davis 2006
41.73	-70.31	ad	sr	Perkins 2006, MARC 2007
42.69	-70.62	ad	sr	Peterson 2007
42.92	-70.80	ad	sr	Peterson 2007, NHRBC 2010
43.80	-70.19	ad	sr	Peterson 2007
43.52	-70.38		ph	Vazzano 2006, Peterson 2007
43.17	-70.60		sp	Perkins 2007
43.33	-64.73		sr	Mills 2008
43.79	-68.85	imm	ph	MBRC 2008
38.09	-75.20		video	MOS 2011
24.39	-81.97	imm	ph	FOSRC 2010
44.26	-76.50	ad	ph	this paper

2 A = "Atlantic" Yellow-nosed Albatross (*T. c. chlororhynchos*); I = "Indian" Yellow-nosed Albatross (*T. chlororhynchos carteri*)

3 dates in Maybank (1989) are incorrect (I. McLaren, pers. comm.)

4 ad = adult; sub = subadult; im = immature

5 sp = specimen; ph = photograph; sr = sight record

exhibiting extensive white on the trailing edge of the wing (Figure 4). (2) All previous North American records of Yellow-nosed Albatross were of single birds (Table 1), and thus it is unlikely that there were two *Thalassarche* albatrosses in the Kingston area. (3) The Wolfe Island bird was found close in both space (7 – 8 km across the water) and time (12 days later) to the first sighting.

Identification

The Kingston bird is identifiable as an adult Yellow-nosed Albatross based on our examination of photos (Figures 1 – 6), and in particular bill and head colouration. The bill is primarily black, with bright yellow on the top (culminicorn) of the bill. The tip of the bill (maxillary unguis) is reddish in colour, while the base of the lower mandible is orange (Figures 2, 6). Outside of Yellow-nosed Albatross, only two species of albatross have a combination of primarily black bills with yellow running along the top of the bill (Brooke 2004, Onley and Scofield 2007). Both Grey-headed Albatross (*T. chrysostoma*) and Buller's Albatross have yellow on the top of the bill, but both species also have yellow running along the lower edge of the lower mandible (ramicorn), and have yellow (not red) on the tips of their bills (Brooke 2004, Onley and Scofield 2007). The bright colouration of the Kingston bird's bill also identifies this bird as an adult — this colouration is not present on younger birds (Brooke 2004, Onley and Scofield 2007).

Additional differences exist between the Yellow-nosed Albatrosses and other albatross species. The bird is identifiable as a *Thalassarche* albatross by the combination of its grey/white head, dark upper wings and back, completely white rump, and predominantly white underparts (Brooke 2004). Laysan Albatrosses (*Phoebastria immutabilis*) look similar to *Thalassarche* albatrosses in some plumages, but Laysans typically have brown extending from the back onto the rump, and have feet that extend beyond the tail (Sinclair *et al.* 2002, Brooke 2004, Onley and Scofield 2007). Younger Laysan Albatrosses are primarily dark on the undersides of the wings, while older Laysans have pale bills (Onley and Scofield 2007).

Other *Thalassarche* albatrosses show different colouration of the bill and undersides of the wings. Black-browed (*T. melanophrys*) and Campbell (*T. impavida*) albatrosses typically have more extensive black on the underside of the wings (particularly as immatures), while older birds have pale or yellow bills (Sinclair *et al.* 2002, Brooke 2004, Onley and Scofield 2007). Shy (*T. cauta*), Salvin's (*T. salvini*) and Chatham Islands (*T. eremita*) albatrosses all show thinner black on the leading edges of the undersides of the wings, symmetrical with black on the trailing edges of the wings.

These species also have pale or yellow bills as adults and subadults and show a black "thumb print" at the base of the wings on the leading edge (Sinclair *et al.* 2002, Brooke 2004, Onley

and Scofield 2007). Gray-headed Albatrosses have different bill colouration as adults (discussed above), and typically have more black on the undersides of the wings, including along the trailing edge, and have prominent gray heads (Sinclair *et al.* 2002, Brooke 2004, Onley and Scofield 2007). Buller's Albatross is probably the closest in appearance to the Yellow-nosed, differing in bill colouration (discussed above), and by having slightly more extensive gray on the head and black on the underside of the wings, and being larger and bulkier than Yellow-nosed Albatross (Sinclair *et al.* 2002, Brooke 2004, Onley and Scofield 2007).

The Kingston bird is further identifiable as an "Atlantic" Yellow-nosed Albatross (*T. c. chlororhynchos*) based on the extent of gray on the head and black around the eye. "Indian" Yellow-nosed Albatrosses (*T. chororhynchos carteri*) have primarily white heads and napes, with gray restricted to the cheeks, and very little dark gray or black around the eye (Figure 7; Sinclair *et al.* 2002, Brooke 2004, Onley and Scofield 2007). In contrast, "Atlantic" Yellow-nosed Albatross, including the Kingston bird, have gray extending from just behind the top of the head down to meet the back, continuing onto the cheeks to the bill, contrasting with a whitish forehead and top of the head. Dark gray/black around the eye is more extensive and defined in the "Atlantic" compared with the "Indian" Yellow-nosed Albatross (Figure 7; Sinclair *et al.* 2002, Brooke 2004, Onley and Scofield 2007).

Outcome

When brought to the Sandy Pines Wildlife Centre, the Yellow-nosed Albatross was emaciated and anemic, and weighed far below the normal weight of the species, but showed no signs of trauma (S. Meech, pers. comm., 2010; Hendra 2010). At the centre, Sue Meech and coworkers were, remarkably, able to save the bird. On 12 August 2010, the bird was shipped from Napanee to a special facility at the Cummings School of Veterinary Medicine, Tufts University in western Massachusetts, and later, to Suncoast Seabird Sanctuary, a seabird rehabilitation facility in Florida. In late November 2010, the bird was euthanized in captivity in Florida after developing a bone infection in its leg (S. Meech, pers. comm., 2010).

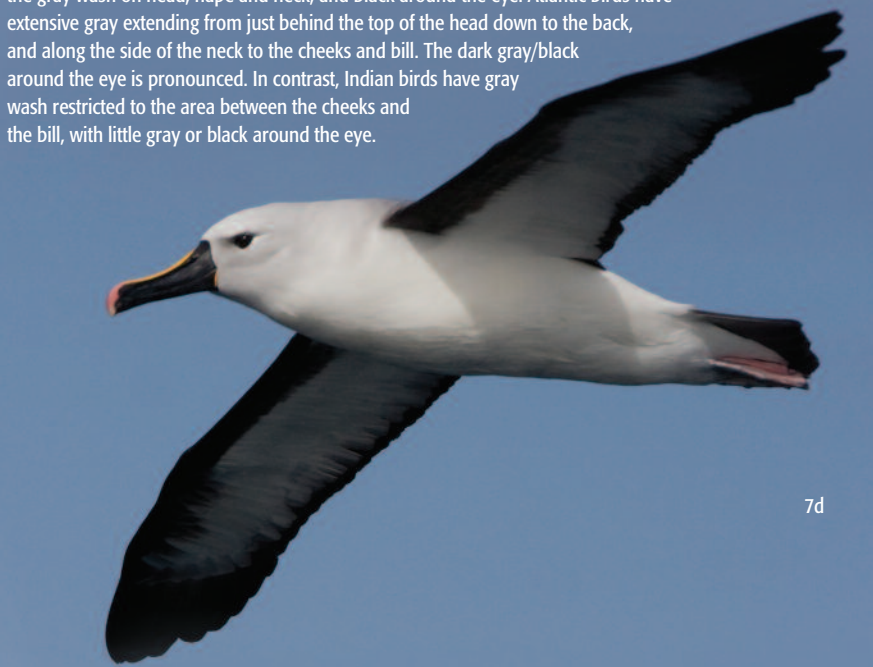
The bird is now a specimen (skin) in the Royal Ontario Museum (ROMZ #120272, collector Gregory R. Brown). A blood sample taken at the Sandy Pines Wildlife Centre was also deposited at the ROM. The record has been accepted as Ontario's first Yellow-nosed Albatross (Ontario Bird Records Committee, pers. comm., 2011), and the committee has concurred that it is indeed of the “Atlantic” subspecies. Consistent with the adult plumage and bill colouration, the bird had no bursa (bursa are only present in younger birds; Pettingill 1970). The bird was found to be a female, with granular ovaries (18 x 13 mm), no fat, and a weight of 1622 grams (postmortem).

7a

7b

All photos were taken off Cape Town, South Africa by Trevor Hardaker.

Figure 7. "Atlantic" Yellow-nosed Albatross (*T. c. chlororhynchos;* 7a, 7b) and "Indian" Yellow-nosed Albatross (*T. c. carteri;* 7c, 7d) sitting and in flight. Note differences in the gray wash on head, nape and neck, and black around the eye. Atlantic birds have extensive gray extending from just behind the top of the head down to the back, and along the side of the neck to the cheeks and bill. The dark gray/black around the eye is pronounced. In contrast, Indian birds have gray wash restricted to the area between the cheeks and the bill, with little gray or black around the eye.



Taxonomy

The taxonomy of the Yellow-nosed Albatross group is not yet consistent across ornithologists. Historically, the Yellow-nosed Albatross was considered one species with two subspecies ("Atlantic", *chlororhynchos* and "Indian", *carteri*). Robertson and Nunn (1998) proposed elevating these two subspecies to full species based on genetic differences between the Atlantic Ocean-breeding and Indian/Pacific Ocean-breeding populations that suggested that these populations do not interbreed, and on differences in plumage (discussed above) and size (Indians are slightly smaller). In addition to these differences, the "Atlantic"and "Indian" Yellow-nosed Albatrosses usually differ slightly in the shape of the yellow on the upperside of the bill, with "Indians" typically having a more pointed proximal end to the yellow at the base of the upper mandible (Tickell 2000, Brooke 2004, Onley and Scofield 2007). "Atlantic" and "Indian" Yellow-nosed Albatrosses are now regarded as full species by most seabird biologists (e.g., Brooke 2004, Onley and Scofield 2007), BirdLife International (BirdLife International 2010a,b), the International Ornithologists' Union (Gill and Donsker 2010), and ornithologists in southern Africa (Sinclair *et al.* 2002, Hockey *et al.* 2005). The split has not yet been recognized by the American Ornithologists' Union, in part because neither taxonomic committee (North and Middle Americas or South America) have yet received proposals to elevate the two taxa to full species (J.V. Remsen, *in litt.*, 9 August 2010).

Natural History

The Yellow-nosed Albatross is a small southern hemisphere albatross in the mollymawk group (Tickell 2000, Brooke 2004) that typically feeds by seizing food from the surface of the ocean, and less frequently, plunging and even diving in pursuit of prey (Marchant and Higgins 1990, BirdLife International 2010a,b). The primary food includes small fish, squid, krill, and offal from fishing boats (Marchant and Higgins 1990, Brooke 2004, ACAP 2009). Yellow-nosed Albatrosses often forage in the company of shearwaters, and are thought to associate with foraging whales, dolphins and larger predatory fish that force small fish and squid towards the ocean surface (Marchant and Higgins 1990, Brooke 2004, Onley and Scofield 2007, ACAP 2009, BirdLife International 2010a,b). They will also follow fishing boats, feeding on discarded fish and bait used in long line fisheries (ACAP 2009, BirdLife International 2010a,b).

"Atlantic" Yellow-nosed Albatross is listed currently as globally endangered by BirdLife International due, in part, to high incidental mortality during fisheries activities (ACAP 2009, BirdLife International 2010a). "Atlantic" Yellow-nosed Albatrosses begin breeding at about 10 years of age (range six – 13 years) and typically breed almost annually (on average two out of every three

years) (ACAP 2009). Birds arrive at at breeding colonies in late August or September, lay one egg per nest without replacement, typically in September, with young fledging in March and April (ACAP 2009). Atlantic" Yellow-nosed Albatrosses can live to at least 37 years in the wild (Hagan 1982)

"Atlantic" Yellow-nosed Albatrosses breed on the Tristan da Cunha Island group in the south-central Atlantic, specifically on Tristan, Gough, Nightingale, Inaccessible, Middle and Stoltenhoff islands (Figure 8; Tickell 2000, Brooke 2004, ACAP 2009, BirdLife International 2010a). These birds are pelagic, typically occurring in the subtropical southern Atlantic Ocean between South America and southern Africa and extending into the Indian Ocean, commonly off South Africa (Figure 8; Tickell 2000, Sinclair *et al.* 2002, Brooke 2004, BirdLife International 2010a), rarely east to Australia and New Zealand (Marchant and Higgins 1990, Tickell 2000). "Atlantic" Yellow-nosed Albatrosses show some evidence of seasonal movements, becoming abundant off the African continental shelf in March and April and moving south in May, possibly associated with a movement towards breeding islands (Tickell 2000). Off Brazil, however, they are common throughout the year (Tickell 2000). Yellow-nosed Albatrosses have a history of vagrancy into the North Atlantic, with over 40 records from the United States and Canada (Table 1; Figure 9), and additional records from Europe (Brooke 2004, Onley and Scofield 2007).

"Indian" Yellow-nosed Albatross are ecologically very similar to "Atlantic", but breed on islands in the Indian Ocean (and rarely in the Pacific near New Zealand) and occur from the southwest Pacific Ocean through the Indian Ocean and into the southern Atlantic off South Africa (Tickell 2000, Brooke 2004, BirdLife International 2010b).

Other North American Records

Forty-seven records of Yellow-nosed Albatross have been documented from North America, primarily from the Atlantic and Gulf coasts, from Québec to Texas (Table 1; Figure 9). All previous records of Yellow-nosed Albatross in North America were thought to represent "Atlantic" Yellow-nosed Albatross (Buckley and Schairer 2000, Pranty *et al.* 2008); however, we note that photographs of two Texas records are of "Indian" Yellow-nosed Albatross (28 October 1978, South Padre Island, specimen; 26 September 2003, east of Port Isabel, photos; see http://www. texasbirds.org/tbrc/ynalbatr.htm). The remaining North American records identified to subspecies appear to be "Atlantic" Yellow-nosed Albatross (including an 11 July 1997 record from San Jose Island, Texas). Most North American records, however, do not distinguish between "Atlantic" and "Indian", and further review may reveal additional records of "Indian" Yellow-nosed Albatross in North America.

North American records of Yellow-nosed Albatross show some repeated patterns of occurrence. Most records occur from May to August (36 of 47

records) with eight records for the Gulf of Mexico (Florida, Louisiana, Texas), eight records from eastern Canada (Nova Scotia, New Brunswick, Québec and Ontario), and 30 records from eastern United States, from North Carolina north to Maine (Table 1; Figure 9).

Many of the Yellow-nosed Albatross records from North America involve birds flying along shorelines and over land, with over one-half of the sightings made by observers on land. Some of these birds flew back and forth over beaches (e.g., Buckley and Schairer 2000, Burgiel *et al.* 2000, Davis 2006, Vazzano 2006, Peterson 2007), while one bird even roosted on a beach (Burgiel *et al.* 2000) and another lingered around a Brown Pelican (*Pelecanus occidentalis*) colony for weeks (Davis 2006). Many birds appeared to be in good health, and several observers suspect the same birds of returning to the same locations in subsequent years (e.g., Perkins 2005, Davis 2006). Richard Veit (cited in Perkins 2005) suggested that North American records of Yellow-nosed Albatross may be increasing, and may represent long-distance dispersal events of birds in search of breeding sites,

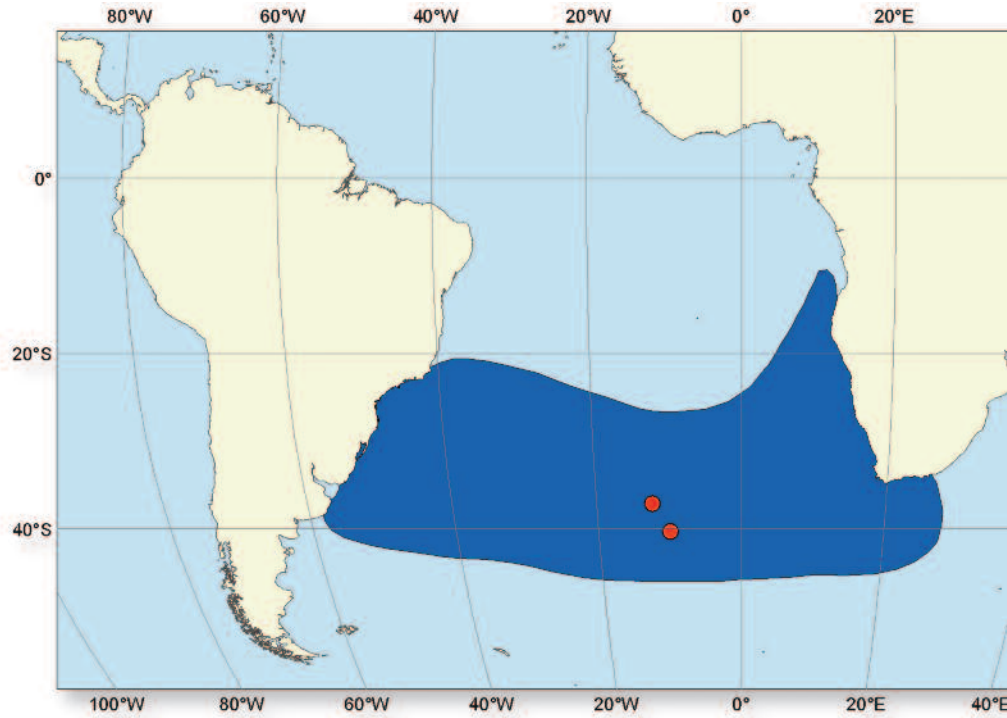


Figure 8. Distribution of the "Atlantic" subspecies of Yellow-nosed Albatross (*Thalassarche c. chlororhynchos*). Dark blue indicates distribution at sea. Red dots indicate breeding islands. Map adapted from BirdLife International and NatureServe (2011).

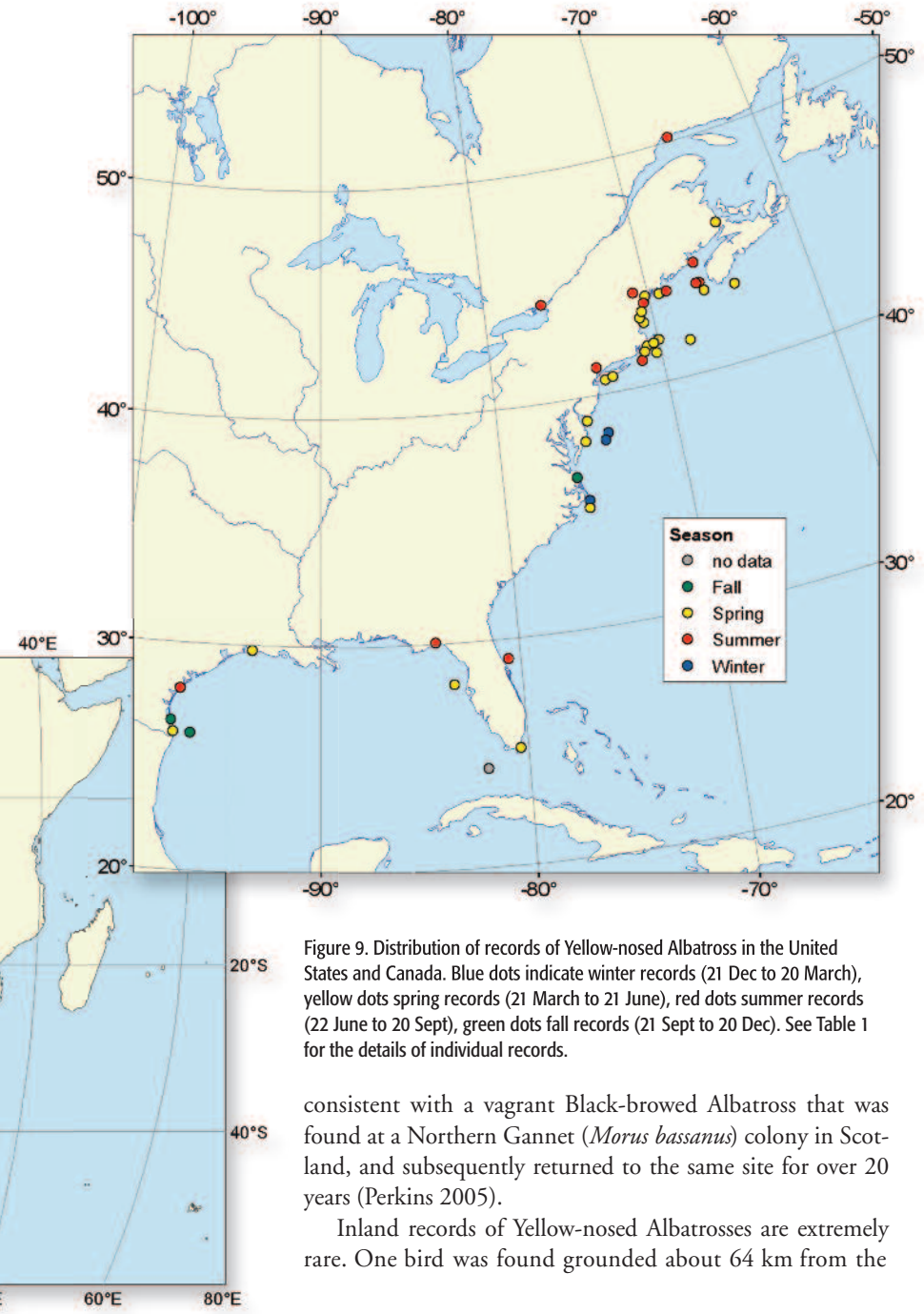


Figure 9. Distribution of records of Yellow-nosed Albatross in the United States and Canada. Blue dots indicate winter records (21 Dec to 20 March), yellow dots spring records (21 March to 21 June), red dots summer records (22 June to 20 Sept), green dots fall records (21 Sept to 20 Dec). See Table 1 for the details of individual records.

consistent with a vagrant Black-browed Albatross that was found at a Northern Gannet (*Morus bassanus*) colony in Scotland, and subsequently returned to the same site for over 20 years (Perkins 2005).

Inland records of Yellow-nosed Albatrosses are extremely rare. One bird was found grounded about 64 km from the

... the "Atlantic" Yellow-nosed Albatross at Kingston represents an amazing example of vagrancy, occurring over 8,000 km away from its normal distribution in the southern hemisphere.

coast in East Fryeburg, Maine, in July 1934 (Norton 1934). One adult was recorded 40 km up the Hudson River in Westchester Co., New York on 10 August 1976 and was associated with Hurricane Bella (Howe and Weissman 1976). Another albatross, believed to be a Yellow-nosed, was observed in Lake Champlain, Essex Co., New York on 8 May 1994, over 200 km from the ocean (accepted by the New York State Avian Records Committee as an albatross spp.; A. Wilson, pers. comm., 2011, Lowe 1996).

Other species of pelagic seabirds have been recorded previously in southeastern Ontario, and thus inland vagrancy of seabirds into this area has precedence. Northern Fulmar (*Fulmarus glacialis;* Dobos 1999), Audubon's Shearwater (*Puffinus lherminieri*; Godfrey 1976), Manx Shearwater (*P. puffinus*; Curry and Di Labio 2008), Band-rumped Storm-Petrel (*Oceanodroma castro*; Taverner 1934), Leach's Storm-Petrel (*O. leucorhoa*; Toner 1940), Northern Gannet (*Morus bassanus*; Dobos 1999), Thick-billed Murre (*Uria lomvia;* Dobos 1997), Dovekie (*Alle alle;* Di Labio 1995a), Long-billed Murrelet (*Brachyramphus perdix*; Di Labio 1996) and Atlantic Puffin (*Fratercula arctica*; Di Labio 1995b) have all occurred in southeastern Ontario. Some of these records were associated with hurricanes and other weather systems (e.g., Leach's Storm-Petrel), but others were not associated with any unusual local weather, similar to the Ontario Yellow-nosed Albatross (e.g., Manx and Audubon's shearwaters, Long-billed Murrelet).

Possible Causes of the "Atlantic" Yellow-nosed Albatross in Kingston

We are not sure what prompted the Kingston bird to stray so far from its usual distribution. A hurricane in the Atlantic Ocean preceded the 4 July sighting, suggesting that the albatross may have been blown north with the storm and continued inland with the subsequent weather front. Hurricane Alex formed as a tropical depression in the western Caribbean Sea on 25 June 2010, and strengthened to a tropical storm on 26 June, reaching land in Belize. Alex then weakened as it moved across the Yucatan Peninsula, but re-emerged over the Bay of Campeche and strengthened to a Category 2 hurricane on 29 June. Hurricane Alex moved northwest, making landfall on 30 June along the north Mexican coast near Texas with maximum sustained winds

of 169 kph (National Oceanic and Atmospheric Administration, National Climatic Data Center, www.ncdc.noaa.gov/sotc/). The timing of Hurricane Alex fits the arrival of the albatross in Kingston on 4 July. It should be noted, however, that the path of Hurricane Alex did not reach the Great Lakes, and that most birds associated with hurricane displacement generally occur along areas of direct hurricane contact.

Other possible causes of the albatross landing in Kingston include problems with navigation, perhaps resulting from the bird straying far into the northern hemisphere, following fishing vessels (or other ships), or travelling to Kingston while resting or in captivity on a ship. We feel that ship-assistance is unlikely for several reasons. First, albatrosses are pelagic and spend most of their lives on the ocean without need to land on ships like terrestrial birds caught at sea. Indeed, albatrosses are quite awkward on land, and would be unlikely to settle on a ship. Second, albatrosses are renowned for their ability to fly, taking advantage of wind currents to minimize energetic effort (Tickell 2000, Brooke 2004). This tendency to use air currents for movement makes them good candidates for vagrancy associated with storms. Third, the numerous records from North America (Table 1; Figure 9) suggest that Yellow-nosed Albatrosses have a tendency to stray, and such repeated patterns of vagrancy are unlikely to represent repeated cases of ship assistance.

Regardless of how this bird arrived in Ontario, the "Atlantic" Yellow-nosed Albatross at Kingston represents an amazing example of vagrancy, occurring over 8,000 km away from its normal distribution in the southern hemisphere. The Kingston record represents the first of an albatross in Ontario and on the Great Lakes.

Acknowledgements

Thanks to Fran Bonier, Greg Brown and family, Glenn Coady, Donna Dittmann, Michel Gosselin, Trevor Hardaker, Bruce Mactavish, Ian McLaren, Sue Meech, J.V. Remsen, Chris Risley, Terry Sprague, Chip Weseloh, Angus Wilson, Alan Wormington and the Sandy Pines Wildlife Centre in Napanee. The manuscript was significantly improved by comments from Fran Bonier, Alan Wormington and the editors of *Ontario Birds*. Our review of previous records of Yellow-nosed Albatross was aided by the compilation of albatross records made by the late Mark Libby.

Literature Cited

Agreement on the Conservation of Albatrosses and Petrels. 2009. ACAP Species assessment: Atlantic Yellow-nosed Albatross *Thalassarche chlororhynchos*. Downloaded from http://www.acap.aq on 1 September 2009.

BirdLife International. 2010a. Species factsheet: *Thalassarche chlororhynchos*. Downloaded from http://www.BirdLife.org on 9 August 2010.

BirdLife International. 2010b. Species factsheet: *Thalassarche carteri*. Downloaded from http://www.BirdLife.org on 9 August 2010.

BirdLife International and **NatureServe**. 2011. Bird species distribution maps of the world. BirdLife International, Cambridge, UK and NatureServe, Arlington, VA.

Brooke, M. 2004. Albatrosses and Petrels across the World. Oxford University Press, Oxford, UK.

Buckley, P. A. and **G. Schairer**. 2000. Yellow-nosed Albatross on Fire Island, LI, NY. Kingbird 50:223 – 231.

Bull, J. L. 1961. Yellow-nosed Albatross off the coast of Long Island. Auk 78:425 – 426.

Burgiel, J. C., R. O. Paxton and **D. A. Cutler**. 2000. Spring migration. Hudson-Delaware. North American Birds 54:263 – 268.

Christie, D. S., B. E. Dalzell, **M. David**, **R. Doiron**, **D. G. Gibson**, **M. H. Lushington**, **P. A. Pearce**, **S. I. Tingley** and **J. G. Wilson**. 2004. Birds of New Brunswick: An annotated list. / Oiseaux du Nouveau-Brunswick: une liste commentée. New Brunswick Museum and New Brunswick Bird Records Committee. New Brunswick Museum Monographic Series (Natural Science) No. 10.

Conway, R. A. 1992. Field-checklist of Rhode Island birds. Bulletin No. 1, 2nd edition. Rhode Island Ornithological Club, RI.

Curry, R. and **B. Di Labio**. 2008. Manx Shearwaters on the Great Lakes. Ontario Birds 26:50 – 57.

Davis, R. 2004. Regional reports. Southern Atlantic. North American Birds 58:354 – 357.

Davis, R. 2006. Regional reports. Southern Atlantic. North American Birds 60:362 – 365.

Di Labio, B. M. 1995a. Another Dovekie record from Eastern Ontario. Ontario Birds 13:31 – 34.

Di Labio, B. M. 1995b. Atlantic Puffin: third Ontario record. Ontario Birds 13:99 – 101.

Di Labio, B. M. 1996. First record of Asiatic Marbled Murrelet in Ontario. Ontario Birds 14:15 – 22.

Dobos, R. Z. 1997. Ontario Bird Records Committee Report for 1996. Ontario Birds 15:47 – 66.

Dobos, R. Z. 1999. Ontario Bird Records Committee Report for 1998. Ontario Birds 17:62 – 83.

Environment Canada. 2010. National Climate Data and Information Archive. www.climate.weatheroffice.gc.ca

Finch, D. W. 1971. Regional reports. The spring migration. Northeastern maritime region. American Birds 25:705 – 710.

Florida Ornithological Society Records Committee (FOSRC). 2010. Minutes 31 July 2010 meeting. Florida Ornithological Society http://www.fosbirds.org/records-committee-reports.

Gill, F. and D. Donsker (eds.) 2010. IOC World Bird Names (version 2.5). Available at http://www.worldbirdnames.org/ [Accessed 9 August 2010].

Godfrey, W. E. 1976. Audubon's Shearwater, a new species for Canada. Canadian Field-Naturalist 90: 494.

Godfrey, W. E. 1986. The birds of Canada. Revised edition. National Museums of Canada, Ottawa, ON, 595 pp.

Hagen, Y. 1982. Migration and longevity of Yellow-nosed Albatrosses *Diomedea chlororhynchos* banded on Tristan da Cunha in 1938. Ornis Scandinavica 13:247 – 248.

Hendra, P. 2010. Ailing albatross turns up on island. Whig Standard http://www.thewhig.com/ArticleDisplay.aspx?e=2677707&archive=true

Hockey, P. A. R., W. R. J. Dean and **P.G. Ryan**. 2005. Roberts Birds of Southern Africa. New Holland Publishers, Cape Town, South Africa.

Howe, W. and **B. Weissman**. 1976. Yellow-nosed Albatross at Croton Point, Westchester County. Kingbird 26:200 – 201.

Imhof, T. A. 1970. Regional reports. The spring migration. Central southern region. Audubon Field Notes 24:615 – 619.

Kain, T. (ed.) 1987. Virginia birdlife. Virginia Society of Ornithology, VA.

Lasley, G. W., C. Sexton, M. Lockwood and **W. Sekula**. 1997. The nesting season. Texas region. National Audubon Society Field Notes 51:1018 – 1023.

Lockwood, M. W. 2004. Fall migration. Texas. North American Birds 58:102 – 106.

Lowe, J. 1996. Report of the New York State Avian Records Committee 1994. Kingbird 46:296 – 302.

Mactavish, B. 1993. The summer season. Atlantic provinces region. American Birds 47:1084 – 1086.

Mactavish, B., J. E. Maunder, W. A. Montevecchi, J. L. Wells and **D. A. Fifield**. 2003. Checklist (2003) of the birds of insular Newfoundland and its continental shelf waters. The Natural History Society of Newfoundland and Labrador, Inc., St. John's, NF.

Maine Bird Records Committee (MBRC). 2008. Third report of the Maine Bird Records Committee - 2008. Maine Bird Records Committee http://sites.google.com/site/mainebirdrecords committee/reports.

Marchant, S. and **P. J. Higgins** (co-ordinators). 1990. Handbook of Australian, New Zealand and Antarctic Birds. Volume 1. Part A. Ratites to Petrels. Oxford University Press, Melbourne, Australia.

Maryland Ornithological Society (MOS). 2011. Maryland / District of Columbia records committee database, abridged version. Maryland Ornithological Society http://www.mdbirds.org/ mddcrc/rcindex.html#mdbirds.

Massachusetts Avian Records Committee (MARC). 2007. Eleventh annual report of the Massachusetts Avian Records Committee (MARC). http://www.maavian records.com/ home/annual-reports/report-11.

Maybank, B. 1989. The spring season. Atlantic provinces region. American Birds 43:443 – 447.

McDaniel, J. W. 1973. Vagrant albatrosses in the western north Atlantic and Gulf of Mexico. American Birds 27:563 – 565.

Mills, E. 2008. Autumn bird reports. Nova Scotia Birds 50:9.

New Hampshire Rare Bird Committee (NHRBC). 2010. New Hampshire State Bird List. http://www.nhbirdrecords.org/birding/index.htm#list

New Jersey Bird Records Committee (NJBRC). 2011. New Jersey Bird Records Committee list of accepted records of rare birds in New Jersey through 2009. Fifth corrected and revised edition. http://www.njbrc.net/rlist.html.

Norton, A. H. 1934. Second occurrence of the Yellow-nosed Albatross (*Thalassogeron chlororhynchos*) in Maine. Auk 51:507 – 508.

Oberholser, H. C. 1974. The bird life of Texas. University of Texas Press, Austin, TX.

Onley, D. and **P. Scofield**. 2007. Albatrosses, Petrels and Shearwaters of the World. Princeton University Press, Princeton, NJ.

Paul, R. T. 1983. The nesting season. Florida region. American Birds 37:980 – 982.

Perkins, S. 2000. Spring migration. New England. North American Birds 54:259 – 263.

Perkins, S. 2005. Regional reports. New England. North American Birds 59:402 – 408.

Perkins, S. 2006. Regional reports. New England. North American Birds 60:347 – 352.

Perkins, S. 2007. Regional reports. New England. North American Birds 61:412 – 418.

Peterson, W. R. 1999. The nesting season. New England region. North American Birds 53:363 – 366.

Peterson, W. R. 2004. The nesting season. New England. North American Birds 57: 465 – 469.

Peterson, W. R. 2007. Regional reports. New England. North American Birds 60: 504 – 508.

Natura
TOURS

41 Canoe Court, Oak Ridges, ON, L4E 3Y1
Toll-Free: 1.877.404.3424

Specialists in Global Bird Watching and Nature Ecotours

We Offer:
- Birding and Wildlife Day Trips
- Global Birding and Wildlife Tours
- Wildlife Photography and Art Tours
- Custom Group or Individual Tours

www.naturatoursinc.com
info@naturatoursinc.com

Tourism Promoting Conservation

License Number: 50018444 tico.ca

Pettingill, O. S., Jr. 1970. Ornithology in laboratory and field. Fourth edition. Burgess Publishing Company, Minneapolis, MN.

Pranty, B. 2000. Spring migration. Florida. North American Birds 54:274 – 277.

Pranty, B., J. L. Dunn, S. C. Heinl, A. W. Kratter, P. E. Lehman, M. W. Lockwood, B. Mactavish and **K. J. Zimmer**. 2008. ABA Checklist: Birds of the continental United States and Canada, seventh edition. American Birding Association, Colorado Springs, CO.

Robertson, C. J. R. and **G. B. Nunn**. 1998. Towards a new taxonomy for albatrosses. Pap. 13 – 19 in Albatross Biology and Conservation. (G. Robertson and R. Gales, eds.) Surrey Beatty and Sons Ltd, Sydney, Australia.

Scott, F. R. and **D. A. Cutler**. 1975. Middle Atlantic coast region. American Birds 29:672 – 676.

Sinclair, I., P. Hockey and **W. Tarboton**. 2002. Birds of southern Africa. Third edition. Struik Publishers, Cape Town, South Africa.

Stevenson, H. M. 1958. The nesting season. Florida region. Audubon Field Notes 12:405 – 408.

Stevenson, H. M. and **B. H. Anderson**. 1994. Birdlife of Florida. University of Florida Press, Gainesville, FL.

Taverner, P. A. 1934. The Madeira Petrel in Ontario. Auk 51:77.

Texas Ornithological Society (TOS). 1995. Checklist of the birds of Texas, 3rd edition. Texas Ornithological Society, Austin, TX.

Tickell, W. L. N. 2000. Albatrosses. Yale University Press, New Haven, CT.

Toner, C. G. 1940. Leach's Petrel in Ontario. Wilson Bulletin 52:124.

Tove, M. and **B. Patteson**. 2002. First record of Yellow-nosed Albatross for North Carolina. Chat 66:88 – 93.

Tufts, R. W. 1986. The birds of Nova Scotia. Nova Scotia Museum, Halifax, NS.

Vazzano, T. 2006. Summer season. New Hampshire Bird Records 25:4 – 31.

Veit, R. R. and **W. R. Petersen**. 1993. Birds of Massachusetts. Massachusetts Audubon Society, Lincoln, MA.

Vickery, P. D. 1980. The autumn migration. Northeastern maritime region. American Birds 34:139 – 141.

Webster, F. S., Jr. 1972. The nesting season. South Texas region. American Birds 26:875 – 878.

Webster, F. S., Jr. 1977. The autumn migration. South Texas region. American Birds 31:197 – 199.

Paul R. Martin, Department of Biology, Queen's University, Kingston, ON K7L 3N6.
E-mail: pm45@queensu.ca

Bruce M. Di Labio, 400 Donald B. Munro Drive, Carp, ON K0A 1L0.
E-mail: bruce.dilabio@sympatico.ca

Eastern Gartersnake as a nest predator of American Redstart

By Michael Patrikeev

Every year uncountable numbers of bird eggs and nestlings are lost to a multitude of nest predators. Ground nesting birds are often considered to be most at risk, but species building their nests in shrubs and trees are not immune from nest predation either.

In this note, I report a rare observation of predation by an Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) upon one week-old nestling American Redstarts (*Setophaga ruticilla*) in northern Bruce Peninsula, Ontario. American Redstarts occupy a range of coniferous, mixed and hardwood habitats on the peninsula, where they are one of the most common warblers (Cadman *et al.* 2007, pers. obs.). American Redstarts usually place their nests at 1.8 – 15 m above the ground, with some as low as 0.3 m (Peck and

Figure 1. Female American Redstart (*Setophaga ruticilla*) attending nest with small young. Bruce Peninsula, Ontario. 25 June 2011. *Photo by Michael Patrikeev.*

James 1987). The nests are often camouflaged with bark stripes, lichen and moss (Peck and James 1987), but do not present a challenge for an experienced observer.

On 20 June 2011, I found a nest of American Redstart next to a trunk of a small eastern white cedar (*Thuja occidentals*) in a dry eastern white cedar dominated forest west of Shouldice Lake, Municipality of Northern Bruce Peninsula. The nest was built about 1.8 m above the ground and, at the time of finding, it contained four newly hatched young.

Below: **Figure 2. Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) with a week-old nestling of American Redstart in its mouth. Bruce Peninsula, Ontario. 27 June 2011.** *Photo by Michael Patrikeev.*

Right: **Figure 3. Eastern Gartersnake swallowing a nestling of American Redstart. Bruce Peninsula, Ontario. 27 June 2011.** *Photo by Michael Patrikeev*

Figure 4. Singing male American Redstart. Bruce Peninsula, Ontario. 25 June 2011. *Photo by Michael Patrikeev.*

The nest was revisited on 25 June 2011 when the young were approximately six days old and photographed from a blind placed 4 – 5 m away from the nest (Figure 1). Something was clearly amiss when I returned to this nest on 27 June 2011, around 1800 hrs, to take additional photos. Both male and female showed agitation in the vicinity of the nest, but did not approach it closely. Only when I entered the blind and looked at the nest through the lens did I understand the cause of their alarm: a snake's head was projecting from the nest. A quick examination of photographs revealed that the nest robber was an Eastern Gartersnake that was working its jaws trying to swallow the limp, possibly dead body of a week old nestling (Figure 2).

Though any nest loss is lamentable, seeing a nest predation is a rare opportunity. In my twenty-five year career as an ornithologist and bird photographer, I have witnessed nest predation less than a half a dozen times, never by a snake. While I struggled with myself whether to document the predation event or hurry to the rescue of the remaining young, the gartersnake had finally engulfed the unfortunate redstart (Figure 3). At my approach, the gartersnake immediately dropped onto the ground and crawled away, but not before I noticed four little lumps on its body. So it had eaten all four young! I checked the nest, just to confirm my suspicions, and found it empty.

The Eastern Gartersnake is widely distributed in Bruce Peninsula (Oldham and Weller 2000, pers. obs.). It is a feeding generalist with preferences for amphibians and earthworms, which may make up 35 – 90% of its diet in most populations, although slugs, fish, mice and occasionally bird eggs and nesting birds are also eaten (Ernst and Ernst 2003). Some bird eggs and nestlings eaten by the gartersnake were of species nesting on or near the ground (i.e. sparrows, wrens, gulls and terns), but nests of species nesting at least some

distance above the ground in shrubs and trees (i.e. finches, thrushes, warblers) were also robbed (Ernst and Ernst 2003). However, finding a nest placed at 1.8 m above the ground is probably a very rare feat for this species.

The Eastern Gartersnake normally finds its food by following scent trails, with vision supplementing olfaction during the capture (Ernst and Ernst 2003). In the case of the redstart, the snake might have been attracted by the scent of fecal sacs that the adult redstarts would have deposited nearby, but the snake still would have to work out the source and catch the scent of the nest or the young from the ground. The male redstart often remained by the nest after feeding the young and frequently sang from branches and twigs just below the nest (Figure 4). However, it is unlikely that such activity would have attracted a snake.

Eastern Gartersnakes do not suffocate their prey; they normally seize it in their mouth and swallow it as quickly as possible. The young redstart, captured by the snake, did not struggle when the photographs were taken; it might have already died of suffocation (its head was in the snake's mouth), or succumbed to the snake's saliva, which may have venomous properties (Ernst and Ernst 2003). This species often chews on its prey before swallowing it (as it was seen in this case) and Ernst and Ernst (2003) speculated that the saliva's enzymes may help to immobilize prey. Many climbing snakes seek out birds and their nests purposefully, and Eastern Foxsnake (*Pantherophis gloydi*) is a known nest predator of the redstarts (Sturm 1945, Stevenson and Anderson 1994). However, predation by Eastern Gartersnakes on nests of this species is likely a very rare occurrence. The majority of nest failures in American Redstarts are attributed to mammalian and avian predators such as Red Squirrels (*Tamiasciurus hudsonius*), Blue Jays (*Cyanocitta cristata*), feral and domestic cats, etc. (Bent 1953, Sherry and Holmes 1997).

Literature Cited

Bent, A.C. 1953. Life histories of North American wood warblers. U.S. National Museum Bulletin 203.

Ernst, C. H. and **E. M. Ernst**. 2003. Snakes of the United States and Canada. Smithsonian Institution Press, Washington, D.C. 668 pp.

Beck, D. Lepage and **A.R. Couturier**. 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto. 706 pp.

Oldham, M.J. and **W.F. Weller**. 2000. Ontario Herpetofaunal Atlas. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. http://nhic.mnr.gov. on.ca/MNR/nhic/herps/ohs.html.

Cadman, M.D., D.A. Sutherland, G.G. Peck, G.K. and **R.D. James**. 1987. Breeding birds of Ontario, nidiology and distribution. Volume 2: Passerines. Life Sciences Miscellaneous Publications. Royal Ontario Museum, Toronto.

Sherry, T.W. and **R.T. Holmes**. 1997. American Redstart (*Setophaga ruticilla*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds cornell.edu/bna/species/277doi:10.2173/bna.277

Stevenson, H.M. and **B.H. Anderson**. 1994. The birdlife of Florida. University of Florida Press, Gainesville.

Sturm, L. 1945. A study of the nesting activities of the American Redstart. Auk 62:189-206.

Michael Patrikeev, 28 Indian Harbour Rd., Tobermory, ON N0H 2R0.
Email: mpatrikeev@hotmail.com

Nest site characteristics of **Hooded Warblers** at the northern edge of their breeding range

By Benjamin J. Walters and Erica Nol

Introduction

The northern limit of the breeding range of the Hooded Warbler (*Setophaga citrina*) extends from southeastern Nebraska to the southern Great Lakes Region and includes Wisconsin, Michigan, southern Ontario and New York (Chiver *et al.* 2011). The southern limit of the Hooded Warbler's breeding range extends from Florida to eastern Texas, although breeding in California has been documented (Chiver *et al.* 2011). Hooded Warblers have been undergoing a population and range expansion in the northeastern portion of their range (Gartshore 1988, Badzinski 2007, Hitch and Leberg 2007, Melles *et al.* 2011). For example, between the first (1981 – 1985) and second (2001 – 2005) Ontario Breeding Bird Atlas, Hooded Warblers were found in 68 new 10 km x 10 km atlas squares, and 12 of the same squares, while the species became absent in eight squares (Cadman *et al.* 2007). The expansion has generally been attributed to climate change (Hitch and Leberg 2007, Melles *et al.* 2011), but may also be a result of increases in suitable forested habitat within portions of its range (Badzinski 2007).

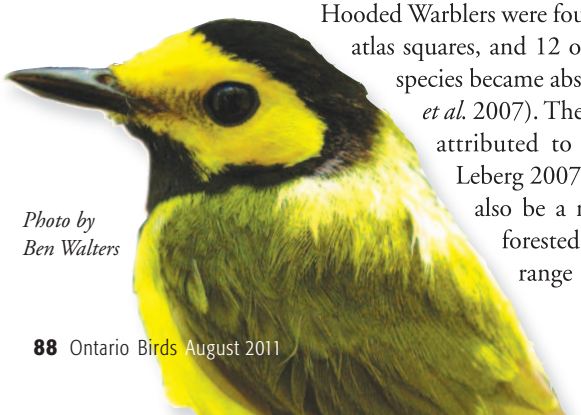


Photo by Ben Walters

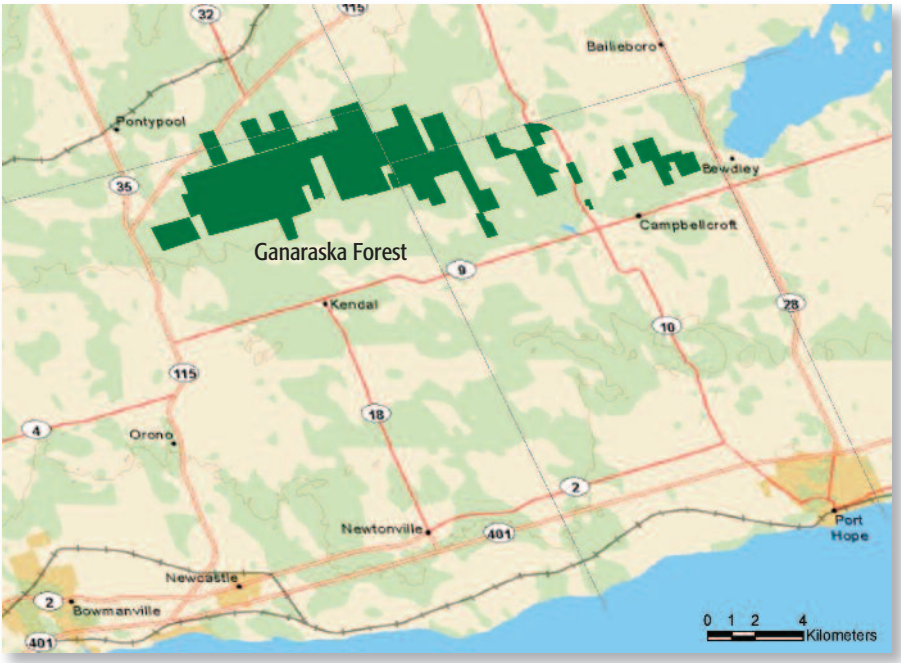


Figure 1. Location of the Ganaraska Forest owned by the Ganaraska Region Conservation Authority.

The Hooded Warbler is listed as a "threatened" species in the federal *Species at Risk Act*, and a "special concern" species in *Ontario's Endangered Species Act*, 2007. Less than 1% of the Hooded Warbler's breeding range is in Canada (Environment Canada 2011) and all of that is in southern Ontario (Badzinski 2007). The first documented occurrence of the Hooded Warbler at the northern extent of its range in Ontario was in 1878 and nesting was first documented in 1949 (Peck and James 1987). The northern extent of the Canadian Hooded Warbler population was considered to inhabit primarily Carolinian Forests in southwestern Ontario (Bisson and Stutchbury 2000, Friesen *et al.* 2000, Whittam *et al.* 2002, Badzinski 2003).

Some breeding evidence north of this range, such as a male feeding young east of Peterborough, Ontario, in 1963 (Sadler 1968), has been reported, but a breeding population was not discovered. Evidence now suggests that Hooded Warblers may breed as far north as the Bruce Peninsula, Lake Simcoe-Rideau and the southern Canadian Shield regions (Badzinski 2007). For example, an unsuccessful breeding attempt was documented at Awenda Provincial Park in 1989 (Weir 1989) and a pair with fledged young was observed there in 2010 (Friends of Awenda Park 2011).

Hooded Warblers mainly breed in mid- to late-successional mixed deciduous forests. At the northern extent of their range, such as in Ontario, Pennsylvania, Ohio, and Missouri, they breed in beech-maple and oak-hickory dominated forests (Horn and Benninger-Truax 1997, Friesen *et al.* 2000, Howlett and Stutchbury 2003, Wallendorf *et al.* 2007, Chiver *et al.* 2011). At the southern edge of their range they breed in wet lowlands such as cypress-gum swamps (Heltzel and Leberg 2006). Hooded Warblers will also inhabit forests with coniferous components such as oak-pine in south-central Missouri (Wallendorf *et al.* 2007), mature pine forests in North (Greenberg and Lanham 2001) and South Carolina (Sargent *et al.* 1997) and coniferous plantations in southwestern (Badzinski 2003) and south-central Ontario (*this study*).

Hooded Warblers prefer mature forests with a high canopy (Whittam and McCracken 1999), dense understory, and canopy gaps for nest sites and territories (Gartshore 1988, Whittam and McCracken 1999, Bisson and Stutchbury 2000, Friesen *et al.* 2000, Pasher *et al.* 2007). Hooded Warbler nest sites would naturally be found in tree-fall gaps (Chiver *et al.* 2011), but because of a lack of mature forest throughout their range, they are typically found in sites that are selectively logged (Tarof and Stutchbury 1996, Whittam and McCracken 1999, Greenberg and Lanham 2001). Hooded Warblers appear to be more abundant at sites within 12 to 18 years after harvest (Gartshore 1988, Heltzel and Leberg 2006) and in hurricane created gaps after two and three years (Greenberg and Lanham 2001) rather than in control stands without gaps. In some regions, Hooded Warblers are observed only in sites that have undergone forest harvesting (Wallendorf *et al.* 2007, *this study*). As well, because of their preference for dense understory, nesting can occur close to skidder trails, old logging roads and roads (Gartshore 1988, Howlett and Stutchbury 1996).

In 2006, a small nesting population of Hooded Warbler was observed in the Ganaraska Forest in south-central Ontario, approximately 200 km north of the previously documented northern range (Friesen *et al.* 2000) (Fig. 1). Unlike the southwestern Ontario population in the Carolinian Forest Zone, this south-central Ontario population inhabits the Great Lakes-St. Lawrence Forest Zone. Similarly, however, the Ganaraska Forest is mainly underlain by sandy soils as is much of this species' distribution in Ontario's Carolinian Forest (Gartshore 1988). The Ganaraska Forest is composed of beech-maple and oak-maple forest with some mixed pine-oak forest and coniferous plantations. Some trees and shrubs such as tulip-tree (*Liriodendron tulipifera*), sassafras (*Sassafras albidum*) and spicebush (*Lindera benzoin*), that are present in the Hooded Warbler's southwestern Ontario breeding habitat, are absent from the Ganaraska Forest. Therefore, differences in forest structure such as tree spacing, canopy height and closure, and shrub layer density, between

Figure 2. Deciduous habitat used by nesting Hooded Warblers in the Ganaraska Forest. *Photo by Ben Walters*

the Carolinian Forest Zone and the Ganaraska Forest could result in differences in habitat selection. Our objective was to determine whether the structure of nesting habitat in the Ganaraska Forest was similar to that in other areas of this species' range, particularly in southwestern Ontario. Determining the similarity in nest-site habitat requirements among forest types would be useful for understanding what forest management practices are most beneficial to Hooded Warblers and whether they could be the same across this species' Canadian range. Furthermore, identifying the similarities or differences in structural characteristics would help in future assessments of potential breeding habitat availability in the Great Lakes-St. Lawrence Forest Zone. We expected that Hooded Warblers would use nest-sites with the same structural characteristics as as individuals to the south, despite a difference in forest type. We expected that, because Hooded Warblers are a gap-dependent

species (Bisson and Stutchbury 2000, Shifley *et al.* 2006), nesting habitat would be structurally similar to areas to the south with dense undergrowth and an open canopy.

Methods

Study area

The Ganaraska Forest (N44° 5.8' W78° 30.5'), owned by the Ganaraska Region Conservation Authority, is a 4,228 ha forest on the Oak Ridges Moraine (Figure 1). The boundaries of the Ganaraska Forest are within Durham Regional Municipality, and Peterborough and Northumberland counties. Forest soils are dominated by Pontypool series gravely sand, Dundonald sandy loam, Bridgman sand and Pontypool sandy loam underlain by Black River Trenton group limestone. Forest elevations range from 200 m to 408 m above sea level (Tedford 1978).

In the early 1900s, reforestation of the Ganaraska Forest was necessary to stabilize the soils that began to erode after they were cleared for farmland. The forest is approximately equally comprised of coniferous plantation and mixed hardwoods. The coniferous plantations consist of red pine (*Pinus resinosa*) with smaller areas of scots pine (*Pinus sylvestris*), jack pine (*Pinus banksiana*), white spruce (*Picea glauca*), European larch (*Larix deciduas*) and American larch (*Larix laricina*). The mixed hardwoods are dominated by red oak (*Quercus rubra*), sugar maple (*Acer saccharum*) and poplar (*Populus spp.*) (Tedford 1978). The surrounding land use is largely agricultural. Pasture lands for horse and cattle production dominate with some hay fields and few row crops. Similar to the St. Williams forest where a large percentage of Canada's Hooded Warblers breed (Whittam *et al.* 2002), tree harvesting in the Ganaraska Forest is performed by either single-tree selection in mixed deciduous forest or row-thinning in pine plantations.

Nest site vegetation characteristics

Hooded Warbler nest sites were located in 2006 (n = 4) and 2007 (n = 8) through intensive foot searches near singing males and agitated females. Vegetation characteristics were measured at eight of the 12 sites in 2007.

We measured the habitat characteristics at nest sites within a 5m x 10m area centered on the nest. The habitat variables measured included percent cover of overstory canopy cover, stem density of saplings and trees, ground cover and vegetation stratification (Kilgo *et al.* 1996). We then compared the vegetation characteristics from the nest patch to the vegetation characteristics at randomly chosen unused sites (Kilgo *et al.* 1996, Bisson and Stutchbury 2000). To test nest-site selection, we pooled nests from 2006 and 2007 because of small sample sizes (Whittam *et al.* 2002).

All statistical analyses were performed using STATISTICA (Statsoft 2004). Normality was tested using the Kolmorogov-Smirnov test and homogeneity of variances was tested using

the Levene's test. Variables that were normally distributed, or normalized using a transformation, were tested for their difference between nest sites and non-use sites using independent t-tests. Data that were not normally distributed were transformed using log(k) or log(k+1) to meet the assumptions of parametric testing. If data could not be normalized, the difference between nest sites and non-use sites was tested using a Mann-Whitney U test.

To assess percent cover within the nest and random unused sites, vegetation was vertically stratified as follows: Ground cover = <0.5 m; Regeneration = >0.5 m and <1.3 m; Saplings = >1.3 m <2.5 m; Understory = >2.5 m and <10 m; Sub-canopy = >10 m and < 20 m; Canopy = >20 m. Percent cover estimates were categorized as follows: 0% = 1; 1 – 25% = 2; 26 – 50% = 3; 51 – 75% = 4; 76 – 100% = 5 Kilgo *et al.* 1996, Moorman *et al.* 2002. Because of the high degree of correlation within the percent cover classes, one variable was removed from each correlated pair (Moorman *et al.* 2002). Within the percent cover classes, the uncorrelated variables analyzed were regeneration and understory. All trees (>25 cm circumference), saplings (>1.3 m high and <7.8 cm circumference) and shrubs within the plot were counted and classed as either dead or alive. The vegetation plot rectangle was quartered into quadrats by assigning boundaries along each cardinal direction. The distance to the nearest tree and the nearest sapling in each of the quadrats was measured. Distances were then pooled into a mean distance. Litter depth was measured at the edge of the plot in all cardinal directions and at the centre point of the plot. Measurements at each site were pooled to create a mean depth for each site.

Coarse woody debris (CWD) was counted along a 10 m transect which was defined as 1 m on either side of the eastern boundary of the vegetation plot (20 m^2). CWD was classified as small CWD (<2.5 cm circumference), medium CWD (2.6 – 8 cm circumference), and large CWD (>8 cm circumference). Lastly, all classes at each site were pooled to create a total abundance of CWD for each site. For testing of the pooled CWD, one site was removed from the non-use sites as it had no CWD and was a severe outlier affecting normality.

Basal area, the area of land that is covered by the cross-sections of woody stems (m^2/ha), was measured using a 2X prism centred on the nest or at the centre of the plots in the non-use sites. From the non-use sites, two sites that were measured in large openings such as on roads at logging landings were not used as they severely affected normality. Once these outliers were removed, parametric tests could be used without transformation.

Canopy cover was measured using a spherical densiometer. Four measurements were taken by standing at the centre point and extending the densiometer in each cardinal direction. The measurements from each direction were multiplied by 1.04 as required by the instructions for the instrument to approximate 100% coverage, and the results were averaged.

Table 1. Comparisons of the percent cover in the regeneration layer between Hooded Warbler nest sites and randomly chosen non-use sites in the Ganaraska Forest, Ontario, 2006 – 2007.

Class	Nest sites (n = 4)	Non-use sites (n = 62)
1 (0%)	0 (0%)	3 (5%)
2 (1 – 25%)	0 (0%)	44 (71%)
3 (26 – 50%)	3 (75%)	12 (19%)
4 (51 – 75%)	1 (25%)	3 (5%)
5 (76 – 100%)	0 (0%)	0 (0%)

Table 2. Comparisons of the percent cover in the understory layer between Hooded Warbler nest sites and randomly-chosen non-use sites in the Ganaraska Forest, Ontario, 2006 – 2007.

Class	Nest sites (*n* = 4)	Non-use sites (*n* = 62)
1 (0%)	0 (0%)	7 (11%)
2 (1 – 25%)	1 (25%)	29 (47%)
3 (26 – 50%)	2 (50%)	16 (15%)
4 (51 – 75%)	1 (25%)	9 (15%)
5 (76 – 100%)	0 (0%)	1 (2%)

Results

We observed four nests (probably of three nesting pairs) and five males (two unpaired) in 2006, and eight nests in 2007 (probably of seven nesting pairs) and 14 males (seven unpaired). Search effort was similar in the two years so the local breeding population appears to have increased between 2006 and 2007. By colour-banding males with individually identifiable patterns in 2007, we were able to determine that two nests with nestlings were being attended by the same male.

All but one Hooded Warbler nest found in the Ganaraska Forest were placed in gaps created by silvicultural wood removal. Hooded Warblers chose four different nest substrates: elderberry (*Sambucus sp.*), 3 (25%); sugar maple (*Acer saccharum*), 6 (50%); raspberry (*Rubus sp.*), 2 (17%), and beaked hazel (*Corylus cornuta)*, 1 (8%). The average nest height was 0.56 m ± 0.10 (mean ± standard error). Most nests were placed in the crotch of nest substrates or on a platform created by branches. One nest however, was placed where a dead branch touched the stem of a sapling and the edges of the nest on two sides were attached to the substrate at the top of the nest cup. The nest was very flimsy and had begun to disintegrate by the time of fledging. This nest was also different because it was found in a medium-aged patch of forest approximately 10 m from the nearest typical gap nesting habitat.

Because we had percent cover estimates for a few sites only ($n = 4$), we did not analyze them statistically. Hooded Warbler nest sites were found in areas with a high percent cover (between 26 – 75% cover) in the regeneration layer

Table 3. Comparison of vegetation characteristics between Hooded Warbler nest sites and randomly chosen non-use sites in the Ganaraska Forest, Ontario, 2006 – 2007.

Parameter	Nest Site[h]	Non-use Site[h]	P[i]
Live tree density (# of trees/50 m^2)[b]	2.6 ± 0.7	3.1 ± 0.3	0.74
Dead tree density (# of trees/50 m^2)[a,b]	0 (range 0 – 3)	0 (range 0 – 5)	0.66
Live sapling density (# of saplings/50 m^2)[b]	27.9 ± 7.8	9.3 ± 1.0	**<0.0001**
Dead sapling density (# of saplings/50 m^2)[b]	0.8 ± 0.5	1.3 ± 0.3	**0.005**
Shrub density (# of shrubs/50 m^2)[a,d]	43 (range 7 – 66)	3 (range 0 – 125)	**0.02**
Mean distance to trees (cm)[c]	510.0 ± 42.2	438.1 ± 39.1	0.25
Mean distance to saplings (cm)[c]	184.3 ± 48.7	414.4 ± 41.9	**0.007**
Distance to nearest tree (cm)[c]	249.9 ± 22.0	272.6 ± 38.3	0.45
Distance to nearest sapling (cm)[c]	64.4 ± 14.9	191.8 ± 30.9	0.058
Litter depth (cm)[e]	3.6 ± 1.2	3.3 ± 0.2	0.7
CWD small (# of pieces/20 m^2)[d]	43.5 ± 9.8	42.1 ± 4.0	0.93
CWD medium (# of pieces/20 m^2)[d]	9.3 ± 1.7	5.2 ± 0.6	0.06
CWD large (# of pieces/20 m^2)[d]	1.5 ± 0.5	2.3 ± 0.5	0.86
CWD total (# of pieces/20 m^2)[d]	54.3 ± 10.0	49.6 ± 4.4	0.51
Basal Area (m^2/ha)[f]	18.8 ± 1.3	23.5 ± 1.1	0.12
Canopy cover (#/100 units)[g]	27.6 ± 3.8	31.8 ± 4.7	0.98

a Mann-Whitney U test
b Nest site ($n = 8$); Non-use site ($n = 62$)
c Nest site ($n = 7$); Non-use site ($n = 62$)
d Nest site ($n = 4$); Non-use site ($n = 62$) CWD: Coarse woody debris
e Nest site ($n = 3$); Non-use site ($n = 61$)
f Nest site ($n = 8$); Non-use site ($n = 60$)
g Nest site ($n = 4$); Non-use site ($n = 22$)
i Mean ± standard error
h Significant results ($P<0.05$) are bolded.

(between 0.5 m and 1.3 m from the ground) of the Ganaraska Forest (Table 1). Although the sample size was small, this observation was disproportionate to the non-use sites which had a higher distribution in the lower regeneration class of 1 – 25% cover.

Similarly, although not analysed statistically, nest sites were found at locations with proportionally more cover in the understory layer (between 2.5 m and 10 m from the ground) than non-use sites (Table 2). While non-use sites were found to occur within each

Figure 3. Hooded Warbler nest containing four eggs in a sugar maple sapling, the most often used nesting substrate in the Ganaraska Forest. *Photo by Ben Walters*

percent cover class, they were distributed around class 2 (1 – 25%). Nest sites were distributed around class 3 (26 – 50%), suggesting that Hooded Warblers in the Ganaraska Forest choose a denser understory. The variables that were significantly different between nest sites and non-use sites were: (1) live sapling abundance; (2) dead sapling abundance; (3) shrub density, and (4) mean distance to saplings. There were significantly more living and fewer dead saplings at nest sites that at non-use sites (Table 3). As well, there were significantly more shrubs at nest sites than at non-use sites (Table 3). In addition, the mean distance to saplings, measured from the nearest sapling to the northwest, northeast, southwest, and southeast was significantly lower at nest sites than non-use sites.

Figure 4. Female Hooded Warbler incubating eggs that included the first observed case of Brown-headed Cowbird parasitism in the Ganaraska Forest. *Photo by Ben Walters*

Discussion

Hooded Warbler nest sites in the Ganaraska Forest were mostly in deciduous dominated forest (Figure 2), although two of the 12 nests were in managed conifer plantations that were regenerating to mixed forest. The preference of Hooded Warblers nests to be in forest gaps with dense vegetation in the lower regeneration layer in the Ganaraska Forest was similar to the preferences reported elsewhere (*e.g.,* Gartshore 1988, Whittam and McCracken 1999, Bisson and Stutchbury 2000, Pasher *et al.* 2007). Proportionally more often, Hooded Warblers in the Ganaraska Forest used sugar maple as the nesting substrate compared to other substrates (Figure 3), although the sample size of nests was small. Higher proportional use of sugar maple as nest substrate had not been reported in other studies, however two of our nests were in raspberry brambles,

Due to the success of the populations to the south, Hooded Warbler individuals appear to have emigrated north to suitable habitat

the preferred substrate of nests in southwestern Ontario (Badzinski 2003). Nest heights in the Ganaraska Forest (mean = 0.56 m) were similar to the heights observed in the southwestern Ontario (*e.g.*, mean = 0.48 m: Badzinski 2003), Pennsylvania (mean = 0.54 m: Howlett and Stutchbury 1996, mean = 0.51 m: Howlett and Stutchbury 1997) and slightly lower than in South Carolina (mean = 0.98 m: Kilgo *et al.* 1996; mean = 0.9 m <100 m from edge, and mean = 0.8 m>100 m from edge: Moorman *et al.* 2002).

Although Hooded Warblers in the Ganaraska chose nest sites in openings created by forest harvesting, we did not observe a significant difference between the canopy cover at nest sites and non-use sites. On average, canopy cover at nest sites was lower, but the difference was not statistically significant. Nest sites in South Carolina also did not have significantly different canopy cover at nest sites (Kilgo *et al.* 1996); however, other studies have found significantly reduced canopy cover at nest sites (Whittam *et al.* 2002, Pasher *et al.* 2007). A potential reason for our results differing from other studies is that we used a spherical densiometer to measure canopy cover. Due to its concave mirror, we may have sampled forest canopy cover further outside the nest patch than other studies. The increased coverage outside the nest patch would have decreased the overall coverage by the opening. Because there were no apparent differences among the nest sites at our study site in the Great Lakes-St. Lawrence Forest Zone and the nest sites to the south such as in the Carolinian Forest Zone, we suggest that this new nesting population of Hooded Warblers is part of a range expansion rather than attraction to a novel habitat feature.

Due to the success of the populations to the south, Hooded Warbler individuals appear to have emigrated north to suitable habitat, possibly as a result of a warming climate (Melles *et al.* 2011). Forest harvesting practices in the Ganaraska Forest are similar to those in southwestern Ontario (*e.g.*, South Walsingham and St. Williams Forest) and their populations have continued to grow in those forests when suitable habitat is created by logging practices (Whittam and McCracken 1999). We expect that unless a stochastic event occurs to

Figure 5. An after second year male Hooded Warbler banded as part of research in the Ganaraska Forest. *Photo by Ben Walters*

adversely affect nest productivity or the interannual survival of individuals of this new population, continued population growth and expansion will occur in this Great Lakes-St. Lawrence Forest Zone population.

Interestingly, following the intensive surveys for Hooded Warblers in 2007, the population has appeared to remain (as of July 2011) at approximately five pairs and nesting as far north as Peterborough County in 2008 has not been re-observed (BJW, pers. obs.). A major problem for more southern populations is a high incidence of nest parasitism by Brown-headed Cowbirds (*Molothrus ater*).

However, until a nest containing a Brown-headed Cowbird egg was found in 2010 in the Ganaraska Forest (Figure 4), no previous incidences of parasitism had been detected. Therefore it is unlikely that nest parasitism is a cause of slow population growth. In fact, we

could speculate that the novelty of Hooded Warbler nesting allowed them to go undetected until the local Brown-headed Cowbirds became accustomed to Hooded Warbler nesting behavior. The stability, rather than growth of this population may be an effect of the small number of annual recruits being offset by interannual mortality and territorial abandonment by unpaired adults. In 2009, two years after banding many fledglings and adults (Figure 5), we only re-encountered a single banded male despite nesting occurring at similar territories. The difficulty of finding mates in a small population was exemplified in 2008 when a male was observed mating with a female offspring from the previous year. While geographic expansion of the Hooded Warbler populations provides a promising outlook for a stable Ontario population, population growth at the northern limit appears slow.

Summary

The population and range of the Hooded Warbler has been expanding in Ontario. Once considered a species of the Carolinian Forest Zone, Hooded Warblers have continued to expand northward. In 2006, we found a previously unreported, small breeding population of Hooded Warblers in the Ganaraska Forest, south of Peterborough, Ontario. This population represented a shift from being restricted to the Carolinian Forest Zone in Canada to inhabiting the Great Lakes-St. Lawrence Forest Zone. In 2007, we sought to assess the habitat characteristics of Hooded Warbler nest sites in the Ganaraska Forest to determine if the habitat structure was similar to the more southern breeding population. We found that Hooded Warblers were choosing to nest in forest gaps. The nest sites in the gaps had higher vegetation density in the regeneration (>0.5 m and <2.3 m) and understory (>2.5 m and <10 m) layers than random locations. For example, most nest sites had 26–50% cover in the regeneration layer while most random locations had 1–25% cover. Similarly the greatest number of nest sites had 26–50% cover in the understory layer while most random locations had 1–25% cover. Nest sites had significantly higher sapling and shrub densities than random locations. As we expected, Hooded Warblers appear to be choosing structural characteristics in the Ganaraska Forest that are similar to those in more southern forest types. We detected only one case of Brown-headed Cowbird parasitism in Hooded Warbler nests since 2006.

Acknowledgments

We are grateful to the Ganaraska Region Conservation Authority for their support of the project and access to the Ganaraska Forest. Funding for this project was provided by the Ontario Ministry of Natural Resources Species At Risk Stewardship Fund and the Oak Ridges Moraine Foundation. We also thank Myles Falconer, Paul Woodard, Andrea Geboers, Sara Pieper, Alison Elliott and Erin Wiancko for field assistance.

Literature Cited

Badzinski, D.S. 2003. Hooded Warbler research in St. Williams Forest, Ontario; An investigation of nest productivity, nest concealment, territory size and species associations. Bird Studies Canada, Port Rowan, Ontario.

Badzinski, D.S. 2007. Hooded Warbler, pp. 524 – 525 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier, eds. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706 pp.

Bisson, I.A. and **B.J. Stutchbury**. 2000. Nesting success and nest-site selection by a neotropical migrant in a fragmented landscape. Canadian Journal of Zoology 78: 858 – 863.

Cadman M.D., D.A. Sutherland, G.G. Beck, D. Lepage and **A.R. Couturier**, eds. 2007. Atlas of the Breeding Birds of Ontario, 2001 – 2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706 pp.

Chiver, I., L.J. Ogden and **B.J. Stutchbury**. 2011. Hooded Warbler (*Wilsonia citrina*). *In*: The Birds of North America Online. A. Poole, editor. Cornell Lab of Ornithology, Ithaca, New York. http://bna.birds.cornell. edu.cat1.lib.trentu.ca:8080/bna/species/ 110doi:10.2173/bna.110

Environment Canada. 2011. Recovery strategy for the Acadian Flycatcher (*Empidonax virescens*) and the Hooded Warbler (*Wilsonia citrina*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa, Ontario. ix + 32 pp.

Friends of Awenda Park. 2011. Bird Research (2010). A Friends of Awenda Park Online Publication. http://www. awenda-park.ca/?page_id=550

Friesen, L., M. Cadman, P. Carson, K. Elliott, M. Gartshore, D. Martin, J. McCracken, J. Oliver, P. Prevett, B. Stutchbury, D. Sutherland and **A. Woodliffe.** 2000. National recovery plan for the Acadian Flycatcher (*Empidonax virescens*) and Hooded Warblers (*Wilsonia citrina*): national recovery plan no. 20; recovery of nationally endangered wildlife (RENEW). Ottawa, Ontario. 33pp.

Gartshore, M.E. 1988. A summary of the breeding status of Hooded Warblers in Ontario. Ontario Birds 6: 85 – 99.

Greenberg, C.H. and **J.D. Lanham**. 2001. Breeding bird assemblages of hurricane-created gaps and adjacent closed canopy forest in the southern Appalachians. Forest Ecology and Management 154: 251 – 260.

Heltzel, J.M. and **P.L. Leberg**. 2006. Effects of selective logging on breeding bird communities in bottomland hardwood forests in Louisiana. Journal of Wildlife Management 70: 1416 – 1424.

Hitch, A.T. and **P.L. Leberg**. 2007. Breeding distributions of North American bird species moving north as a result of climate change. Conservation Biology 21: 534 – 539.

Horn, D.J. and **M. Benninger-Truax**. 1997. The summer bird community in a late-successional beech-maple forest in Ohio. Ohio Journal of Science 97: 14 – 16.

Howlett, J.S. and **B.J.M. Stutchbury**. 1996. Nest concealment and predation in Hooded Warblers: experimental removal of nest cover. Auk 113: 1 – 9.

Howlett, J.S. and **B.J.M. Stutchbury**. 1997. Within-season dispersal, nest-site modification, and predation in renesting Hooded Warblers. Wilson Bulletin 109: 643 – 649.

Howlett, J.S. and **B.J.M. Stutchbury**. 2003. Determinants of between-season site, territory, and mate fidelity in Hooded Warblers (*Wilsonia citrina*). Auk 120: 457 – 465.

Kilgo, J.C., R.A. Sargent, B.R. Chapman and **K.V. Miller**. 1996. Nest-site selection by Hooded Warblers in bottomland hardwoods of South Carolina. Wilson Bulletin 108: 53 – 60.

Melles, S.J., M.-J. Fortin, K. Lindsay and **D. Badzinski**. 2011. Expanding northward: influence of climate change, forest connectivity, and population processes on a threatened species range. Global Change Biology 17:17 – 31.

Pelee Wings
NATURE STORE
636 Point Pelee Dr. Leamington ON N8H 3V4
Birding • Nature • Optics • Books
Canada's Largest Selection of Binoculars and Scopes
All at Discount Prices!
•Swarovski
•Kowa
•Pentax
•Leica
•Nikon
•Swift
•Bushnell
•Zeiss
•Steiner
•Celestron
•Vortex

•Manfrotto
•BushHawk
For FAST Mail Order Delivery or Quote...
519-326-5193 sales@peleewings.ca
www.peleewings.ca

Moorman, C.E., D.C. Guynn Jr. and **J.C. Kilgo**. 2002. Hooded Warbler nesting success adjacent to group-selection and clearcut edges in a southeastern bottomland forest. Condor 104: 366 – 377.

Pasher, J., D. King and **K. Lindsay**. 2007. Modelling and mapping potential Hooded Warbler (*Wilsonia citrina*) habitat using remotely sensed imagery. Remote Sensing of the Environment 107: 471 – 483.

Peck, G.K. and **R.D. James.** 1987. Breeding birds of Ontario, nidology and distribution, volume 2: passerines. The Royal Ontario Museum, Toronto, Ontario.

Sadler, D.C. 1968. Birds of the Peterborough area and their seasonal movements. Publisher unknown. Peterborough, Ontario.

Sargent, R.A., J.C. Kilgo, B.R. Chapman and **K.V. Miller**. 1997. Nesting success of Kentucky and Hooded Warblers in bottomland forests of South Carolina. Wilson Bulletin 109: 233 – 238.

Shifley, S.R., F.R. Thompson III, W.D. Dijak, M.A. Larson and **J.J. Millspaugh**. 2006. Simulated effects of forest management alternatives on landscape structure and habitat suitability in the Midwestern United States. Forest Ecology and Management 229: 361 – 377.

Statsoft. 2004. Statistica 7. Tulsa, Oklahoma.

Tarof, S.A. and **B.J.M. Stutchbury**. 1996. A case of cooperative breeding in the Hooded Warbler. Wilson Bulletin 108: 382 – 384.

Tedford, J.A. 1978. Ganaraska Forest Study. Published by the Ganaraska Region Conservation Authority and the Ontario Ministry of Natural Resources, Port Hope, Ontario.

Wallendorf, M.J., P.A. Porneluzi, W.K. Gram, R.L. Clawson and **J. Faaborg**. 2007. Bird response to clear cutting in Missouri Ozark forests. Journal of Wildlife Management 71: 1899 – 1905.

Weir, R.D. 1989. Ontario Region. American Birds 43: 1310 – 1313.

Whittam, R.M. and **J.D. McCracken**. 1999. Productivity and habitat selection of Hooded Warblers in southern Ontario; An interim report to the Endangered Species Recovery Fund of the World Wildlife Fund Canada. Bird Studies Canada, Port Rowan, Ontario.

Whittam, R.M., J.D. McCracken, C.M. Francis and **M.E. Gartshore**. 2002. The effects of selective logging on nest-site selection and productivity of Hooded Warblers (*Wilsonia citrina)* in Canada. Canadian Journal of Zoology 80: 644 – 654.

Benjamin J. Walters, Environmental and Life Sciences Graduate Program, Trent University. Peterborough, Ontario K9J 7B8. E-mail: benjaminwalters@trentu.ca

Erica Nol, Biology Department, Trent University. Peterborough, Ontario K9J 7B8.

Ontario Field Ornithologists

President: John Black,
17 Valerie Drive, St. Catharines, Ontario L2T 3G3
(905) 684-0143,
E-mail: jblack3@brocku.ca

Ontario Field Ornithologists is an organization dedicated to the study of birdlife in Ontario. It formed in 1982 to unify the ever-growing numbers of field ornithologists (birders/birdwatchers) across the province, and to provide a forum for the exchange of ideas and information among its members. The Ontario Field Ornithologists officially oversees the activities of the Ontario Bird Records Committee (OBRC); publishes a newsletter (*OFO News*) and a journal (*Ontario Birds*); operates a bird sightings listserv (ONTBIRDS), coordinated by Mark Cranford; hosts field trips throughout Ontario; and holds an Annual Convention and Banquet in the autumn. Current information on all of its activities is on the OFO website (www.ofo.ca), coordinated by Valerie Jacobs and Doug Woods. Comments or questions can be directed to OFO by e-mail (ofo@ofo.ca).

All persons interested in bird study, regardless of their level of expertise, are invited to become members of the Ontario Field Ornithologists. Membership rates can be obtained from the address below. All members receive *Ontario Birds* and *OFO News*.

Please send membership enquiries to:
Ontario Field Ornithologists, PO Box 116, Station F, Toronto, Ontario M4Y 2L4.

Printing: DTP Inc., Toronto

© Mixed Sources
Product group from well-managed forests, controlled sources and recycled wood or fibre
www.fsc.org Cert no. SW-COC-003090
© 1996 Forest Stewardship Council

bullfrogpowered
Printing by DTP! is bullfrogpowered

50% recycled fibre, 25% post consumer

Ontario Birds

Editors:
Chip Weseloh, 1391 Mount Pleasant Road, Toronto, ON. M4N 2T7

Glenn Coady, 330 Crystal Beach Boulevard, Whitby, ON. L1N 9Z7

Chris Risley, 510 Gilmour Street Peterborough, ON. K9H 2J9

Assistant Editor: Karl Konze

Editorial Assistance: Ron Tozer, Ron Pittaway

Ornithology Consultants: Michel Gosselin, Ross James, Mark Peck

Art Consultant: Barry Kent MacKay

Advertising: Marcie Jacklin
mjacklin@brocku.ca

Design/Production: Judie Shore

The aim of *Ontario Birds* is to provide a vehicle for documentation of the birds of Ontario. We encourage the submission of full length articles and short notes on the status, distribution, identification, and behaviour of birds in Ontario, as well as location guides to significant Ontario birdwatching areas, book reviews, and similar material of interest on Ontario birds.

Submit material for publication by e-mail attachment (or CD or DVD) to either:
chip.weseloh@ec.gc.ca
glenn_coady@hotmail.com
chris.risley@ontario.ca
kkonze@dougan.ca

Please follow the style of this issue of *Ontario Birds*. All submissions are subject to review and editing and may be submitted to peer review beyond that of the editors. For photographic material used in *Ontario Birds* the copyright remains in the possession of the photographers.