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# Wintering locations of Ontario-banded Great Egrets: New Jersey to the Caribbean

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Figure 1. A Great Egret with red alpha-numeric leg bands used from 2001-2010.
*Photo: Simon Audy*

## Introduction

In the northern portion of its range, which includes Ontario, the Great Egret (*Ardea alba*, henceforth egret) is considered a highly migratory bird (McCrimmon *et al.* 2011). Autumn migratory movements of egrets from Ontario are usually underway by September and extend through October to November and, for some individuals, into December (Canadian Wildlife Service (CWS) unpubl. data). For some egrets, however, the migration period can be very short and fast, as was demonstrated by a juvenile bird which was wing-tagged on Nottawasaga Island (Georgian Bay, Lake Huron, near Collingwood, ON) on 4 July 2011 and observed in Jamaica three months later on 11 October 2011 (see below). In general, however, most egrets which bred, or were raised in Ontario, usually have reached their wintering areas by December, where they may remain throughout January and February; young birds may stay even later (see below). By early March, many adult birds will have already started their northward migration (McCrimmon *et al.* 2011).

The overall winter range of the Great Egret in North America is well known (Mikuska *et al.* 1998, Sibley 2003, McCrimmon *et al.* 2011). However, in order to fully understand the life cycle of egrets from Ontario, and to know the conditions and risks they may face during winter, it is essential to know the specific jurisdictions to which the birds migrate and spend those 3-6 months of the year.

Figure 2. A Great Egret with the alpha-numeric laminated PVC wing tags used from 2010 – 2012.
*Photo: Alan Wormington.*

The winter range of egrets from eastern North America extends throughout the Caribbean islands, the entire state of Florida, southern Georgia and a narrow strip along the east coast of the U.S. from New York, New Jersey and Virginia south around Florida and the Gulf of Mexico, to Honduras in Central America and beyond (McCrimmon *et al.* 2011). The northern limit of the winter range is usually weather dependent in any given year as egrets need open water in which to forage (McCrimmon *et al.* 2011). Mikuska *et al.* (1998) identified 21 key wintering areas for Great Egrets in North America, mostly along the Pacific and Atlantic coasts through North, Central and northern South America. In the U.S., several large banding studies have been conducted to track where egrets from specific states or regions spend the winter (Byrd 1978); at the time of its compilation, there were no encounters of Ontario or Canadian-banded egrets. Dunn *et al.* (2009) showed that only three egrets had been banded in Canada up through 1995. However, from 2001 to 2012, the CWS (Environment Canada) had a large egret banding program in Ontario's Great Lakes (and the adjacent New York waters of the Niagara River)(see below). In this paper, we present results from this ongoing work, which demonstrate where egrets banded in Ontario spend the winter.

## Methods

During the period 2001-2012, we banded 1900 young flightless egrets with metal bands at four locations: Nottawasaga Island (near Collingwood), Chantry Island (near Southampton) and Middle Sister Island (near Colchester) in Ontario and Motor Island (near Buffalo) in New York. Alpha-numeric red plastic leg bands were placed on 1280 of these egrets between 2001-2010 (inclusive) (Fig.1); 711 were given coloured, alphanumeric laminated PVC wing tags from 2010 – 2012 (Fig. 2) and nine had no auxiliary markers.

From the CWS Bird Banding Office, we obtained details of all Great Egrets banded in Ontario and encountered anywhere up through 2012. "Encounters" included cases in which the aluminum band, colour band or wing-tag was recovered from a dead or injured bird, when a marked bird was captured and released, or when one or more of the band or tag numbers were read through binoculars or a spotting scope. All of the encountered egrets had been marked as part of this project.

A second and much more productive method of obtaining "encounters" of marked egrets came from re-sightings of colour-banded or wing-tagged egrets from CWS staff and volunteers as well as records we received from birders in response to notices posted on various birding/ornithological listservs (*e.g.* Ont-Birds, GeneseeBirds) up through 14 April 2013.

From the banding/encounter data listed above, we first selected all encounters of marked egrets from the "Winter Period", *i.e.* December – February, as defined by (Dunn *et al.* 2009. However, because the encounters showed that some egrets migrated quickly and directly to reach their winter quarters before December (see above) and others remained at their winter quarters into March (see below), we also selected all encounters of marked egrets from October-November and March. This expansion of dates to include early autumn and late spring migrants increased the probability of including egrets that were not yet at, or had already left, their wintering grounds. To compensate for this situation, we, secondarily, only selected encounters that were received from the egrets' known winter ranges (Byrd 1978, Root 1988, Mikuska *et al.* 1998, McCrimmon *et al.* 2011, eBird 2013 and National Audubon Society 2000-2012). Thus, we did not include any records from outside the October – March period nor from areas where egrets in North America were not already known to winter, *i.e.* Ontario, Indiana, Michigan, Wisconsin, western or central New York, Pennsylvania, Europe, etc. (McCrimmon *et al.* 2011). For example, October and November encounters from Ontario, or any Great Lakes states, were not considered to be valid winter records (because egrets do not winter in Ontario) nor were three December-January encounters of the same Ontario-tagged egret in the Azores Islands (Weseloh and Moore 2008) considered valid wintering records. Lastly, if a given individual was encountered more than once, the most southerly record was retained; this occurred only once (see below).

## Results

Data from the CWS Banding Office showed 45 records of 38 different Great Egrets banded in Ontario and encountered anywhere throughout the year. Eight of these encounters were from the distinct "winter" period (December – February) and 14 were from the late autumn/early spring period (October – November and March). Two of the winter encounters and nine of the late autumn/early spring encounters were reported from areas where egrets were not known to winter (see above) and were discarded, leaving 11 encounters from the banding office which we considered to be valid winter range records. All birds had been banded on Lake Huron or the Niagara River as part of this CWS project.

From the public and CWS staff and volunteers, we received 1206 reports on 465 known individuals and 229 undifferentiated marked individual egrets banded in Ontario (and the Niagara River) and encountered in Ontario or elsewhere throughout the year. Twenty-four of these encounters were from the "winter" period (December - February) and 81 were from the October - November and March period. Eleven of the encounters from the winter period and 71 from the late autumn/early spring period were either from areas where egrets were not known to winter or were also listed with the data from the banding office and were discarded, leaving 23 encounters which we considered to be valid winter range records. Thus, this paper is based on a total of 34 encounters of Great Egrets colour-banded or wing-tagged as flightless young in Ontario (Table 1).

**Table 1. Locations and numbers of Ontario-marked Great Egrets encountered during the expanded winter period, October - March, 2001-2013.**

| ENCOUNTER LOCATION | ENCOUNTER MONTH | | | | | | |
|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Total |
| North Carolina | | | 3 | 3 | 2 | 2 | 10 |
| South Carolina | | 3 | 1 | | 2 | | 6 |
| Florida | 1 | 3 | | 1 | | | 5 |
| New Jersey | 2 | | 1 | | | | 3 |
| Cuba | | 1 | | 1 | | | 2 |
| Lesser Antilles | | | 1 | | 1 | | 2 |
| Tennessee | | | | 1 | | | 1 |
| Alabama | | | | 1 | | | 1 |
| Georgia | | | 1 | | | | 1 |
| Dominican Republic | | | | | | 1 | 1 |
| Virginia | | | | | | 1 | 1 |
| Jamaica | 1 | | | | | | 1 |
| **Total** | **4** | **7** | **7** | **7** | **5** | **4** | **34** |

## Winter Range and Encounter Details

The 34 encounters were received from 12 jurisdictions: eight states within the United States and four Caribbean islands. The centre of the winter distribution was North and South Carolina (Fig. 3). Of the six months analyzed in this study (October – March), tagged egrets were encountered equally as often in November, December and January (seven each month, 62% of all encounters) (Table 1). There were four reports of egrets in October, two from as far south as Florida and Jamaica. There were five and four reports for February and March, respectively, one as far south as the Dominican Republic in March.

A large majority (30 of 33 or 91%) of the known age egrets encountered were 3-9 months old; the rest (9%) were 2-6 years old. Of the 34 encounters, four were found dead, one was caught due to an injury, one was caught or found dead due to control actions and the rest were sight records.

## Discussion

The major wintering areas for several regional or jurisdiction-specific banded Great Egret populations have been identified by Byrd (1978) and Coffey (1943, 1948). Egrets banded in colonies on the Atlantic coast, as well as in Ohio, wintered from as far north as New York, but mostly from North Carolina south to Florida and onward through the Caribbean islands. Those banded west of the Great Lakes, in Minnesota, wintered farther to the west in Alabama, Louisiana, Texas, Central America and western Cuba (Byrd 1978). For those egrets banded in the southern U.S. (in Mississippi, Louisiana, Texas and Oklahoma), some were sedentary, wintering in Louisiana and Texas, while others moved to the western Caribbean (western Cuba and Jamaica), perhaps through the Yucatan Peninsula, and Central and South America (Byrd 1978, summarized in McCrimmon *et al.* 2011). Thus, based on the current study, egrets banded in Ontario appear to winter, in some years, as far north as coastal New Jersey but their main wintering area is North and South Carolina, and, in lesser numbers, from there southward through Florida and the Caribbean islands. In this way, their winter range overlaps considerably with egrets from Ohio and areas of the mid-Atlantic coast (at least New York, New Jersey and Maryland (DVCW unpubl. data)).

The wintering areas for Great Egrets identified in this study can be assigned to 10 of the 43 wintering areas for North American herons defined by Mikuska *et al.* (1998). Of our 34 encounters, 50% occurred in their SE Atlantic Coast wintering area and 20% were just to the north in their Mid-Atlantic Coast wintering area. The rest of the encounters (30%) were distributed among eight of their remaining 41 wintering areas from south Florida (12%) through the Caribbean countries (18%). It would appear that the focal wintering range of Great Egrets banded in Ontario is the 900 km coastal area from SE North Carolina to central eastern coastal Florida; secondary wintering areas lie north and south of this area.

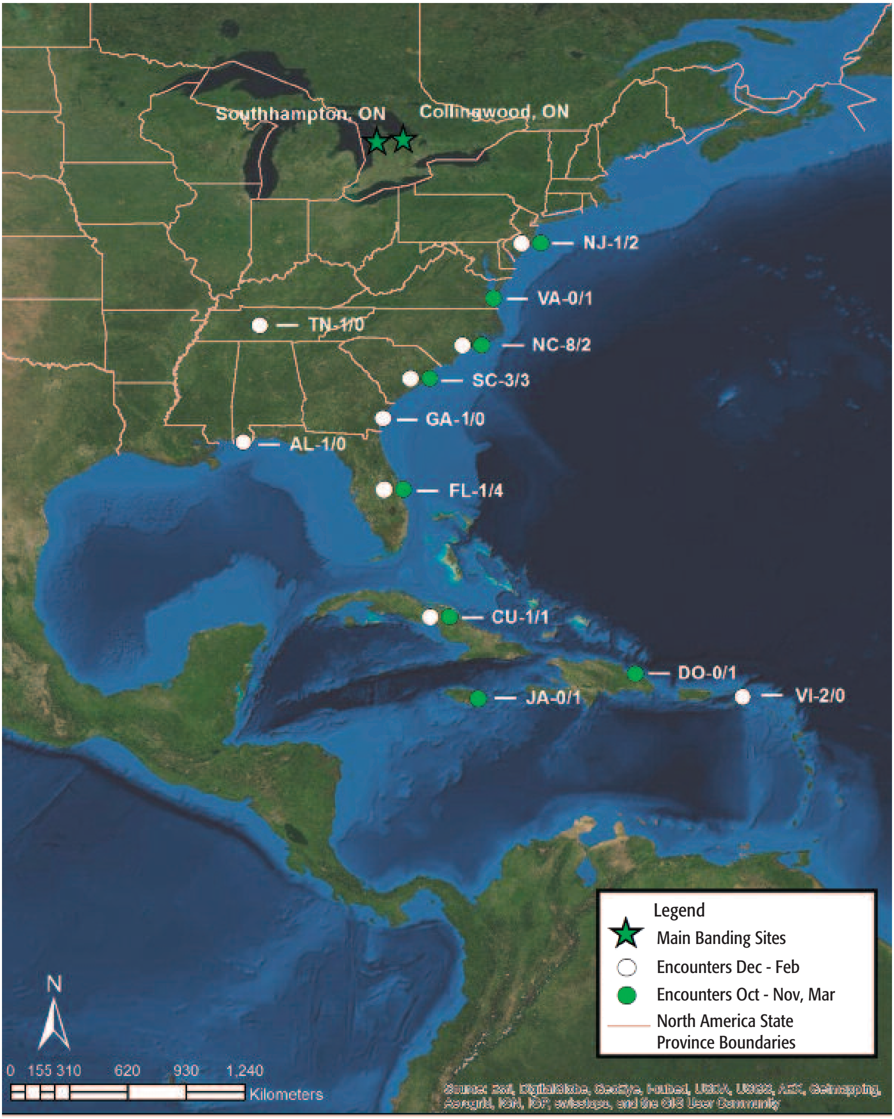


Figure 3. Locations and numbers of Ontario-banded Great Egrets encountered during October to March (2001 - 2013).

NJ = New Jersey*, VA = Virginia, TN = Tennessee, NC = North Carolina, SC = South Carolina, GA = Georgia, AL = Alabama, FL = Florida, CU = Cuba, JA = Jamaica, DO = Dominican Republic, VI = Virgin Islands.

* New Jersey: 1 egret encountered during December – February,
2 egrets encountered October, November and March.

The northern edge of the wintering range of Great Egrets in eastern North America is difficult to identify with certainty or consistency as it is known to fluctuate with annual temperature (McCrimmon *et al.* 2011). McCrimmon *et al.* (2011) state that egrets winter as far north as New Jersey and locally in New York. Boyle (2011) states that in New Jersey, the Great Egret is "a scarce winter resident — most migrate in October but a few usually try to winter in the southern coastal salt marshes." We did not receive any winter records of Ontario-banded birds from coastal New York, and all New Jersey records were from October and December — inconclusive wintering times when at the northern edge of their winter range. Interestingly, two New Jersey records which we did not include in our analysis were wing-tagged birds that were observed leaving the New Jersey shore, flying south out over the ocean, at the Avalon Seawatch (a migration monitoring project) during 21-23 October 2011. Obviously they were not going to be wintering in New Jersey.

The encounters in New Jersey, two in October and one in early December are highly suggestive of egrets migrating through that state in the autumn. With no encounters in January or February, the heart of winter, it seems unlikely that very many egrets overwintered there during this study. However, we did find that nine of eleven encounters from the October – November period occurred in well recognized wintering areas for egrets. The single encounter from Virginia in March is suggestive of a spring migrant, although this bird was an immature, most of which rarely migrate back to their natal area/colony in their 1st year (CWS unpubl. data). Nevertheless, all four of the encounters from March could represent legitimately wintering birds.

Farther south, the other 30 encounters from Tennessee through the Caribbean appear to be straightforward valid winter range records. The record from Tennessee is unusual for being an inland location; however, the same orange-tagged individual (10D) was identified at the same location in January and March. A second observation in January and another in April (of the same year) when the number on the orange tags could not be read, were likely the same bird. Tennessee is on the periphery of the Midwest wintering site for North American herons (Mikuska *et al.* 1998). The record from Jamaica is exceptional for the speed with which that egret reached that location, 3.5 months from the date of banding.

When considering the distribution and occurrence of encounters in the December-January period, it should be remembered that during the latter half of December and early January there would have been intensive field observations because of the Christmas Bird Counts (CBCs). Four of the 14 encounters during this period (29%), and 50% of the encounters for North Carolina, occurred during the traditional CBC count period. It is somewhat surprising then, that there were only single encounters of marked egrets from South Carolina (23 CBCs in 2012-13), Florida (61 CBCs) and New Jersey (25 CBCs) and none in Virginia (47 CBCs) in those months;

North Carolina, on the other hand, where 50 CBCs were conducted, had five encounters during the CBC period. This may suggest the potential for an unintentional bias away from searching for tagged egrets in some states during CBCs.

## Case Studies

Three very interesting encounters of the same green-tagged egret (22C) shed some light on movements of individual birds during the winter period. This bird was banded on Nottawasaga Island on 4 July 2011; it was encountered four months later in Cuba on 6 November 2011; however, later, on 30 November 2011 and 9 December 2011, it was encountered again in Monroe Township, Middlesex County, NJ. Thus, it traveled from Nottawasaga Island to Cuba and back to New Jersey during the period from July to November. Travels like this beg the question of what band encounters really tell us. Depending on the date, a bird may be sedentary in an area or it may be on the move (*i.e.* migrating). Normally, an Ontario-banded egret in Cuba on 6 November would be assumed to have reached its wintering area; however, this egret did not settle but kept on moving.

Furthermore, the fact that Ontario-banded migrating juvenile egrets may either get blown off course during autumn migration or otherwise lose their way was illustrated vividly by the three encounters of a red leg-banded egret (27F) during November 2005 through January 2006 on the Azores Islands, 3900 km off the east coast of North America (Weseloh and Moore 2008).

## Summary

Nineteen hundred Great Egrets were banded in Ontario and the New York waters of the Niagara River with field readable leg-bands or patagial wing-tags during the period 2001 – 2012 (inclusive). Thirty-four encounters of these egrets were received from an expanded winter period from October through March. Most encounters came from North and South Carolina but birds were recorded from New Jersey through to the Dominican Republic and Virgin Islands of the Caribbean.

We urge Ontario birders to keep watch for marked egrets; they will be returning to Ontario in the spring of 2014. Please report them to the lead author.

### Acknowledgements

We are very appreciative to the more than 100 observers who reported banded or wing-tagged egrets over the years, as well as to the dozens of volunteers who have assisted in banding egrets since 2001. Dan Clark, David Okines, Lesley-Anne Howes and Louise Laurin were especially helpful in the design and/or application of the wing-tags. Cynthia Pekarik and Tania Havelka developed the initial spreadsheets for tracking banding encounters. Louise Laurin provided the data from the CWS Bird Banding Office and answered our many questions. Jeffery Costa designed the map. Jack Hughes commented on an earlier version of this paper. This paper would not have been possible without all of the above team work.

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# A birding perspective and analysis of Hurricane Sandy in Ontario, Autumn 2012

*Brandon R. Holden and Kenneth G.D. Burrell*

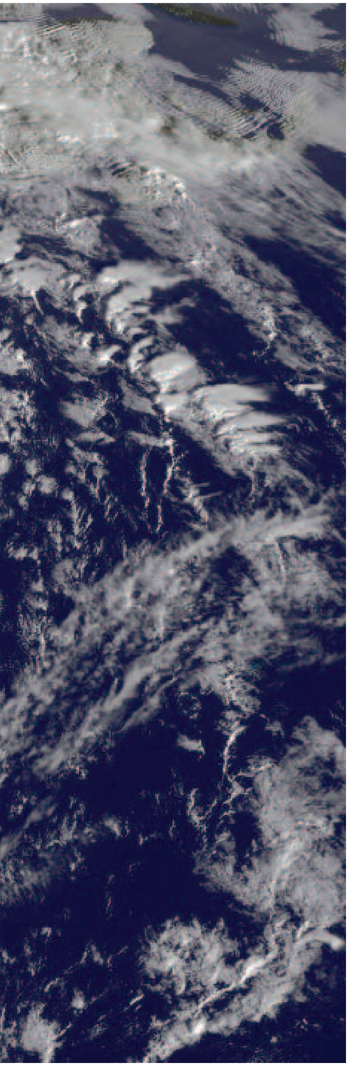

Figure 1. NOAA's GOES-13 satellite captured the visible image of post-tropical Sandy rolling inland Tuesday, 30 October 2012 at 6:02 AM EDT (Blake *et al*. 2013).

## Introduction

Hurricane Sandy was the largest Atlantic hurricane on record (since 1988, when reasonably accurate estimates of storm sizes began) to ever move up the eastern seaboard (Fig. 1; Blake 2013, Blake *et al.* 2013), displacing thousands of birds to the lower Great Lakes in the process (eBird 2013), some of which were unprecedented in their rarity.

The Global Forecast System was one of the first models to hint at the remote possibility that a remarkable weather event could affect the mid-Atlantic coast, around 29 October 2012. The prediction on 21 October 2012 of a 954 mb low pressure system seemed beyond reason, as it is well known that forecasting powerful systems far in advance is strewn with error in track and intensity (Leslie *et al.* 1998, Marks and Shay 1998). Eventually, however, the final outcome was one of the most remarkable meteorological and ornithological events in Ontario's history.

The purpose of this paper is to describe the events leading up to Hurricane Sandy (hereafter 'Sandy') and its aftermath as it passed through Ontario, from both meteorological and ornithological viewpoints.

## Meteorological History

What would eventually become Sandy was labeled as a tropical depression by the National Oceanic and Atmospheric Administration (NOAA) National Hurricane Center (NHC) at 1200 Coordinated Universal Time (UTC) on 22 October 2012, roughly 305 nautical milles south-southwest of Kingston, Jamaica (Blake 2013, Blake *et al.* 2013). The system organized fairly quickly and was deemed a tropical storm six hours later, receiving the name Sandy as the eighteenth named storm of the 2012 Atlantic hurricane season (Blake 2013, Blake *et al.* 2013).

Development of the system was gradual, progressing steadily. The NHC data indicated that Sandy became a hurricane at 1200 UTC on 24 October and made her initial landfall seven hours later in Jamaica as a 75kt category one hurricane (Blake 2013, Blake *et al.* 2013). As Sandy emerged over open water north of Jamaica, the storm intensified rapidly, reaching category three intensity just prior to her second landfall in Cuba (Blake 2013, Blake *et al.* 2013) (Fig. 2).

After weakening across Cuba, due to interaction with land, Sandy continued northwards into the Bahamas (Blake 2013, Blake *et al.* 2013). It was during this period, from 25 – 27 October, that a complex series of meteorological events began, setting the stage for the final track of Sandy. The interaction with a trough of cold air arriving from mainland North America provided energy in the form of baroclinic forcing and began processes associated with an extratropical transition, allowing Sandy's wind field to expand dramatically (Blake 2013, Blake *et al.* 2013).

Extratropical transition was incomplete and Sandy was able to maintain full tropical storm status (Blake *et al.* 2013). The complex series of events caused frontal structures to form within the

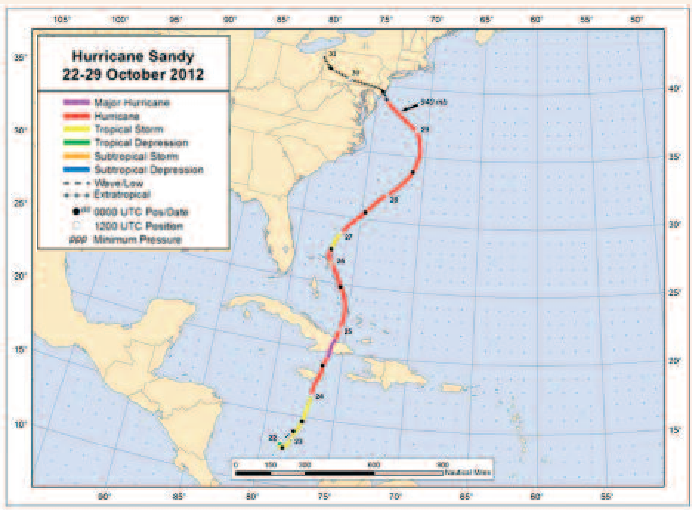


**Figure 2. The official storm track of Hurricane Sandy (Blake *et al.* 2013).**

## Ontario Meteorology Perspective

The remarkable events which took place over the Atlantic Ocean involving the movement and intensity of Sandy were well documented by meteorological experts around the world (Blake *et al.* 2013). The story in Ontario was easier to monitor by the authors as they examined data from stationary weather stations and provided personal field observations. A day by day breakdown is examined below:

**26 October 2012** – A warm southerly flow is pushing into Lake Ontario in the morning. To the west, an approaching trough (cold front) will provide the future fuel to turn Sandy into the powerful and devastating system it will become over the next few days.

**27 October 2012** – The cold front brings north or northwest winds from James and Hudson bays.

**28 October 2012** – The inversion of the trough, due to the anomalous blocking pattern over Atlantic Canada, coupled with the remarkable wind field of Sandy, are impacting Ontario.

**29 October 2012** – North-northwest to north-northeast winds intensify and the origin of the wind curves more to the northeast in the morning. The remarkably large wind field of Sandy is pushing east and northeast winds down the St. Lawrence Seaway and into southern Ontario (primarily Lake Ontario).

It is just after sundown on the 29th that Sandy is close to landfall near Atlantic City, New Jersey. It is around this time that Sandy loses her tropical characteristics. The NHC cyclone away from the centre (Blake 2013, Blake *et al.* 2013). Hurricanes typically do not show these features, giving Sandy the appearance of a hybrid system (Blake 2013, Blake *et al.* 2013).

Sandy continued to grow in size as the cyclone moved northwards from Bermuda to North Carolina (Blake 2013, Blake *et al.* 2013). On 29 October, Sandy reached an anomalous blocking pattern (high pressure) in the North Atlantic (Blake 2013, Blake *et al.* 2013); perhaps the defining moment from an Ontario birding standpoint, causing a highly unusual change in wind direction to the north and then northwest as Sandy began her final course towards the coast of New Jersey. This blockage allowed a second trough over the southeast US to provide a notable boost to the baroclonic forcing of energy into the cyclone (Blake 2013, Blake *et al.* 2013). This change in direction moved Sandy again over warm Gulf Stream waters allowing her to intensify to her secondary peak of an 85kt category two hurricane on 1200 UTC 29 October 2012 (Blake 2013, Blake *et al.* 2013).

Over the next several hours, Sandy began to transition to an extratropical cyclone once again. This time the process was accelerated by the additional injection of cold air and cooler water near the coast of New Jersey (*i.e.* to the west of the Gulf Stream; Blake 2013, Blake *et al.* 2013). When only 45 nautical miles northeast of Atlantic City, New Jersey, the NHC declared Sandy a fully extratropical system at 2100 UTC on 29 October (Blake 2013, Blake *et al.* 2013). Post-tropical cyclone Sandy made her final landfall at 2330 UTC in New Jersey with an estimated intensity of 75kt winds (Blake 2013, Blake *et al.* 2013).

Sandy weakened steadily and moved slowly west-northwest to north before losing a defined centre over northeast Ohio around 1200 UTC on 31 October (Blake 2013, Blake *et al.* 2013). Following this event, the remnants of Sandy moved northwest to northeast over Ontario in the days before eventually merging with a low pressure system over eastern Canada (Fig. 2; Blake 2013, Blake *et al.* 2013).

declares Sandy a post-tropical cyclone, though still remarkable in terms of her size and strength.

**30 October 2012** – As the core of the system continues to move closer to Ontario, winds intensify throughout the night and a remarkable north-northwest to northeast wind greets observers at various lake watching sites around southern Ontario. Now that Sandy is post tropical, she is weakening steadily. A frontal boundary that formed days ago over the Atlantic Ocean inside Sandy is at the far reaches of eastern Lake Ontario early in the morning. By late morning, the boundary has pushed across Lake Ontario to Hamilton. The shift is marked by an increase in precipitation and a shift in winds to the east-northeast noted by observers at Van Wagners Beach. Winds are now blowing to all of Lake Ontario directly from the Atlantic Ocean in an area roughly from Massachusetts to Long Island, NY (Fig. 3, Blake *et al.* 2013, *see page 16*).

**31 October 2012** – The weak remnant core of post tropical Sandy slowly passes over eastern Lake Erie and western Lake Ontario throughout the day. Winds are light and variable.

**1 November 2012** – The remnants of Sandy have pushed north through southern Ontario, and the back of the storm produces powerful west-northwest winds, squalls and cooler temperatures.

**2 November 2012 and onwards** – Northwest winds persisted for days following the passage of the system.

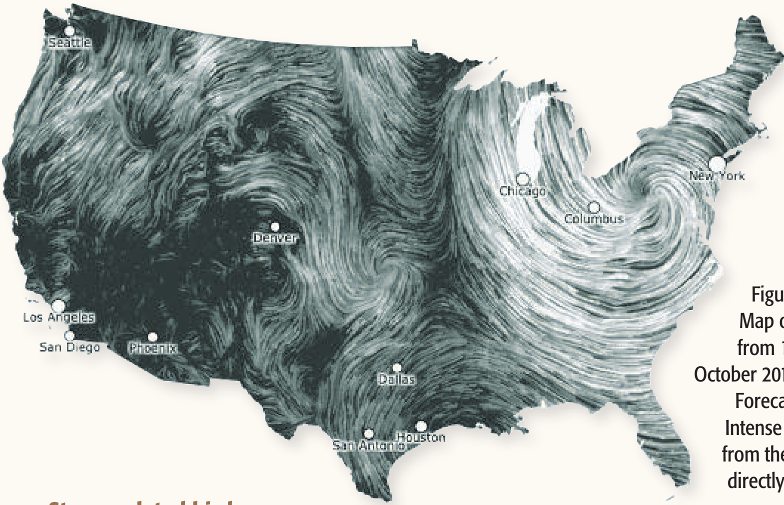


Figure 3. CONUS Wind Map of Hurricane Sandy from 11:59am EST on 30 October 2012 (National Digital Forecast Database 2012). Intense winds are blowing from the eastern seaboard directly into Lake Ontario.

## Storm-related birds

Sandy displaced thousands of birds from the Atlantic Ocean as well as birds from the Arctic (eBird 2013). A summary of select notable species observed throughout Sandy's displacement are provided below, as per OntBirds, eBird (2013), Cranford (2013) and Mackenzie (2013).

**Brant** *(Branta bernicla)*

Exceptional numbers were found on lakes Huron, Erie and Ontario, with places like Sarnia and Long Point recording local record high counts.

A record high count of 220 was recorded at Long Point on 30 October.

**Wilson's *Storm-Petrel*** *(Oceanites oceanicus)*

- one, 30 October, Van Wagners Beach (Robert Z. Dobos *et al.*)

**Leach's Storm-Petrel** *(Oceanodroma leucorhoa)*

- one, 30 October, Thickson Point (Glenn Coady)
- one, 30 October, Van Wagners Beach (Fig. 4, David R. Don *et al.*)

**Storm-Petrel sp.** *(Hydrobatidae sp.)*

- one, 30 October, Van Wagners Beach (Brandon R. Holden *et al*.)

**Black-legged Kittiwake** *(Rissa tridactyla)*

Impressive numbers were observed throughout southern Ontario at multiple locations on lakes Huron, Erie and Ontario, with minimum high counts listed below:

- 88, including two second basic (the rest first basic/first winter), 30 October, Van Wagners Beach (Fig. 5, m. obs.)
- 16 (all first basic/first winter), 1 November, Fort Erie (Waverly Beach, m. obs.)

**Ross's Gull** (*Rhodostethia rosea)*

- one adult, 1 November, Waverly Beach (Kenneth G.D. Burrell *et al.*)

**Laughing Gull** *(Leucophaeus atricilla)*

- one adult, 30 October, Thickson Point (Glenn Coady)

**Figure 5. Black-legged Kittiwakes (*Rissa tridactyla*) at Van Wagners Beach on 30 October 2012.**
*Photo: Brandon R. Holden.*

**Pomarine Jaeger** *(Stercorarius pomarinus)*
Similar to Black-legged Kittiwakes, impressive numbers were observed throughout southern Ontario at multiple locations on lakes Huron, Erie and Ontario, with minimum high counts listed below:

- ten, 30 October, Van Wagners Beach (m. obs.)
- seven, 1 November, Waverly Beach (m. obs.)

**Long-tailed Jaeger** *(Stercorarius longicaudus)*

- one, 30 October, Van Wagners Beach (m. obs.)
- one sub-adult, 1 November, Long Point Tip (Stuart A. Mackenzie and Adam Timpf)

**Razorbill** *(Alca torda)*

- one, 30 October, Thickson Point (Glenn Coady)

While the above species list identifies exceptional or record high numbers of interesting species observed during Sandy, numerous other interesting species or record counts were recorded throughout this event. Gyrfalcon (*Falco rusticolus*), Sabine's Gull (*Xema sabini*), Forster's Tern (*Sterna forsteri*) and many other species, most notably waterbirds, were recorded in higher than normal numbers, most likely attributed to Sandy (eBird 2013).

Numerous Cave Swallows (*Petrochelidon fulva)* were recorded throughout southern Ontario and upstate New York (eBird 2013); however, a previous system occurring just prior to Sandy was the most likely culprit in pushing birds north into the region. Several other interesting and unusual species were noted for which documentation by the Ontario Bird Records Committee has yet to review; these birds are not listed above.

## Discussion

Prior to the arrival of the storm, Holden postulated the potential impacts Sandy could have on avian migration and vagrants into southern Ontario. The basic premise was that migrants and vagrants would occur from the direction of origin of the wind field impacting an area. As the storm progressed, the impacts would compound as new and stronger winds directed birds to southern Ontario from different locations. They were informally dubbed Phases 1, 2, 3 and 4. A brief overview is presented below:

**Phase 1:** Initially strong north winds associated with a trough of cold air would draw migrants and potential vagrants southwards (*i.e.* from James Bay) into the southern Great Lakes region.

**Phase 2:** As the centre of the storm approached, the counter clockwise motion of the cyclonic storm would then bring northeast winds into southern Ontario and potentially birds from the St. Lawrence Seaway and nearby areas.

**Phase 3:** An unusual frontal boundary-like feature was present within Sandy. As the remnants of Sandy pushed closer to Ontario, somewhat resembling a "back door warm front", winds came directly from the east coast of the US into southern Ontario (specifically Lake Ontario).

**Phase 4:** If any birds were trapped within the eye (or remnant core), the passage of this portion of the storm (and any accompanying southerly winds) could displace them.

Beyond the predicted Phases, it was also noted that storm conditions at any time led observers to detect noteworthy birds that were already present in a given area which were now simply concentrated or reshuffled allowing for them to be recorded. An analysis of vantage points, weather and bird observations are presented below. An attempt was made to compare popular vantage points for lake watching among the three Great Lakes directly affected by the winds of Sandy in southern Ontario. The locations used are:

- Lake Ontario – Van Wagners Beach and Niagara-on-the-Lake.
- Lake Huron – Point Edward Lighthouse.
- Lake Erie – the tip of Long Point and Waverly Beach (Fort Erie).

**28 October:** Holden spends several hours lake watching at Van Wagners Beach, with notable sightings being single flocks of Brant and Sanderling (*Calidris alba*) (Fig. 6). These sightings correlate to the effects of Phase 1.

**29 October:** powerful north-northwest to north-northeast winds occur throughout Ontario. Observers stationed at the tip of Long Point had few notable sightings; observers stationed at Van Wagners Beach, including Holden, remarked at the general lack of interesting observations before 10 Black-legged Kittiwakes were recorded from mid-afternoon to dusk (pers. obs.). This is contrasted by observers at the Point Edward Lighthouse who had a notable day with sightings of Brant, Black-legged Kittiwake, Red Phalarope (*Phalaropus fulicarius*), Parasitic Jaeger (*S. parasiticus*) and Franklin's

Gull (*L. pipixcan*). These observations indicate that the effects of Phase 1 were being felt at all locations around southern Ontario; and that the effects of Phase 2 were likely beginning to be felt on Lake Ontario by mid- to late-afternoon.

**30 October:** powerful north-northwest to north-northeast winds continued in the morning; however, they eventually shift northeast by mid-morning. The remnant core of Sandy was much closer to Ontario than the previous day and many observers around southern Ontario reported remarkable numbers and exciting vagrants; including record high counts of Black-legged Kittiwakes. This was likely attributed to the continuing and compounding effects of Phases 1 and 2 at all vantage points. Perhaps the most notable observations of Sandy occurred on this day, as multiple Leach's Storm-Petrels were reported on Lake Ontario as well as a single Wilson's Storm-Petrel (Cranford 2013). The observations of storm-petrels strongly correlate with the passage of an abnormal frontal-boundary feature within Sandy — bearing some resemblance of a "back door warm front". The passage of this feature came with a change in wind direction from north-northeast to east-northeast at Van Wagners Beach, less than an hour prior to the first sighting of a Leach's Storm-Petrel. This is strongly linked to the beginning of Phase 3 and also indicates why these species were not recorded at stations on lakes Erie or Huron this day (which stayed within the effects of Phase 2).

**31 October:** the enlarged and weakening core of the system occurred over a large area of southern Ontario. Large numbers of observers took to the field in hopes of relocating the remarkable birds recorded on 30 October, yet few were successful. Sightings such as Brant at Point Edward and the tip of Long Point would have been quite notable in any given year, but paled in comparison to numbers recorded the previous day. If any birds were to occur in Ontario under the effects of Phase 4, the passage of this feature over lakes Erie and Ontario would have made it the ideal location to drop any noteworthy individuals.

**1 November:** the core of the system was pulling away from Ontario, and powerful west-northwest winds pushed through southern Ontario. This dramatic change in direction meant that locations previously watched vigorously (*i.e.* Van Wagners Beach and the Point Edward Lighthouse) were either unmanned or did not produce sightings of note. The authors moved to Waverly Beach in Fort Erie believing it would be the best location to record birds associated with Phase 4. While no species were recorded that would be associated with displacement in this manner, a number of remarkable birds were recorded, the most notable being an adult Ross's Gull (Cranford 2013). The lingering effects of Phases 1 through 3 were well recorded with continued sightings of Brant, Black-legged Kittiwake and Pomarine Jaeger among other species both at Waverly Beach and by observers stationed on Lake Ontario at Niagara-on-the-Lake (Fig. 5, eBird 2013).

## Conclusion

Sandy had the largest wind field ever recorded (since 1988, when reasonably accurate estimates of storm size began) for a hurricane in the Atlantic Basin (Blake *et al.* 2013). The abnormal northwest turn in Sandy's track brought her ashore and provided a remarkable learning experience for amateur ornithologists, demonstrating how large storm systems can displace various bird species. The predictions made by Holden prior to the storm's arrival and the observations made by dozens of individuals throughout southern Ontario have increased our understanding of how to detect storm driven waifs and migrants alike. Many climate scientists believe that human-influenced global warming will lead to increased size and intensity of storms felt in North America, including hurricanes (Emanuel 2005, Anthes *et al.* 2006, Bender *et al.* 2010). If these predictions are realized, continued study of the effects these storms can have on avifauna will be a significant focal point for amateur ornithologists in Ontario and beyond.

Figure 6. Sanderling (*Calidris alba*) at Van Wagners Beach on 28 October 2012, attributed to the effects of Phase 1. *Photo: Brandon R. Holden.*

### Acknowledgements

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# Unusual mortality of a juvenile Double-crested Cormorant

*Barry Kent MacKay and Ross D. James*

Figure 1. The head of the dead juvenile Double-crested Cormorant (determined to be female) found near Middle Island, Lake Erie, 2 August 2012. *Photo: Barry Kent MacKay*

**A juvenile Double-crested Cormorant** (*Phalacrocorax auritus*) was found dead, floating in shallow water 10 – 20 m from the south shore of Middle Island, western Lake Erie, Ontario (41º 40' 54" N, 82º 40' 54" W) on 2 August 2012 (by BKM). It was very freshly dead, with the eye and colouring of the soft parts appearing normal, rigor mortis only just setting in (Fig. 1). The bird was fully feathered, but with bases of the contour and wing feathers still showing sheaths. Based on the feathering, the bird was estimated to be about 7 weeks of age, and appeared capable of flight based on the size and development of the wing feathers. The bird was emaciated; the wasted flight muscles and prominent sternum were noted immediately.

The bird was prepared as a study skin the following day, and the body was dissected (by BKM) to try to determine why it was so rigid from end to end. Astonishingly, within the gut, extending from the clavicles to the vent, was a 27 cm long partially digested and probably previously desiccated outer wing of another cormorant.

Figure 2. The tightly folded, 27 cm long, outer wing of a Double-crested Cormorant, removed from the gut of a freshly dead Double-crested Cormorant, found near Middle Island, Lake Erie, 2 August 2012.

It consisted of the radius and ulna (now bare of muscle tissue) and the primary wing feathers and at least some secondary feathers and wing coverts, still attached to the bones, all tightly folded together (Fig. 2). The wrist of this outer wing was at the anterior end of the gut (near the clavicles), while the tips of the primary feathers were barely visible at the vent. This swallowed part of a wing was only about 1 cm shorter than the wing of the now dead bird.

## Discussion

The cormorant colony on Middle Island had been subjected to a major cull of birds in late April of 2012, in the final year of a five year cull by Parks Canada. Middle Island is part of Point Pelee National Park. Dead cormorants littered the ground at the time this juvenile bird was found. When birds decompose and dry in the sun, wings often separate at the joints, but at least some wing feathers, particularly the longer primaries, typically remain strongly attached to the end of the wings (pers. obs.). A number of such desiccated outer cormorant wings were seen on Middle Island when BKM boated near the island on 2 August. They would certainly have been available to the juvenile bird. Inexperienced and probably hungry, this bird apparently found and consumed one of the desiccated partial wings. As the desiccated wing part was probably already fairly tightly compressed, the bird managed to get it down, but was unable to subsequently regurgitate it, filling and blocking its digestive system, and subsequently dying of starvation or by drowning.

Double-crested Cormorants are readily able to swallow intact elongate objects, although they would ordinarily be flexible. Prey lengths of 30.5 cm and 41.5 cm have been reported (Hatch and Weseloh 1999). They do not seem to be bothered by swallowing things that may be rather rough on the surface, such as various crustaceans or fish with spiny fins. It is perhaps not too surprising that this bird undertook to swallow a longer object. However, that it was able to force this unusual item through and apparently straighten out the entire digestive system seems remarkable.

Cormorants usually eat almost entirely fish, taking a wide variety, though they will opportunistically take aquatic insects, amphibians and crustaceans in small numbers. Almost all their prey is obtained in the water, usually under water and in shallower water closer to shore. Only very rarely have they been known to take such things as a snake or a vole (Hatch and Weseloh 1999). The choice of a desiccated outer wing is certainly unusual, but may have been facilitated by availability of the object, possibly floating in the water, and motivated by hunger. But, why was the wing not regurgitated, even if it was retained for a time to digest any remaining meat on the bones? Cormorants routinely regurgitate fish to feed their young and to be rid of pellets of fish bones and crustacean exoskeletons. And, if disturbed, easily regurgitate food. Regurgitation is generally easy for birds (Terres 1980). However, the stomach would normally act to contain any indigestible parts, or partially digested food, that is readily emitted from there. But, in this cormorant, the swallowed stiff outer wing was forced right through the entire digestive tract. The long primary wing feathers forced to the very end of the digestive tract were not apparently removable through regurgitation, something that would normally be a reflex of only the stomach and oesophagus.

There may have been some desiccated meat remaining on the bones of the partial wing. Any remaining such digestible parts would have been toward the bend of the wing, swallowed in such a way as to be at the front end of the living bird. When swallowed far enough for the bend of the wing to reach the stomach, the bird was apparently unable to reverse the process and eject the remains. Had the wing been swallowed the other way around with the thick end first and not forced beyond the stomach, perhaps this young bird might have ejected this peculiar attempt at a meal.

Survival of first year cormorants tends to be rather low (Hatch and Weseloh 1999). Starvation probably is a significant cause of mortality in young cormorants as it is among many species of birds (Newton 1980). Scavenging is apparently not ordinarily found among Double-crested Cormorants. The abundance of decomposing fish in colonies, for example, suggests that regurgitated prey is seldom, if ever, reswallowed. However, to a starving young bird such a thing may become an option, and a very hungry bird with no other options apparently considered a very unusual sort of meal, one that ended its life.

**Acknowledgements**

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*The most productive wetland habitat for marsh-nesting bird species is the hemi-marsh, a combination of emergent vegetation and open aquatic areas with submergent and floating vegetation.*

# An association between marsh-nesting obligate bird species and submergent vegetation in lower Great Lakes coastal wetlands

*Daniel Rokitnicki-Wojcik, Greg Grabas and John Brett*

## Introduction

Great Lakes coastal wetlands are areas of high diversity of flora and fauna and many studies have explored the relationships between the extent and/or types of vegetation and the quality of marsh bird communities (Steen *et al.* 2006, Peterson and Niemi 2007, Grabas *et al.* 2008). These wetlands support over 150 breeding bird species (Howe *et al.* 2007) including a number of species at risk such as King Rail (*Rallus elegans*), Least Bittern (*Ixobrychus exilis*) and Yellow Rail (*Coturnicops noveboracensis*). Floristically, coastal marshes are complex systems with different zones that are based on species' varying tolerances to water. These zones can be organized from lake to upland as follows: submergent, floating, emergent, meadow, and shrub (Environment Canada 2002, Simon and Stewart 2006). The most productive wetland habitat for marsh-nesting bird species is the hemi-marsh, a combination of emergent vegetation and open aquatic areas with submergent and floating vegetation (Gibbs *et al.* 1991, Crewe *et al.* 2006, Rehm and Baldassare 2007). Submergent and floating vegetation are primarily used by wetland birds for foraging but also for nesting and refugia (Sandilands 2005, Steen *et al.* 2006). The recent decline in populations of wetland obligate bird species (Tozer 2013) and historical loss of coastal wetlands in the Great Lakes basin (Snell 1987, Ducks Unlimited Canada 2010) has resulted in efforts to monitor the status of this guild and determine the factors that contribute to their distribution and abundance.

Submergent and floating vegetation at Big Creek National Wildlife Area *(Photo: Canadian Wildlife Service – Ontario).*

Marsh-nesting obligate bird species (hereafter marsh-nesting obligates) comprise a guild that depends on emergent vegetation and hemi-marsh habitat for nesting. This guild is a key indicator of the condition of the overall health of marshes in the region because their abundance is negatively associated with anthropogenic disturbance (EC and CLOCA 2004, Grabas *et al.* 2008). Past studies have illustrated relationships between the ecological condition of submergent vegetation communities and breeding marsh bird communities using indices of biotic integrity in Lake Ontario coastal wetlands (Grabas *et al.* 2012, CWS-ON unpub data).

In addition, positive relationships have been reported between the abundance of marsh birds and the quality of vegetation communities in coastal riverine wetlands in the upper Great Lakes and lakes Superior and Michigan (Peterson and Niemi 2007). The objective of this study was to determine whether there is a relationship between a component of the bird community and a component of the vegetation community; namely, the abundance of marsh-nesting obligates and the percent cover of submergent and floating-leaved vegetation at a regional scale in coastal wetlands of the lower Great Lakes (Fig. 1).

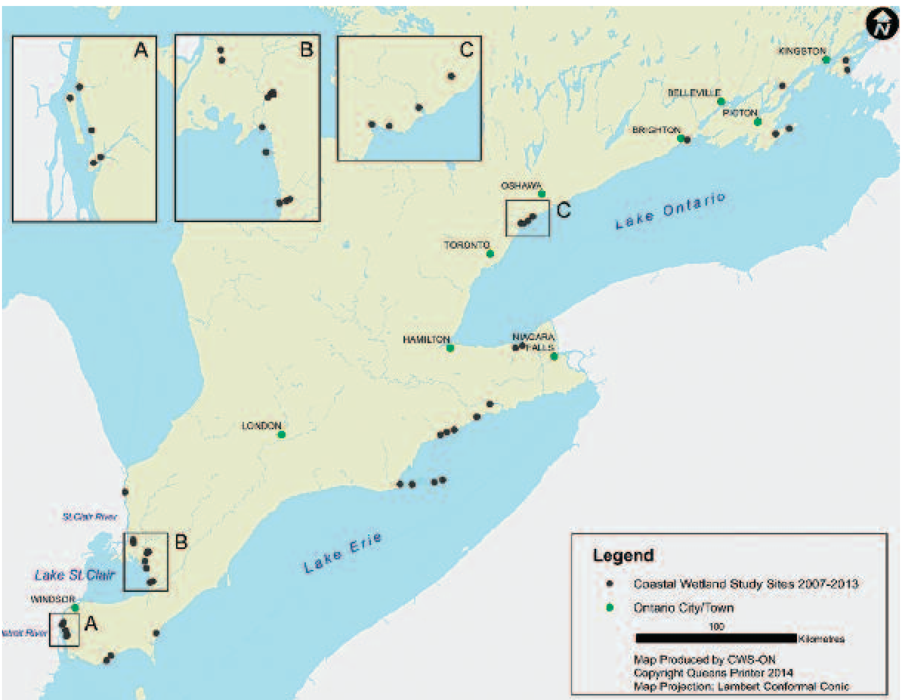



Figure 1: Coastal wetland study sites from 2007-2013 that were included in the analysis (Site names can be found in Table A1, Appendix 1).

Table 1. Marsh-nesting obligate birds identified in this study. Asterisks denote species targeted using call broadcast.

| COMMON NAME | SCIENTIFIC NAME |
| --- | --- |
| Pied-billed Grebe* | *Podilymbus podiceps* |
| American Bittern | *Botaurus lentiginosus* |
| Least Bittern* | *Ixobrychus exilis* |
| Virginia Rail* | *Rallus limicola* |
| Sora* | *Porzana carolina* |
| Common Gallinule* | *Gallinula galeata* |
| American Coot* | *Fulica americana* |
| Black Tern | *Chlidonias niger* |
| Forster's Tern | *Sterna forsteri* |
| Marsh Wren | *Cistothorus palustris* |
| Swamp Sparrow | *Melospiza georgiana* |
| Yellow-headed Blackbird | *Xanthocephalus xanthocephalus* |

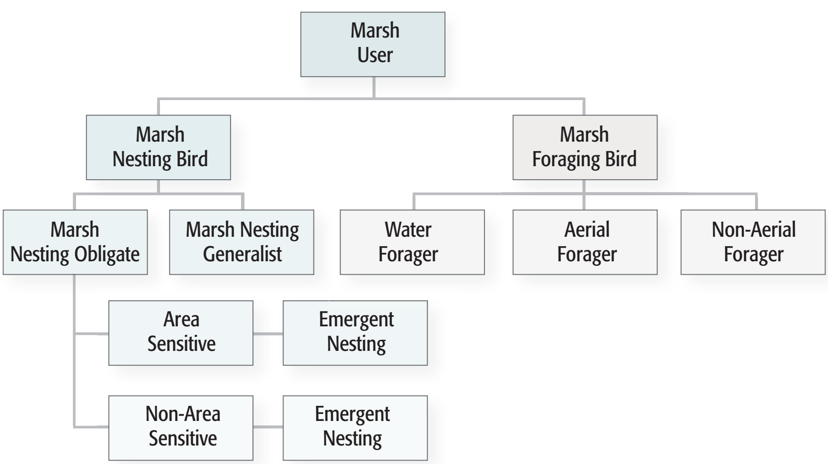
Common Gallinule at Mitchell's Bay, Lake St. Clair.
*Photo: Denby E. Sadler*

## Methods

Marsh bird and submergent vegetation data from 41 coastal wetlands (Table A1 in Appendix 1) were compiled from surveys conducted during 2007-2013. Study sites were located along the shores of lakes Ontario, Erie, St. Clair and the Detroit and St. Clair rivers (Fig. 1). Sites were selected to include the full range of ecological conditions in coastal wetlands in the lower Great Lakes (CWS-ON 2012). Marsh birds were surveyed within 100m radius semicircular stations as per Great Lakes Marsh Monitoring Program protocol (Bird Studies Canada 2009). Where possible, stations were surveyed three times each year and were placed systematically throughout each wetland including throughout the interior following Meyer *et al.* (2006). Surveys included call broadcasts of especially secretive marsh obligate species to increase detections (Table 1). Marsh bird surveys were conducted during the May-July period. Marsh-nesting obligates in this study were based on those categorized by Meyer *et al.* (2006) and include area-sensitive and non-area-sensitive species that nest in emergent vegetation or hemi-marsh habitat (Fig. 2).

In each wetland, submergent vegetation was surveyed from a boat or canoe at 20 1m x 1m quadrats within the open water portion of the marsh. Quadrat locations were generated randomly prior to sampling and were located by GPS navigation. Within each quadrat, total percent cover (0-100%) and individual species percent covers (0-100%) were recorded for rooted floating and rooted submergent vegetation. Floating vegetation (*e.g.* pond lillies) was included in this analysis as it does not persist during winter but grows through the water to the surface each spring. Wetlands with extensive submergent communities are typically surveyed visually from above, and a rake is used to methodically sweep the water column, to collect and estimate the percent cover of species at different

**Figure 2: Categorization of marsh bird species for Great Lakes coastal wetlands (Grabas *et al.* 2008 [adapted from Meyer *et al.* 2006]).**



Identifying submergent plant species using a rake at Long Point NWA.
*Photo: Canadian Wildlife Service –Ontario.*

depths (Croft and Chow-Fraser 2009, Grabas *et al.* 2012). Care is taken when using a rake during surveys to limit disruption of the vegetation. Wetlands were sampled in July-August during maximal vegetative growth to capture the full extent of the submergent vegetation communities (EC and CLOCA 2004, Grabas *et al.* 2012).

Wetlands with complete data for both marsh birds and submergent vegetation were included in the analysis, which resulted in 80 wetland-years of data for 41 different wetlands (Table A1, Appendix 1). To investigate the relationship between submergent vegetation cover and marsh-nesting obligates, two variables were calculated for each wetland: the average maximum abundance (AMA) of marsh-nesting obligates and the average cumulative percent cover (CPC) of submergent vegetation species. A correlation was then calculated to determine the relationship between AMA and CPC. For descriptions of how the variables were created and other statistical details, please refer to Appendix 1.

## Results

The abundance of marsh-nesting obligates recorded per wetland ranged from one to 15 with an average of five across 41 coastal wetlands in the lower Great Lakes. Submergent vegetation cover at these same wetlands ranged from 2% to 173% with an average of 73%. Submergent

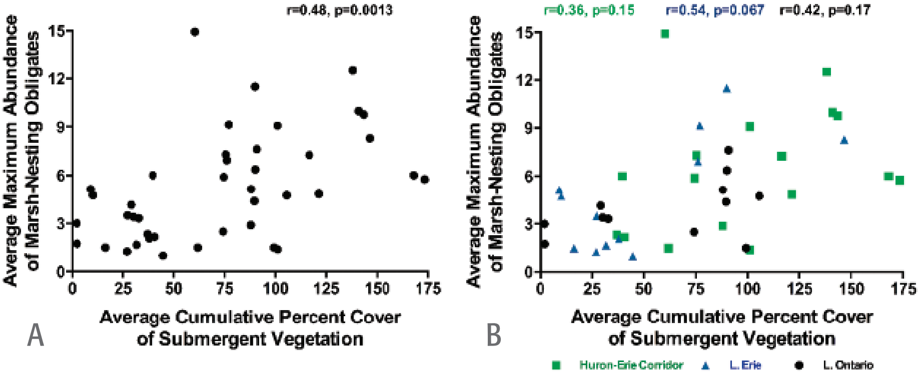



Figure 3. Average maximum abundance (AMA) of marsh-nesting obligates as a function of mean cumulative percent cover (CPC) of submergent vegetation for all of the data (A) and categorized by lake basin (B). Each data point represents a single coastal wetland (wetlands sampled in more than one year were averaged).

vegetation communities can occupy the entire water column; for instance, basal rosettes occupy the zone at the bottom, canopy species grow throughout, and floating species remain on the surface. Due to this stratification of submergent and floating vegetation at different depths, CPC was greater than 100% cover in many cases (x-axis, Fig. 3).

There was a significant positive relationship between AMA and CPC in 41 lower Great Lakes coastal marshes (r= 0.48, p<0.05) over the entire study period (2007-2013) (Fig. 3A). To account for the potential effect that larger wetlands may support greater abundances of birds, these data also were analyzed controlling for the number of stations (*i.e.* larger wetlands have more point counts). The significant positive relationship persisted when the number of stations was taken into account (r=0.47, p<0.05).

Analyzing the data by lake basin showed less agreement with the general trend, with the exception of wetlands along Lake Erie, which exhibited only a marginally significant positive relationship (r=0.54, p=0.067; Fig. 3B). Lake Ontario wetland data did not exhibit as large of a range in CPC values, with an upper limit near 100; although it did exhibit a great deal of variation in AMA at sites in the 80-105 CPC range (Fig. 3B).

The general relationships between marsh-nesting obligates and submergent vegetation presented above used a single averaged AMA and CPC value for a wetland over time (Fig. 3), however, over 70% of wetlands in the dataset were sampled in more than one year over the period of 2007-2013 (Table A1, Appendix 1). Repeating the analysis for each year and each year-lake combination separately did not yield any significant results with the exception of data collected in 2012. The 2012 data exhibited a significant positive relationship (r=0.69, p<0.05).

A representative wetland from each lake basin is presented in Fig. 4 and illustrates that generally, neither AMA nor CPC changed greatly from year to year for a given wetland. This consistency and relatively small variation over time provides some added confidence in the overall relationship presented in Fig. 3A, as each data point represents an average of the yearly data.

## Discussion

In this study, a significant positive relationship between the number of marsh-nesting obligates and the cover of submergent vegetation in coastal marshes in the lower Great Lakes is presented. Although many of the target bird species nest exclusively in emergent vegetation, the fact that the extent of submergent vegetation is related to their abundance is of particular interest. Marsh bird communities are affected by a number of factors such as emergent vegetation cover, wetland size and isolation, and urban and rural land uses. This study suggests that submergent vegetation cover may also be an important factor that influences the abundances of marsh-nesting obligate birds in the region. In addition, a sizable portion of the differences (*i.e.* variation) in the abundance of marsh-nesting obligates (20%) can be explained by the amount of submergent vegetation at a

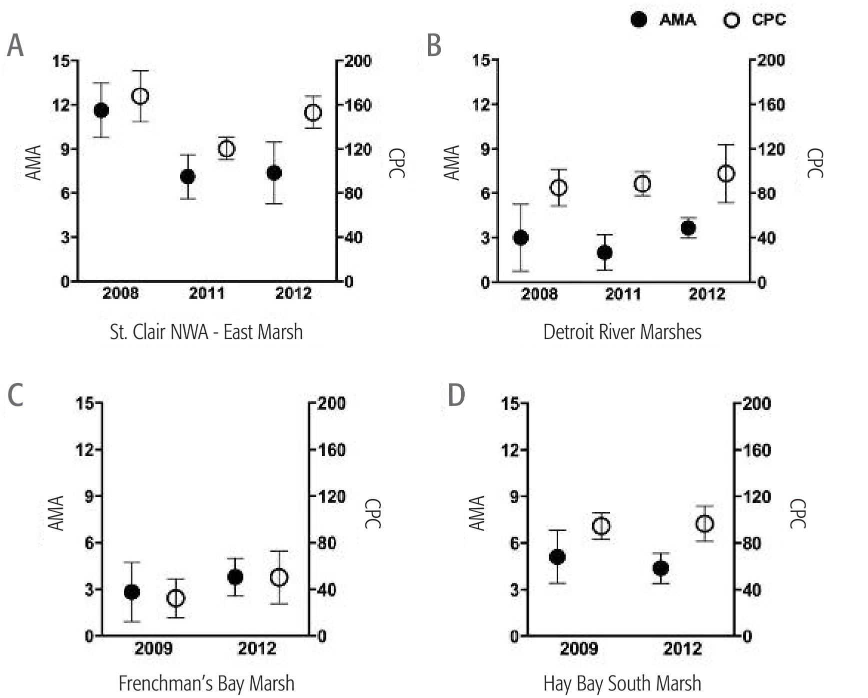



Figure 4. Regional examples (A-D) of the annual variation in average maximum abundance of marsh-nesting obligate birds (AMA) and mean cumulative percent cover of submergent vegetation (CPC) for wetlands with multiple years of data. Error bars represent the 95% confidence interval.

wetland. This is important because this study examined just the percent cover of vegetation and not the quality of this habitat, such as incorporating the number of native or pollution intolerant species. This is not to say that submergent vegetation drives bird communities, but simply highlights that the degree of cover of aquatic plants can provide a reasonable indication of the abundance of marsh-nesting obligate birds. There is still a great deal of variation in bird abundance that is not explained by submergent vegetation. It was not the purpose of this study to provide an exhaustive investigation into the factors that influence these communities but to use data that were available from wetland monitoring programs to identify an association with submergent vegetation. This study does however, provide some evidence that the existence of submergent vegetation may play a role in influencing how marsh-nesting birds select specific coastal wetlands for breeding and nesting. This has implications that managing wetlands for marsh birds should also include considerations for the submergent vegetation community.

Submergent vegetation may be an important habitat feature for marsh birds because it provides key habitat for common prey items such as aquatic macroinvertebrates, aerial insect larvae, amphibians and fish, and acts as a food source for herbivorous species such as Common Gallinule and American Coot who eat the vegetation directly. Submergent vegetation may also be used as nesting materials and refugia for young broods/fledgings. Sandilands (2005) identifies all of these uses in the species accounts for all of the focal species in the surveys (Table 1). In this study, it was shown that greater cover of submergent vegetation was related to higher abundances of marsh-nesting birds. It is likely that wetlands that can provide greater coverage of foraging habitat can support larger food sources and in turn sustain greater abundances of birds.

This study also illustrates that for some cases and scales, submergent vegetation cover may not be associated with the abundance of marsh-nesting obligates. For example, Tic Tac Point (TTP) on Lake St. Clair supports a large AMA and a variety of aquatic bird species in general (CWS unpub. data), but has relatively little CPC, which does not fit the general relationship presented in the study. Some wetlands such as TTP act as hotspots due to their size, local habitat availability or context in the landscape (*e.g.* proximity to a migration corridor or flyway) and have high conservation value. Conversely, at some disturbed sites such as Four Mile Creek on the Niagara Peninsula, submergent vegetation cover is high with few marsh-nesting birds. The submergent vegetation community at sites that support relatively few marsh-nesting birds may have a different composition and is perhaps less likely to support a faunal forage base. Wetland isolation and relatively low extent of emergent vegetation (*i.e.* nesting habitat) may also explain some instances where submergent vegetation cover is relatively high but there are few marsh-nesting birds. And so, although the general relationship presented between submergent vegetation and marsh-nesting obligates is noteworthy, there are likely other parameters

**Aerial view of submergent and floating vegetation within a 1m x 1m quadrat.**
*Photo: Canadian Wildlife Service – Ontario.*

or combinations of parameters at various scales (*e.g.* urban encroachment or extent of emergent habitat) that contribute more strongly to governing the abundances of this guild.

Few relationships were found at regional or annual scales with the exception of Lake Erie wetlands and the year 2012. The Lake Erie wetlands sampled may cover a more comprehensive range of habitat and bird community conditions (Canadian Wildlife Service - Ontario 2012) compared to other lake basins sampled, thus strengthening the observed AMA:CPC relationship. Similarly, the significant relationship observed in 2012 may be the result of a larger sample size because both the Huron-Erie Corridor and Lake Ontario wetlands were surveyed (providing more statistical power to detect the correlation), as opposed to only one lake basin in remaining years. Annual variability in climatic and hydrological conditions may have resulted in differences in the abundances of marsh-nesting birds (Timmermans *et al.* 2008). Continuing with regional assessments will provide data from a variety of hydrological conditions (*e.g.* high, low and stable water levels) to strengthen current marsh bird and habitat associations.

The extent of submergent vegetation cover is a function of light availability, substrate affinity, reproductive success, nutrients and level of physical disturbance from the elements (Lacoul and Freedman 2006). Coastal wetlands in the lower Great Lakes are impacted from nutrient and sediment run-off from urban and agricultural inputs, wind and wave action and are affected by wildlife such as Common Carp (*Cyprinus carpio*) and Mute Swans (*Cygnus olor*). All of these factors can lead to an impairment in the submergent vegetation community and limit its distribution in wetlands (Lougheed *et al.* 2001). Although this analysis does not provide any insight into the quality of the bird and plant communities, higher CPC and AMA values are generally associated with wetlands in better ecological condition (Canadian Wildlife Service - Ontario 2012, Grabas *et al.* 2012). This study has shown that the abundance of marsh obligate birds residing in lower Great Lakes marshes is related to the percent cover of submergent vegetation regardless of the size of the wetland. Further exploration into the relationships among submergent vegetation diversity and condition and various marsh bird community attributes beyond AMA could help to understand marsh bird habitat selection to a greater extent.

Submergent vegetation is also considered an essential component of hemi-marsh habitat. Wetlands with higher complexity at the interface of emergent and open water habitats have been shown to have higher diversity and abundances of both bird (Rehm and Baldassarre 2007) and invertebrate species (Schummer *et al.* 2012). Submergent vegetation typically occurs as part of the complex array of microhabitats in highly interspersed areas. A portion of the vegetation data collected in this study occurred within hemi-marsh habitat but was not distinguished from open water habitat. Quantifying the extent of this habitat type for these wetlands may be a key factor to investigate for future study.

In Lake Ontario, where water levels are regulated, submergent vegetation has been identified as a vegetation type of conservation concern for marsh-nesting birds that rely heavily on, and are adapted to, aquatic microhabitats (Steen *et al.* 2006). Regulated water levels have been linked to lakeward and inland expansion of cattail (*Typha* sp.) in Lake Ontario (Wilcox *et al.* 2008). Despite providing additional nesting area for emergent marsh-nesting obligates, including species at risk, cattails may reduce the extent of submergent vegetation. Peterson and Niemi (2007) reported that in coastal riverine wetlands of western lakes Michigan and Superior, the abundance of obligate wetland birds was positively associated with wetlands with a mix of vegetative types (*e.g.* submergent vegetation, emergents, shrubs, mud flats) but also with larger patches (*i.e.* area) of these types. Here it has been shown that in the lower Great Lakes, for a wider variety of wetland types (*e.g.* embayments, barrier beaches, drowned river mouths) that the extent of submergent vegetation in discrete samples is associated with an abundance of marsh-nesting obligates. Both Steen *et al.* (2006) and Peterson and Niemi (2007) have highlighted the importance of the extent and cover of aquatic vegetation to marsh-nesting birds regardless of location in the Great Lakes basin.

The abundance of marsh-nesting obligates and CPC are both important measures used to assess wetland condition basin-wide (Crewe and Timmermans 2005, Environment Canada and Central Lake Ontario Conservation Authority 2004, Grabas *et al.* 2008, 2012). The goal of this study was to investigate, in a general way, the relationship between this specific guild of marsh birds and submergent vegetation. Based on the positive association presented in this study, submergent vegetation should be included when managing wetlands for marsh bird communities. Continued assessments are required to fully understand the relationships among marsh birds, landscape and habitat attributes including submergent vegetation, and to continue to promote the conservation of these coastal systems in the Great Lakes basin.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## Appendix 1

**Table A1. Coastal wetlands included in the analysis presented from east to west by lake basin and alphabetically. Lake basins are denoted as follows: St. Lawrence River (SLR), Lake Ontario (LKO), Lake Erie (LKE), Detroit River (DR), Lake St. Clair (LSC) and St. Clair River (SCR). For analysis, SLR sites were included with LKO and the Huron-Erie Corridor (HEC) was comprised of DR, LSC and SCR sites.**

| Wetland Name | Lake Basin | Number of Years Sampled |
|---|---|---|
| Bayfield Bay Marsh | SLR | 2 |
| Button Bay Marsh | SLR | 2 |
| Big Sand Bay Marsh | LKO | 2 |
| Carruthers Creek Marsh | LKO | 2 |
| Duffins Creek Marsh | LKO | 2 |
| Four Mile Pond Marsh | LKO | 2 |
| Frenchman's Bay Marsh | LKO | 2 |
| Hay Bay South Marsh | LKO | 2 |
| Hydro Marsh | LKO | 2 |
| Jordan Station Marsh | LKO | 2 |
| Presqu'ile Bay Marsh | LKO | 2 |
| South Bay Marsh | LKO | 2 |
| Big Creek NWA - Impoundment Marsh | LKE | 1 |
| Cedar Creek Marsh | LKE | 1 |
| Dunnville Marsh | LKE | 2 |
| East Two Creeks Marsh | LKE | 1 |
| Fox Creek Marsh | LKE | 1 |
| Hickory Creek Mouth Marsh | LKE | 1 |
| Long Point NWA - Bluff Marsh | LKE | 2 |
| Long Point NWA - Boucks Pond Marsh | LKE | 2 |
| Long Point NWA - Thoroughfare Marsh | LKE | 2 |
| Nanticoke Creek Mouth Marsh | LKE | 2 |
| Selkirk Provincial Park Marsh | LKE | 2 |
| Wardells Creek Mouth Marsh | LKE | 2 |
| Canard River Marsh | DR | 3 |
| Canard River Mouth Marsh | DR | 1 |
| Detroit River Marshes | DR | 3 |
| Fighting Island Diked Marsh | DR | 1 |
| Turkey Creek Marsh | DR | 3 |
| Lake St. Clair Marsh | LSC | 3 |
| Mitchell's Bay Marsh | LSC | 3 |
| Moon Cove - Tic Tac Point Marsh | LSC | 3 |
| St. Clair NWA - East Marsh | LSC | 4 |
| St. Clair NWA - West Marsh | LSC | 1 |
| Roberta Stewart Marsh | SCR | 1 |
| Snye River Marsh | SCR | 3 |
| St. Clair NWA: Bear Creek Unit- - Maxwell Marsh | SCR | 3 |
| St. Clair NWA: Bear Creek Unit - OPG Marsh | SCR | 3 |
| St. Clair NWA: Bear Creek Unit - Snye Marsh | SCR | 1 |
| St. Clair NWA: Bear Creek Unit- Lozon Marsh | SCR | 1 |
| Stag Island | SCR | 2 |

### AMA and CPC Calculations

The AMA variable was calculated as the maximum abundance of marsh-nesting obligates. Marsh-nesting obligates observed using the marsh within the radius of a station (*i.e.* point count) were included in our analyses. Station abundance values were averaged to obtain a single value for a given wetland-year. In a given year, each wetland was visited three times and the maximum abundance refers to the visit with the highest average number of marsh-nesting obligates.

CPC was calculated as the sum of each individual species' percent cover observed within a quadrat. CPC was then averaged over the 20 quadrats sampled to obtain a single value for a given wetland-year. For each variable, site-level data were averaged where multiple years were available to obtain a single value for AMA and CPC for a wetland.

### Statistical Analyses

To meet the assumptions of normality for the statistical tests employed in the analyses, AMA was Log10 transformed and CPC was first standardized to range from 0-1, and then Arcsine square root transformed. Transformed variables did not significantly deviate from normality (Shapiro-Wilk, $p>0.05$). A Pearson correlation was performed to determine the relationship between the two variables. To control for the effect of wetland size on the abundance of marsh-nesting obligates, a partial correlation was conducted controlling for the mean number of stations (*i.e.* point counts) per wetland. The augmented Marsh Monitoring Program protocol (Meyer *et al.* 2006) does not limit the number of stations within a wetland granted they are sufficiently spaced and meet the survey requirements, and so the total number of stations can therefore be used as a proxy of wetland size. Spearman rank correlation was used to determine annual and/or regional relationships between AMA and CPC. This test was used because the sample sizes were small and the data did not meet the assumptions of normality even after transformation. Statistical analyses were conducted in Statistica (ver.12; Statsoft 2013) with significance reported at $p<0.05$.

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Black-billed Magpie. *Ann Brokelman*

# Black-billed Magpie Nesting at Ear Falls, Kenora District

*Ross D. James*

**The Black-billed Magpie** (*Pica hudsonia*) is a widespread species in western North America. While it has a history of vagrancy into Ontario dating back to 1771 (Forster 1772), any eastern expansion into the province from prairie habitats has been very slow. It was only in 1980 that nesting was first confirmed in the province (Lamey 1981, Coady 2007). These first nests were found near Rainy River in western Ontario, and in the first Breeding Bird Atlas (1981-1985) nesting was confirmed in only one northern block near Rainy River (Cadman *et al.* 1987). Most other breeding evidence came from nearby squares, plus sightings near Kenora and Dryden (six squares total). Twenty years later, during the second Breeding Bird Atlas (2001-2005), magpies had expanded their range considerably. Breeding evidence came from 39 squares, and the population was estimated to have increased ten-fold (Coady 2007).

Expansion was concentrated in the Rainy River area, as expected, and near Dryden, about 180 km to the northeast, where suitable open-country habitat had been created by farming activity. In addition to these two pockets of activity, birds were noted in four other squares north of Dryden along the Highway 105 corridor as far as Red Lake 150 km north, with breeding confirmed at Ear Falls and Red Lake (Cadman *et al.* 2007). This note presents information on the Ear Falls nesting, with evidence to indicate they may have been there for 15-20 years previously.

## Observations

Ear Falls lies about 60 km southeast of Red Lake on the north side of the English River near its exit from the west end on Lac Seul. The Ontario Hydro Generating Station at Ear Falls, about 4 km from Lac Seul, controls the level of water in Lac Seul and creates a sizable headpond above the dam close to town. I had an opportunity to visit the area on three occasions, May to July, 2002. Magpies were first noted from 18-22 May on the southeast side of town near the shores of the headpond. A pair was noted there each day making repeated visits to a Black Spruce (*Picea mariana*) tree. Watching from about 450 m away across the pond, nest building was suspected as they made repeated visits to the ground and back to the tree. One was finally seen carrying a stick across the pond to confirm my suspicions.

The area in which they were building was open woodland of White Birch (*Betula papyrifera*), Black Spruce and Balsam Fir (*Abies balsamea*) with a few taller White Pines (*Pinus strobus*) on the rocky Precambrian shore of the pond near the southern part of the town.

On 19 May a pair of magpies was seen about 4 km to the east near Goldpines. It is not known if this was a different pair, but that seems likely, given the persistent nest building activity near the falls.

On my return to Ear Falls on 7 June, I went to the tree where the bird had been seen building. A nest was visible, though barely, amid a dense tangle of spruce branches. It was about 8 m high adjacent to the trunk of the tree, some 2/3 the tree height. The tree was about 6 m from the edge of the headpond. There were six eggs in the nest (50º 38.15' N, 93º 13.25' W).

When I returned to the area on 16 July, there was a family group of magpies, presumably from this nest, just more than 1 km south, on the south side of the river below the dam. This noisy group of magpies was heard in that vicinity over the next several days.

## Discussion

In talking with two long-time residents of Ear Falls in 2002, they indicated that magpies had first moved into the area at least 15 years previously. The father of one of these two, Jake Ellis, has a cottage on Wenasaga Lake (about 8 km northeast of Ear Falls). Jake indicated that a pair had been in the Wenasaga Lake area intermittently, starting possibly as long as 20 years ago, about the time or shortly after the first Breeding Bird Atlas. Jake's father had found a nest on a small island in the lake near the cottage some years earlier. While there does not appear to be a large number of pairs around the town of Ear Falls, they have apparently found enough open habitat and food to persist for some time.

The Black-billed Magpie has done reasonably well in open farmlands of the Rainy River and Dryden areas (Elder 2006). Elder speculates that they may not move farther east, as there is insufficient farmland to host any population for a considerable distance to the east. They may also be physiologically ill adapted to more humid eastern climates (Bock and Lepthien 1975). However, if they were able to adapt to habitats other than farmland, perhaps there is less stopping them from adapting to more eastern areas. In the vicinity of Ear Falls, there is essentially no farmland. There is, however, a fairly constant supply of clearcut forest, as well as wide grassy hydro corridors, open woodlands on rocky terrain, and grassy places about homes and cottages.

However, another factor that may be strongly influencing their survival about Ear Falls is human activity. During summer, there is a copious supply of fish remains dumped on small shoals and islands in the English River and Lac Seul. This food is largely appropriated by a large population of Bald Eagles (*Haliaeetus leucocephalus*), but magpies were seen feeding on these remains at Goldpines. When fish remains are not available in winter, it is possible the birds fly farther south, or use the town dump, carcasses discarded by trappers, or possibly bird feeders, that continue to provide food. If magpies are able to adapt to this type of condition, they may well be able to move father east to towns along the Trans-Canada Highway. Corvids are among the most adaptable of birds.


### Acknowledgements

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# Encounter between Bald Eagles and a Horned Grebe

*Ed Poropat*

**On 7 February 2014**, Minden residents Joan Grant and Norm Thomas had a noteworthy experience involving a pair of Bald Eagles (*Haliaeetus leucocephalus*) and a very fortunate Horned Grebe (*Podiceps auritus*). The incident occurred about 4.7 km NNE of the village of Minden, near the north end of Minden Lake (44.962342° N, 78.693530° W).

During the late afternoon, Mr. Thomas looked out his back window to check on his dogs when he saw a dark object fall from the sky and land in his backyard. He looked up and saw an adult Bald Eagle circling the yard at a height of approximately 20 m. A second adult Bald Eagle sat perched in a tall elm tree at the edge of the yard, approximately 30 m from the house. After bringing his dogs inside, he returned to the window and observed both eagles circling over the yard. They circled three times before flying off. At that point, his partner Joan Grant, who is a local veterinarian, arrived home. As he relayed his story about the eagles, they noticed a dark head bobbing up and down in the snow where the object had fallen. At that point, they realized that there was a bird out there in the snow and that it was still alive!

Ms. Grant donned a pair of snowshoes and grabbed a blanket to check on the bird. There was a fresh layer of snow of approximately 10-15 cm blanketing a deeper, packed layer beneath of another 50+ cm. By the time Ms. Grant arrived at the location of the bird, it had made its way onto the surface of the snow and was awkwardly trying to escape. She noted that the bird had defecated where it had fallen and that there were traces of blood in the snow. As she approached the bird, she noted it was loon-like in shape, and recognized it as some type of grebe. The bird turned toward her, in defense, opened its bill squealing loudly, and spread its wings upon approach. She threw the blanket over the grebe and brought it to the house where she did a quick assessment to check for broken

**Figure 1: Horned Grebe found on driveway at Shuyler's Island, Horseshoe Lake, Haliburton County on 27 January 2014.** *Photo: Jon James*

limbs. After confirming that the bird seemed fine, she began thinking about releasing the bird back to open water. Ms. Grant identified the bird as a probable Horned Grebe.

With dusk quickly approaching, she took the grebe to an area of open water, at the outflow of Horseshoe Lake, approximately 1 km NE of her home. With the help of a neighbour, she took the bird down near the water's edge, opened the blanket, and released it into the open water where it quickly joined up with a flock of Mallards (*Anas platyrhynchos*). The grebe flapped its wings, appeared healthy and dove several times before darkness finally fell.

By 11 February 2014, I had received several forwarded emails about this amazing encounter and drove to Horseshoe Lake after work to verify the sighting. The Horned Grebe was no longer present at the release site, but a Red-necked Grebe (*Podiceps grisegena*) in basic plumage was observed there instead. Since any grebe species would be very rare in Haliburton County at this time of year, the author presumed the bird in question

*With such a harsh, cold winter, there was very little open water anywhere in the county, so waterfowl of any sort would be considered rare.*

had simply been misidentified and was actually a Red-necked Grebe. Also, no other grebes had been reported in the area within the month (eBird 2014). Ms. Grant was then asked to ascertain if any pictures were taken by her neighbour during the release in order to verify with certainty the species of grebe. Although no photos were taken, another interesting story surfaced instead.

On 27 January 2014, Dave Godward, a resident of Shuyler's Island on Horseshoe Lake, found and photographed a Horned Grebe in his driveway (Fig. 1) This location is about 3 kilometers NNE from the release site and about 2 kilometers away from the closest open water. He reported that the bird seemed unhurt but couldn't fly. He brought the bird indoors and tried to feed it but it expired four or five days later, a full week before the eagle encounter. When Ms. Grant saw the photos of this grebe, she felt it was the same species as the one she found in her yard.

With such a harsh, cold winter, there was very little open water anywhere in the county, so waterfowl of any sort would be considered rare. The fact that there were a possible 3 different grebes present within a 2 week period in midwinter is itself quite extraordinary. Both Red-necked Grebes and Horned Grebes are rare species in Haliburton County, especially in the winter. They are fairly regular migrants in the fall but are rarely observed past the middle of December. As mentioned previously, this has been a particularly frigid winter, causing huge portions of the Great Lakes to freeze. There is speculation that this freezing has encouraged some birds to move inland to areas of permanent open water, such as moving rivers. This winter, Red-necked Grebes have been reported in several locations in central Ontario including Washago, Coboconk, Bobcaygeon, Peterborough, and Orillia (eBird 2014). Horned Grebes have not been reported nearly as often in central Ontario, preferring the expansive waters of Lake Ontario to winter on. The only records in February are from Peterborough, Orillia, and Barrie (eBird 2014).

Bald Eagles are becoming more common every year in Haliburton County, especially during the winter. Eleven were reported on the Minden Christmas Bird Count on 14 December 2013 (National Audubon Society 2014). They are frequent visitors to the local landfills, and

Bald Eagles are largely scavengers, but are capable of hunting down ducks, geese and other waterbirds, usually by employing a combination of stoop-and-pursuit (Dunne 2006). They have been recorded preying on grebes including both Horned and Red-necked Grebes (Knight *et al.* 1990).

appear to have lots of scavenging possibilities, especially with the healthy deer populations. As expected, they are most often observed near open water. The area below the Minden Wild Water Preserve, at the north end of Minden Lake, remains open even in the coldest of winters because of the strong current. It is likely that these eagles were hunting in this area and managed to flush and grab the grebe or to snag it from the surface of the water. From here, it would be a flight of about 500 m to the yard where they dropped the bird. It is not known why the grebe was dropped or why the eagles did not return to gather their prey, although the dogs in the yard may have played a role. No information on Bald Eagles dropping live prey could be found (Buehler 2000).



## Acknowledgments

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# Dry land nesting of Ring-billed Gull in Simcoe County

*Peter Wukasch*

Figure 1. An adult Ring-billed Gull at a late season abandoned egg/nest, 23 June.

*Photo: Tim Antonio*

**On the afternoon** of 22 June 2013, I noticed a large flock of very vocal adult Ring-billed Gulls (*Larus delawarensis*) circling over a dry weeded field near the corner of County Road 88 and S.R. 10 of Bradford-West Gwillimbury in Simcoe County. I parked nearby and was surprised to find a sizable colony of nesting gulls (Figs. 1 and 2). The purpose of this short note is to document the details of this unusual sighting.

The colony was located on the eastern edge of a weeded field just north of a CIBC Bank parking lot and west of an extended Walmart parking lot. It was bounded by S.R. 10 on the west side of the bank parking lot. A small storm-water pond and the eastern edge of a Petro-Canada Station were at the southern limit of the colony. The entrance road to the Walmart was on the eastern boundary and an earthen berm was to the north.

The only body of water nearby was the small storm-water pond to the south of the colony where several adults and three chicks were feeding/swimming. There was a broken wire fence line which partially separated the colony from the bank parking lot on the south side, but was not intact enough to provide any protection from predators. The colony itself extended west from the Walmart access road approximately 100 m to an area of denser vegetation and north approximately 60 m to where the earthen berm was located. The site was sparsely vegetated with Chicory (*Cichorium intybus*), Viper's Bugloss (*Echium vulgare*), and patches of Coltsfoot (*Tussilago farfara*) and some grasses. The nests seemed to be concealed mostly among the Coltsfoot patches. The land appeared to have been owned by a commercial developer and seemed likely to be built upon at a future date.

**Figure 2. A telephoto view of the dry land Ring-billed Gull colony.** *Photo: Tim Antonio*

Figure 3. A newly hatched Ring-billed Gull chick.
*Photo: Tim Antonio*

Initially I estimated over 200 birds but was only able to observe 8–10 occupied nests, although there were at least that many flightless chicks wandering among the adult birds (Figs. 3 and 4). When I returned to the colony the next morning, to make a more accurate census, I counted at least 300 adult birds and 30 nests with incubating birds, as well as 40 chicks in various stages of development. One recently hatched chick was found dead in the bank parking lot as well. There were also four adult Herring Gulls (*L. argentatus*) perched on the earthen berm at the northern edge of the colony.

This nesting site was unusual due to the lack of any local large water bodies and the close proximity of a very busy commercial development. Cook's Bay on Lake Simcoe is at least 12 km northeast as the gull flies, and the West Holland River is half that distance to the east. There were two larger storm water ponds within 1–1.5 km of the site and there were large tilled fields frequented by large flocks of gulls. In addition, there were quite a few nearby fast-food establishments, so there was a ready food supply.

Figure 4. Three Ring-billed Gull chicks about three weeks old.
*Photo: Tim Antonio*

***Eds. Note:***
*David Hussell advised us that a dry land colony of Ring-billed Gulls existed for several years at the Townsend sewage lagoons. It was located on the intersection of berms separating the four lagoons. In that case, however, there was limited water adjacent to the site.*

The choice of this "dry land" nesting is a good example of the adaptability and opportunism of Ring-billed Gulls in choosing a breeding site, especially in such a vulnerable location. It seems that this site might also be subject to easy predation because it was so visible and open. In fact, on one return visit to the colony, I observed adult gulls strafing a Red-tailed Hawk (*Buteo jamaicianis*) which was dining on an immature gull in the midst of the colony. It also represents an interesting addition to the breeding avifauna of the Town of Bradford West Gwillimbury since the literature does not indicate any previous colonies in the area.

Thanks to Tim Antonio for his documenting photographs.

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# Ontario Field Ornithologists

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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 Doug Woods. Comments or questions can be directed to OFO by e-mail (ofo@ofo.ca).

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