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ARTICLES

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Common Terns *Photo: Saul Bocian*

Colonial Waterbird Populations

at the Leslie Street Spit/Tommy Thompson Park

Karen McDonald

TOMMY THOMPSON PARK (TTP) is located on the Leslie Street Spit, a 5 km long human-made peninsula in Lake Ontario in Toronto, Ontario (Figure 1). Construction of the peninsula began in the 1950s for port-related facilities, but through natural succession and habitat enhancement efforts by its owner, the Toronto and Region Conservation Authority (TRCA), it has become the largest area of natural habitat on the Toronto waterfront (TRCA No date a). The final size of the Spit is complete at approximately 500 ha, including the associated water lots; however the Toronto Port Authority continues to run a lake filling operation in shoreline erosion areas.

Colonial waterbirds have a long history of nesting at Tommy Thompson Park and are one of the reasons the park was designated an *Important Bird Area* (IBA) in 2000 (Wilson *et al.* 2001). Reasons for the IBA designation include globally significant numbers of colonial waterbirds under the general congregatory threshold and nationally significant numbers of waterfowl during spring and fall migration and during winter depending on ice conditions (Wilson *et al.* 2001). Six species of colonial waterbirds breed regularly at Tommy Thompson Park. Three species are predominately tree-nesters, Double-crested Cormorant (*Phalacrocorax auritus*), Black-crowned Night-Heron (*Nycticorax nycticorax*) and Great Egret (*Ardea alba*); and three species are ground-nesters, Ring-billed Gull (*Larus delawarensis*), Herring Gull (*Larus argentatus*) and Common Tern (*Sterna hirundo*).

Methods

Population estimates for tree-nesting waterbirds and Common Terns are conducted annually, while population estimates for Ring-billed Gulls typically occur every 5 to 10 years with the 10 year survey coinciding with the Canadian Wildlife Service (CWS) decadal census (Morris *et al.* 2011). Individual Herring Gull nests are monitored by the CWS for ongoing contaminant research (Morris *et al.* 2003, Weseloh *et al.* 2006), and TRCA does not usually undertake a population census for this species. Population estimates for any species may also be undertaken more frequently in relation to other projects/studies or to address a population concern. All field estimates are conducted by trained TRCA staff and researchers, using standardized techniques. Upon completion of the survey, Microsoft Excel is used to store and analyze the population data.

Figure 1. Tommy Thompson Park (outlined in red) on the Leslie Street Spit

Tree Nests

Each spring a census is conducted during the last week of May, at the peak of their nesting period, to determine the number and distribution of nests (= pairs) of Double-crested Cormorant, Black-crowned Night-Heron and Great Egret, which helps inform management decisions. Active nests of these species are counted by a team of observers who move systematically through the colony recording the tree number, tree species and number of nests of each bird species. As noted by Jarvie *et al.* (1999), each tree containing a nest is marked with a circular 2.5 cm metal tag bearing a unique number (National Band and Tag #85, 1 mm thick) attached with a single 5 cm galvanized roofing nail which is left out approximately 2.5cm to allow for the growth of the tree without damage. Coordinates of each tree are recorded by GPS. All new nest trees are tagged and coordinates recorded each year. Every tree examined is marked with tree marking paint to identify that it has been counted. The tree coordinates and associated nest data are mapped with Arc View GIS software. Additionally, all nest trees are evaluated post-breeding, in the late summer, to assess their health.

Ground Nests

The census for nests of Common Tern and Ring-billed Gull pairs is conducted at the peak of their nesting period, typically the last week of May or the first week of June, to determine their breeding population, which helps inform management decisions. Common Terns nest exclusively on four floating reef-rafts (Jarvie and Blokpoel 1996) and one artificial island at TTP. Predation and disturbance pressures can result in asynchronous nesting across these subcolonies, making it difficult to obtain a reliable estimate of the breeding population. Therefore, depending on the circumstances of the sub-colony, multiple population counts may be conducted throughout the breeding season. The reef-rafts are approximately 24 m^2, so all nests can be counted, noting the nest contents, by walking or canoeing the periphery of the raft. The artificially created tern island in the Cell One wetland is approximately 120 m^2 (depending on water levels), and is more challenging to count because of its size and tall vegetation. Observers carefully walk the island in a grid pattern and note nests and nest contents.

Ring-billed Gulls are surveyed at least every 10 years with the CWS decadal surveys, however CWS also monitors individual Herring Gull nests annually. Because of the large nesting areas the Ring-billed Gull colony is divided into smaller, discrete sections and all active nests are counted by section using the rope transect method (Morris *et al.* 2011). Ropes are used to delineate 1 m wide transects and observers carefully walk the transect counting all active nests with a manual handheld tally counter and mark each nest with survey paint to identify that is has been counted. Herring Gull nests are recorded on a field data sheet and not included in the tally counter.

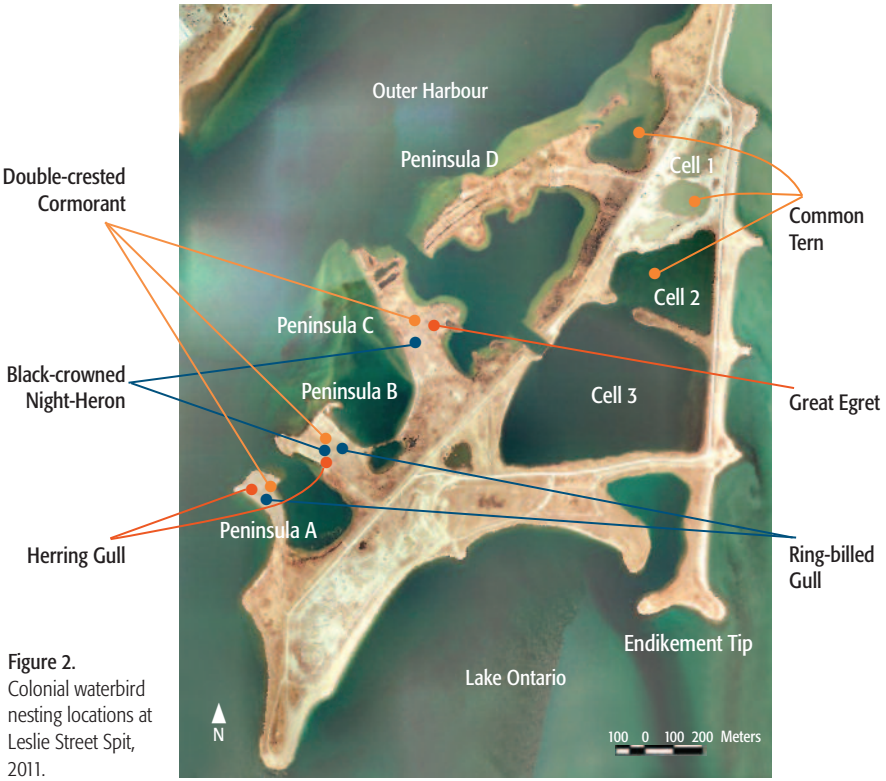

Figure 2.
Colonial waterbird nesting locations at Leslie Street Spit, 2011.

The ropes are then moved to the next transect line until all active nests within the colony are counted. In years where individual nests are not counted, trained staff usually undertake population estimates of the Ring-billed Gull nesting area.

Counts of cormorant ground-nests occur during the last week of May, at their peak nesting period. Nest counts are conducted at night, using minimal light, in order to minimize disturbance and nest predation by Ring-billed Gulls. A minimal number of observers moves quickly and systemically through the ground-nesting area and place a coloured popsicle stick in the nest to mark it as counted.

Results

The first colonial waterbirds to colonize the Leslie Street Spit were Common Terns who were first recorded nesting in 1971 with 30-40 nests reported (Blokpoel and Fetterolf 1978, Wilson *et al.* 2001). As seen in Table 1, the population peaked in 1982 at nearly 1700 nests; however interspecific competition with Ring-billed Gulls for nesting sites, as well as the natural succession of the landscape,

Great Egret *Photo: Saul Bocian*

Table 1. Colonial waterbird nest numbers at Tommy Thompson Park/Leslie Street Spit, 1971-2011[A]

Year	COTE	RBGU	HEGU	BCNH	DCCO	GREG	CATE
1971	30-40	-	-	-	-	-	-
1972	-	-	-	-	-	-	-
1973	170-200	9	0	0	0	0	0
1974	0	"small numbers"	-	-	-	-	-
1975	0	-	-	-	-	-	-
1976	1246	10382	12	0	0	0	4
1977	1238	20564	32	0	0	0	6
1978	1310	22735	48	0	0	0	15
1979	1483	31000*	70	7*	0	0	24
1980	1327	66517	62	42	0	0	62
1981	1310	72500*	88	42	0	0	60
1982	1694	72500*	77	18	0	0	63
1983	847	72500*	74	41	0	0	98
1984	822	74564	91	50	0	0	163

Year	COTE	RBGU	HEGU	BCNH	DCCO	GREG	CATE
1985	564	47895	79	39	0	0	182
1986	583	39788	84	54	0	0	150
1987	424	45355	95	591	0	0	41
1988	447	62782	158	621	0	0	0
1989	108	61945	139	918	0	0	0
1990	136	46799	96	989	6	0	0
1991	346	42495	106	792	62	0	0
1992	329	50000*	102	860	85	0	0
1993	389	40000*	120	911	188	0	0
1994	396	48603	123	536	524	0	1
1995	NC	52500*	NC	790	414	0	3
1996	NC	52500*	NC	1195	931	0	28
1997	NC	57500*	NC	829	1241	0	0
1998	266	57500*	NC	807	1598	0	3
1999	325	59453	111	1001	2539	0	NC
2000	242	58000*	NC	1265	3187	0	18
2001	NC	58000*	NC	762	4237	0	65
2002	445	58000*	NC	1203	3543	2	65
2003	420	56151	48	1159	3942	1	252
2004	433	45000*	79	879	5046	1	350
2005	448	40000*	NC	880	5674	4	0
2006	NC	35000*	NC	649	6125	3	0
2007	367	33000*	45	876	7059	5	0
2008	310	30000*	30	536	6717	5	0
2009	354	30000*	NC	584**	7564	7	0
2010	231	30000*	NC	434	9434	5	0
2011	53	30000*	NC	423	11374	7	0

NC = not counted
* = estimate
** = nesting failed
COTE = Common Tern
RBGU = Ring-billed Gull
HEGU = Herring Gull
BCNH = Black-crowned Night-Heron
DCCO = Double-crested Cormorant
GREG = Great Egret
CATE = Caspian Tern

[A] Data for 1971-2000 from Wilson *et al.* (2001); data for 2001-2011 are from Ontario Breeding Bird Atlas, CWS and TRCA unpublished files.

Figure 3. Artificial reef-raft used by Common Terns. *Photo: Ann Gray*
Figure 4. Cormorant and gull colonies. *Photo: TRCA*

led to a decrease in Common Tern nests (Wilson *et al.* 2001). Ring-billed Gulls arrived at the site in 1973 (Blokpoel and Fetterolf 1978), and their population peaked at nearly 75,000 nests in 1984 (Blokpoel and Tessier 1987). Vegetation management was undertaken in 1982 and a gull management program was initiated in 1985 in response to the Common Tern decline (Morris *et al.* 1992).

Artificial reef-rafts were installed as nesting habitat by the CWS and TRCA in 1990 (Dunlop *et al.* 1991). In 2004, the TRCA created a wetland in the Cell One confined disposal facility, which included an island designed for tern nesting (TRCA No date b). Today, terns nest on four reef-rafts and the Cell One Tern Island (Figure 2 and Figure 3). In 2011, nests numbered only 53 as the Tern Island was submerged due to high water levels in Lake Ontario and the three reef-rafts in Cell Two were depredated by one or several American Mink *(Mustela vison*). This is a 77% decline from last year's population estimate. In 2012, the reef-rafts will receive predator guards to reduce depredation by mammals.

Like Common Terns, Ring-billed Gulls were attracted to the site by the open habitat. From their colonization in 1973 through to 1984 (Wilson *et al.* 2001), their population increased dramatically (Table 1) until management efforts began in 1985 (Blokpoel and Tessier 1987). Management was undertaken for a variety of reasons including their negative impact on vegetation establishment, Common Terns and public complaints (Wilson *et al.* 2001). Without management the population was expected to reach 180,000 pairs (Wilson *et al.* 2001). As vegetation has become established throughout the site and competition for nesting sites with Common Terns has been resolved through habitat creation, management for Ring-billed Gulls has not been undertaken since 2007. Ring-billed Gulls currently nest on Peninsulas A and B (Figure 2). Gull population estimates were not undertaken in 2011, although anecdotal evidence suggests the number of Ring-billed Gulls may be slightly higher than the last official count in 2008 of 30,000 nests (Table 1).

Herring Gulls first occupied the Leslie Street Spit in the mid-1970s (Blokpoel and Fetterolf 1978) and nest among the Ring-billed Gulls in much lower numbers (Wilson *et al.* 2001). Nesting peaked in 1988 and since then has decreased steadily (Table 1). TRCA does not undertake a Herring Gull census due to their low numbers and the involvement of CWS in individual nest monitoring.

Black-crowned Night-Herons likely arrived at the site in 1979 when the Eastern Cottonwood (*Populus deltoides*) trees on the peninsulas reached a sufficient size for nesting (Wilson *et al.* 2001). In 1987, the Mugg's Island colony (part of the Toronto Islands) was abandoned and the number of night-herons nesting at the Leslie Street Spit dramatically increased (Wilson *et al.* 2001). When the population peaked in 2000, they represented 31.6% of the national population

Table 2. Cormorant Nest Numbers by Location at Tommy Thompson Park/Leslie Street Spit, 2001-2011

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Peninsula A	909	730	779	557	311	228	101	49	22	39	19
Peninsula B	3048	1844	1582	1241	1763	1535	1072	1050	917	781	1262
Peninsula B ground nests	0	344	948	809	872	868	1302	1009	1957	3310	4547
Peninsula C	282	625	633	2439	2728	3494	4584	4609	4668	5304	5546
Total Cormorant Nests	**4237**	**3543**	**3942**	**5046**	**5674**	**6125**	**7059**	**6717**	**7564**	**9434**	**11374**

(Wilson *et al.* 2001). Nest numbers have fluctuated at the site, likely in response to human, and predator disturbance, as well as competition for nest sites with Double-crested Cormorants. In 2011, 423 Black-crown Night-Herons nested in trees on Peninsulas B and C (Figure 2), a slight decrease from 2010 (Table 1).

Double-crested Cormorants began nesting on Peninsula B in 1990 (Wilson *et al.* 2001) and expanded to Peninsula A the following year. The population increased and expansion onto Peninsula C occurred in 2000, and ground-nesting on Peninsula B in 2002, likely in response to the loss of tree nesting habitat due to their nesting activities on Peninsulas A and B; as well as an increase in the overall Great Lakes population (Weseloh *et al.* 1995). In 2008, the TRCA developed the Double-crested Cormorant Management Strategy in response to the significant decline and loss of forest habitat on the peninsulas (TRCA 2008). In 2011, cormorants nested in trees on Peninsulas A, B and C, as well as on the ground on Peninsula B (Figure 2 and Figure 4). Their nests numbered 11,374, including 4,547 ground nests (Table 2). The overall population increased 21%, while the ground-nesting population increased 37% over the previous year. Converting tree-nesting birds to ground-nesting birds, as well as protection of the existing ground-nesting colony, is a target of TRCA's management strategy.

The first Great Egret nests were found on 21 May 2002 by Glenn Coady on Peninsula C (Table 1)(Worthington 2002). In 2011, seven nests were confirmed, including one nest where a Black-crowned Night-Heron chick was brooded by egrets and alongside egret chicks and is presumed to have fledged.

Caspian Terns (*Hydropogne caspia*) no longer use the Leslie Street Spit as a nesting area. They occupied the site from approximately 1976 to 1987 and from 1994 to 2004, nesting on the Endikement Tip (Table 1) (Wilson *et al.* 2001). The establishment of vegetation, gull competition for nest sites, unknown predator pressure and habitat creation in Hamilton Harbour are the suggested reasons for their decline at the site (Wilson *et al.* 2001).

Tommy Thompson Park is owned and managed by TRCA and is only open to the public on weekends and holidays. Visitors are reminded the colonial waterbird nesting areas are off limits during the nesting season from April through September. For more information on TTP visit www.tommythompson park.ca.

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Literature Cited

Blokpoel, H. and **G.D. Tessier**. 1987. Control of Ring-billed Gull Colonies at Urban and Industrial Sites in Southern Ontario, Canada. Pages 8-17 *In* Third Eastern Wildlife Damage Control Conference. Gulf Shores, Alabama. 18-21 October 1987.

Blokpoel, H. and **P.M. Fetterolf**. 1978. Colonization of Gulls and Terns of the Eastern Headland, Toronto Outer Harbour. Bird-Banding 49:59-65.

Dunlop, C., H. Blokpoel, and **S. Jarvie**. 1991. Nesting Rafts As A Management Tool For A Declining Common Tern *(Sterna hirundo*) Colony. Colonial Waterbirds 14(2):116-120.

First Base Solutions. 2005. Leslie Street Spit aerial ortho imagery.

Google. 2011. Google Earth Version 6.1.0.5001. Available at: http://www.google.com/earth/download/ge/ 28 January 2012.

Jarvie, S and **H. Blokpoel.** 1996. Reefrafts for Common Terns and Fish: Guidelines for Design, Construction and Operation. Canadian Wildlife Service, Environment Canada. Cat. No. En40-513/1996E. 12pp.

Jarvie, S., **H. Blokpoel**, and **T. Chipperfield**. 1999. A geographic information system to monitor nest distributions of Double-crested Cormorants and Black-crowned Night-Herons at shared colony sites near Toronto, Canada. Pages 121-129 *In* Symposium on Double-crested Cormorants: Population Status and Management Issues in the Midwest (M.E. Tobin, ed.). USDA Tech. Bull. No. 1879. 164pp.

Morris, R.D., **H. Blokpoel** and **G.D. Tessier**. 1992. Management Efforts for the Conservation of Common Tern (*Sterna hirundo*) Colonies in the Great Lakes: Two Case Histories. Biological Conservation 60:7-14.

Morris, R.D., **D.V. Weseloh** and **J.L. Shutt**. 2003. Distribution and abundance of Herring Gull (*Larus argentatus*) pairs nesting on the North American Great Lakes. J Great Lakes Res. 29(3): 400-426.

Morris, R.D., **D.V. Weseloh**, **L.R. Wires**, **C. Pekarik**, **F.J. Cuthbert** and **D.J. Moore**. 2011. Population trends of Ring-billed Gulls breeding on the North American Great Lakes, 1976 to 2009. Waterbirds 34:202-212.

Toronto and Region Conservation Authority. 2008. Double-crested Cormorant Management Strategy, May 2008. Authority Meeting Recommendation #110/08.

Toronto and Region Conservation Authority. No date a. Tommy Thompson Park Toronto's Urban Wilderness. www.tommythompsonpark.ca Web. 27 November 2011.

Toronto and Region Conservation Authority. No date b. Cell One Wetland Creation Project. www.tommythompson-park.ca/habitat-restoration/cell1.dot Web. 27 November 2011.

Weseloh, D.V., **P.J. Ewins**, **J. Struger, P. Mineau**, **C.A. Bishop**, **S. Postupalsky** and **J.P. Ludwig**. 1995. Double-crested Cormorants of the Great Lakes: Changes in Population Size, Breeding Distribution and Reproductive Output between 1913 and 1991. Colonial Waterbirds 18: 48-59.

Weseloh, D.V.C., **Pekarik C.** and **S.R. de Solla.** 2006. Spatial patterns and rankings of contaminant concentrations in herring gull eggs from 15 sites in the Great Lakes and connecting channels, 1988-2002. Environ. Monitor. Assess. 113: 265-284.

Wilson, W.G., **E.D. Cheskey** and **IBA Steering Committee**. 2001. Leslie Street Spit - Tommy Thompson Park Important Bird Area Conservation Plan. Canadian Nature Federation, Bird Studies Canada, Federation of Ontario Naturalists 56pp.

Worthington, D. 2002. Greater Toronto Area Bird Records May - July 2002. Toronto Ornithological Club Newsletter 127:4-14

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Adult Vega Gull. *Photo: Kirk Zufelt*

"Vega" Herring Gull in Algoma District: A new taxon for Ontario

Kirk Zufelt

Introduction

It was a dreary morning typical of the late fall on eastern Lake Superior. An intermittent light drizzle necessitated the occasional use of my windshield wipers as I pulled up to the administrative kiosk at the Sault Ste. Marie landfill. After exchanging pleasantries with the very accommodating landfill staff, I eagerly headed back towards the large cloud of gulls circling the giant rubbish heap.

It was 30 October 2010 and I was partaking in my ongoing survey work of the large gulls of the Sault Ste. Marie area both in Ontario and Michigan. The Sault St. Marie landfill is the municipal landfill for the City of Sault Ste. Marie, Ontario. This site attracts large numbers of gulls in the fall with between 2,000 and 4,000 gulls being present on an average day from late October to late

Figure 1. Adult Vega Gull, Sault Ste. Marie landfill, 30 October 2010. *Photo: Kirk Zufelt*

November. The dumping area is an industrial site that is not open to the general public. I had negotiated access to continue my surveying work with strict guidelines to ensure safety and to avoid any interference with workflow.

Trying to avoid the giant mud-filled craters that can swallow a small vehicle, I maneuvered my way back to an optimal observation spot. I settled in and started sorting through the several thousand "American" Herring Gulls (*Larus argentatus smithsonianus*). Quite quickly, I came across an interesting darker-mantled gull (Figure 1). Although it was elusive at first, within a half an hour it was loafing with several hundred American Herring Gulls within 25 metres of the car and at times closer. Initially I expected it might be a hybrid, but after close observation I started to consider the possibility that this could be an adult "Vega" Herring Gull (*L. a. vegae*). After very careful study, over several hours, I was able to confirm this identification and obtained a large series of diagnostic photographs.

Taxonomy

According to the American Ornithologists' Union, Vega Gull is a subspecies of the Herring Gull (*L argentatus*). The North American subspecies is commonly known as American Herring Gull (*L. a. smithsonianus*) (American Ornithologists' Union 2012), while the distinct

Siberian-based taxon is referred to as Vega Gull (*L. a. vegae*). Clements' checklist of the birds of the world, Version 6.6, concurs with this outlook (Clements *et al.* 2012). The International Ornithological Congress — IOC Checklist version 2.11 — follows the phylogenetic species concept and considers it a full species, *Larus vegae* (Gill and Donsker 2012).

Olsen and Larsson (2003) considered Vega Gull a distinct species in their monograph *Gulls of North America, Europe and Asia*. Howell and Dunn (2007) support this approach and state that it is "quite distinct from American Herring Gull and better treated as a separate species, Vega Gull, *L. vegae*".

Although world opinion generally favors treating Vega Gull as a distinct species, changes in the current AOU taxonomy will undoubtedly be deferred until definitive scientific data are presented.

Vagrancy in North America

Documentation of extralimital Vega Gulls in North America has been hampered by its official status as a subspecies of Herring Gull and the reluctance of many bird records committees to review the taxon. The significant difficulty in identifying immature birds, especially those in first cycle, has certainly contributed to the paucity of confirmed records.

Only two previous widely accepted records exist in North America outside of Alaska. The first was an adult documented by Martin Reid and Willie Sekula at the Elliot Landfill, Corpus Christi, Texas on 6 March 2000. Pictures of this are featured on the Texas Bird Records Committee website. The second record was of an adult meticulously documented by Michael Brothers on 2 January 2009 at Daytona Beach Shores, Florida (Figure 2).

Figure 2. Adult Vega Gull, Daytona Beach Shores, Florida, 2 January 2009. *Photo: Michael Brothers*

Status and Distribution

The Vega Gull breeds predominantly on islands and sea cliffs in the high arctic of northeast Siberia (Olsen and Larrson 2003). There is a small breeding population on St. Lawrence Island in the Bering Sea, which is the only regular North American breeding location (Howell and Dunn 2007). Vega Gulls winter predominantly in Japan, Korea, south and east China and Taiwan. Olsen and Larsson (2003) state "some post breeding wandering to N. Alaskan coast, but no other reliable observations from North America". Howell and Dunn (2007) refer to specimens from British Columbia and Oregon, noting that "the former pertains to a hybrid…and the latter warrants critical examination".

This report was reviewed and accepted by the Florida Ornithological Society Records Committee (FOS Records Committee Report-2009-FOS RC 09-761) (Kratter 2010). Howell and Dunn (2007) report that it is "almost certainly overlooked in western North America, with several December to March records of presumed Vega Gulls from central California".

A specimen record from Henderson Lake, British Columbia from 27 November 1922 (Campbell 1990) was refuted by Howell and Dunn (2007) with the assertion that the specimen "pertains to hybrid Glaucous-winged (*Larus glaucescens*) x Western Gull (*Larus occidentalis*) or Glaucous-winged x American Herring Gull".

Twelve records of Vega Gull from between 2000 and 2009 in British Columbia were noted by Toochin and Fenneman (2008). Fifty percent of these were adult birds. The authors noted that "no attempt has been made to unilaterally pass judgment on any sight records. This responsibility is best left to a proper Rare Birds Committee, which currently does not operate in the province." At present none of these records have been published or reviewed by an independent records committee so they are considered tentative. Hopefully a mechanism for independent review of British Columbia bird records can be developed to provide legitimacy to these and other rare bird records from the province.

Although a fair amount of gull study has taken place in the Yukon, and Vega Gull is considered casual north to the Arctic coast of Alaska (Howell and Dunn 2007), there are no known records from Canada's far north although it is quite possible that it has been overlooked (C. Eckert pers. comm.).

Description

The following description of the bird was compiled from my careful observations and notes at the time of observation as well as from the detailed photographs. It is, in essence, the same description submitted to and accepted by the Ontario Bird Records Committee (Wormington and Cranford 2011).

Size and Structure

This bird was comparable in overall size to the Herring Gulls that it accompanied. From direct comparison to a large number of Herring Gulls, I estimated it was at about the 70th percentile in size, being smaller than about 30% of the associated gulls.

The structure was also very comparable. The head was relatively rounded at rest suggesting this bird might be a relatively large female. The bill was average in width and length with a relatively modest gonydeal expansion when compared to the Herring Gulls. A direct comparison of the bird's bill with American Herring Gulls nearby showed that the bill was well within "average" range and certainly not in the larger

Figure 3. Algoma Vega Gull (right) showing similar structure to American Herring Gull but with a darker mantle, 30 October 2010. *Photo: Kirk Zufelt*

end of the American Herring Gull spectrum which one would expect in a Herring Gull x Great Black-backed Gull (*L. marinus*) hybrid. The leg length and primary extension were both very similar to the Herring Gulls.

In conclusion, this bird fit well within the average range for size and structure in direct comparison to several hundred Herring Gulls with which it closely associated during the observation period (Figure 3). This would be the expectation for a Vega Gull.

Bare Parts

In discussing the bare parts, I will compare the findings on this bird with the data presented by Chris Gibbins (2003) in his study "Identification of Adult Vega Gull: Field Observations from Japan".

The eye of this Vega Gull was brownish-yellow (Figure 4). It was darker than average for an American Herring Gull, although uncommonly they can have a dark eye. This "in between" eye colour was neither light as in the vast majority of Herring Gulls or in the eastern Pacific population of Slaty-backed Gull (*Larus schistisagus*), nor truly dark as would be expected in, for instance, a California Gull (*Larus californicus*). Gibbins (2003) noted that the vast majority of adult Vega Gulls he observed had an "in-between eye color with only about 10 percent having a very dark eye and none having a very light eye".

Figure 4. Algoma Vega Gull showing darkish eye and reddish orbital ring, 30 October 2010.

Figure 5. American Herring Gull showing typical light eye and yellowish-orange orbital ring, 30 October 2010. *Photos: Kirk Zufelt*

The orbital ring in this bird was definitely reddish with possibly a bit of an orange tinge (Figure 4). Sibley (2000: 217) illustrates this well and he describes the Vega Gull's orbital ring as "orange-red" and the American Herring Gull's orbital-ring as "orange-yellow". Olsen and Larsson (2003) describe the Vega Gull's orbital ring simply as "red". They describe the American Herring Gull's orbital ring as "orange-yellow" (Figure 5).

The bill was a yellowish-orange color with the distal portion of the upper mandible having a bit deeper orange color (Figure 4). The bill was a bit brighter than most of the associated American Herring Gulls, likely because it had not fully transitioned to basic plumage as had almost all of the Herring Gulls at this date. It had a single red spot on the gonys, near the tip of the lower mandible, with no black markings. In Gibbins' (2003) study of 103 adult Vega Gulls in Japan, the majority had this bill pattern with no black markings.

The leg colour was light pink. Although we often think of Vega Gull as having "bright pink" legs, my review of the adults on Osao and Michiaki Ujihara's website (see Lit. Cited) from this time of year shows some adult Vega Gulls with fairly bright legs and others with rather light to dull pink legs.

Gibbins' (2003) study showed that in later winter Vega Gull legs were mostly quite a light pink color and the pictures of the birds on his website show this fairly pale pink color in all the birds. It appears that most adult Vega Gulls have fairly bright pink legs during breeding season transitioning during the fall and early winter to a much lighter pink not significantly different from the American Herring Gull.

Plumage

Molt

One of the very key features supporting this gull's identification as a Vega Gull is its molt strategy. At the time of the

Figures 6 and 7. Algoma Vega Gull showing extensive molt and retained old primaries as well as broad white trailing edge to wing and extensive white tongue tips to outer primaries, 30 October 2010. *Photos: Kirk Zufelt*

sighting, the bird was still in definitive prebasic molt. It can be seen that it had at least three old retained primaries on both wings, P-7 missing on both wings and P1-6 were freshly grown (Figures 6 and 7). This is characteristic of Vega Gull, which molts much later than the American Herring Gull. On 25 October 2006, O. Ujihara noted that of 40 adult and sub-adult Vega Gulls he observed at Miura Kanagawa, Japan, only two individuals did not have some old retained primaries. Of the more than 500 adult American Herring Gulls I studied on the same date and the next day, I could not find a single bird with any retained primaries. The outer secondaries of the bird were fresh with a few inner ones being very worn. There was extensive molt of the coverts noted on the open wing photos (Figures 6 and 7).

Head

The head was entirely white, as was the nape, hind neck, throat, chest and neck. Given the Vega Gull's late molt, this lack of head streaking appears fairly regular for this taxon in October, although many birds would appear to have some head markings by this stage. Several adult Vega Gulls in mid- to late-October shown on Ujihara's web site have an unmarked white head, neck and nape.

Under Parts

The under parts were entirely white and otherwise unmarked.

Upper Parts

The mantle and scapulars were a uniform gray with the exception of a small white scapular crescent (Figure 8). Using the Kodak Gray Scale I estimated the gray as 7. The gray mantle of the associated American Herring Gulls was estimated as a 4.5. This is consistent with the estimates of upperparts gray given by Howell and Dunn (2007:26). The scapular crescent was mostly worn away but was much more contrasting than in the associated American Herring Gulls because of the bird's darker mantle colour.

The wing pattern exhibited by the bird was quite distinctive. The outer secondaries were fresh and the innermost

Figure 8. Algoma Vega Gull, 30 October 2010. *Photo: Kirk Zufelt*

ones old and very worn. Primaries 1-5 were fresh and fully-grown. P6 is fresh and partially grown in on the left and mostly grown in on the right. P7 was absent on both wings and P8-10 were old and worn. There was extensive molt of the coverts (Figures 6 and 7).

The secondaries and inner primaries had long white tips, giving the bird a very broad trailing white edge typical of the Vega Gull. The outer primaries revealed a large mirror on P10 and a smaller mirror on P9. There was black on the primaries from P4 to10. The amount of black on P4 was minimal. There were extensive white tongue tips to the outer primaries typical for the Vega Gull and best seen on the freshly emerged P5 and P6 (Figures 6 and 7). The wingtip pattern on this bird was very close to that of #2 Vega Gull illustrated in Olsen and Larsson (2003:28). The rump, tail and undertail coverts were entirely white.

Discussion

The Vega Gull is a relatively distinct taxon. Structurally, it is practically identical to the American Herring Gull, its closest relative. Distinguishing features include bare part differences, including a darkish eye and a reddish orbital ring, as well as plumage differences, which include a darker mantle, and differing patterns on the wing primaries. The primary pattern of the Vega Gull usually shows more extensive white-tongue tips on the outer primaries giving a "string of pearls" type impression similar to that of a Slaty-backed Gull. The very broad trailing edge to the inner primaries and secondaries are another feature shared with Slaty-backed Gull.

The timing of molt in Vega Gull is considerably later than in American Herring Gull and this adds considerable support for the identification in this case. Olsen and Larsson (2003) note that adult Vega Gulls molt "P5-6 mid Sept-Oct, P7-8 late Nov., P9-10 late Dec-Jan". This correlates nicely with the stage of molt of this bird. American Herring Gulls have generally completed prebasic molt by mid-October. I specifically studied over 500 adult American Herring Gulls from 30-31 October 2010 and could not find a single bird still in active primary molt or with retained old primaries.

Significant differences in bare parts, mantle color and structure separate Vega Gull from other darker-mantled species such as California Gull, Lesser Black-backed Gull (*Larus fuscus*), Slaty-backed Gull and Great Black-backed Gull.

Clearly the "hybrid question" is often one that significantly complicates identification of Larus species. This question must be addressed adequately in any extralimital occurrence. I have done so on this occasion by answering the following questions.

1. Why isn't this an American Herring Gull x Lesser Black-backed Gull hybrid?

The main argument against this is the primary pattern and the very broad white trailing edge to the wings. This

would not be something you would expect given that the adult Lesser Black-backed Gull usually has only a small white mirror on P10, minimal white tips to the primaries and a relatively narrow white trailing edge (Figure 9). Some individuals will have a small mirror on P9. None of the multiple pictures of adult Lesser Black-backed Gulls I reviewed in many sources had as much white on the wings as this bird. All the putative American Herring Gull x Lesser Black-backed Gull hybrids I have seen in person and in photographs have had a very odd pinkish-yellow leg colour as well as a considerably darker mantle than would be typical for a Vega Gull (Figure 10).

Figure 9. Adult Lesser Black-backed Gull showing maximal amount of white on wings with small mirrors on P9-10, St. John's, Newfoundland, 7 January 2007.

Figure 10. Putative adult American Herring Gull x Lesser Black-backed Gull showing darker mantle, light eye and distinctive yellowish legs with pinkish feet, St. John's, Newfoundland, 7 January 2007. *Photos: Kirk Zufelt*

2. Why isn't this an American Herring Gull x Great Black-backed Gull hybrid?

This is clearly the most likely alternative identification. In fact, initially in the field this was my presumption for this bird's identification. However, as I watched the bird, I was increasingly stumped by its relatively light mantle, which was much lighter than I would expect for this combination. Next, I noted the total lack of any Great Black-backed Gull structural characteristics. There was no sign of the massive bill or the odd "skinny looking", flat head that is usually associated with this hybrid (Figure 11). The size was that of a medium-sized Herring Gull with none

Figure 11. Putative third basic American Herring Gull x Great Black-backed Gull showing long legs, flat Great Black-backed Gull-like head, stout bill and light eye, 20 November 2009. *Photo: Kirk Zufelt*

of the "long-legged" look of a Great Black-backed Gull. The next reason this bird was not likely an American Herring Gull x Great Black-backed Gull hybrid was its primary and secondary flight feather patterns. Both the American Herring Gull and Great Black-backed Gull have medium-sized white trailing edges to the secondaries. This bird was typical of a Vega Gull and had a very wide trailing edge reminiscent of (or maybe even wider than) a Slaty-backed Gull.

Thus, the distinctive features of this bird fit very nicely with its identification as a Vega Gull. The mantle colour, structure and distinctive wing pattern, as well as molt timing, were all consistent with the Vega Gull and inconsistent with potential hybrid imitators.

Summary

The Vega Gull is a distinct taxon which is variably treated either as a distinct species or a subspecies of the Herring Gull. Its primary range is northeastern Siberia with a small breeding colony in North America on St. Lawrence Island, Alaska. Vagrants outside Alaska have rarely been documented sufficiently to be definitive. Only two previous adult Vega Gull records, one from Texas and a second from Florida have been widely accepted. Numerous reports from the

Figure 12. Algoma Vega Gull showing roundish head, average "Herring Gull" type beak and darkish eye, 30 October 2010. *Photo: Kirk Zufelt*

west coast of North America suggest that it may be a regular visitor to that area.

On 30 October 2010, I observed a dark-mantled gull at the Sault Ste. Marie landfill, Algoma District, Ontario (Figure 12). This bird had Herring Gull-like size and structure with a darker mantle, a reddish orbital ring, a very broad white trailing edge to the wings and a typical Vega Gull primary pattern. The eye color, leg color and bill pattern were all consistent with the majority of Vega Gulls studied by Gibbins (2003) in Japan. It was still in active definitive prebasic molt with three retained outer primaries, a feature which strongly supports the identification of Vega Gull in late fall. I believe this is clearly sufficient evidence to identify this bird as an adult Vega Gull. My report was unanimously accepted as pertaining to an adult Vega Gull by the Ontario Bird Records Committee in 2011 (Wormington and Cranford 2011), thus providing the first confirmed record of this taxon for Ontario and Canada.

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Literature Cited

American Ornithologists' Union. 2012. Check-list of North American Birds. Available on-line at: http://www.aou.org/checklist/north/ [Accessed 31January 2012].

Campbell, W.R. 1990. The Birds of British Columbia. Volume Two: Non Passerines, Diurnal Birds of Prey through Woodpeckers. Royal British Columbia Museum, Victoria.

Clements, J. F., **T.S. Schulenberg**, **M.J. Iliff**, **B.L. Sullivan**, **C.L. Wood**, and **D. Robertson**. 2012. The Clements checklist of birds of the world: Version 6.6.

Gibbins, C. 2003. Identification of Adult Vega Gull: Field Observations from Japan. February 2003. http://www.surfbirds.com /ID%20Articles/JapanGulls/index.html [Accessed 31 January 2012].

Gill, F. and **D. Donsker** (Eds.). 2012. IOC World Bird Names (v 2.11). Available at: http://www.worldbirdnames.org/ [Accessed 31 January 2012]

Howell, S. and **J. Dunn**. 2007. Gulls of the Americas. Houghton Mifflin Company, Boston and New York.

Kratter, A.W.. 2010. Nineteenth Report of the Florida Ornithological Society Records Committee: 2009. Florida Field Naturalist 38(4):150-174. Available on-line at http://fosbirds.org/sites/default/files/FFNs/FFN384p150.pdf

Olsen, C.M. and **H. Larrson**. 2003. Gulls of North America, Europe and Asia. Princeton University Press, Princeton and Oxford.

Sibley, D.A. 2000. The Sibley Guide to Birds. Alfred A. Knopf, Inc. New York.

Toochin, R. and **J. Feeneman**. 2008. British Columbia Rare Bird Records. Unpublished manuscript. Available on-line at: http://www.geog.ubc.ca/biodiversity/efauna/documents/BCRareBirdListNovember2008.pdf [Accessed 31 January 2012].

Ujihara, O. and **M. Ujihara**. Japanese Gull Site website. http://www23.tok2.com/home/jgull/gullidentifi_.htm [Accessed 31 January 2012].

Wormington, A. and **M.H. Cranford**. 2011. Ontario Bird Records Committee Report for 2010. Ontario Birds 29:106-148.

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Early History of the Great Gray Owl in the New and Old World

Heimo Mikkola and Alan Sieradzki

Figure 1. Anders Sparrman's illustration (circa 1789) of the Old World subspecies of the Great Gray Owl (*Strix nebulosa lapponica*).

THINK OF THE TAXONOMIC HISTORY of Holarctic birds and one would be excused in automatically thinking of the work of renowned 18th and 19th century European naturalists, such as Carl von Linné (Linnaeus), Carl Peter Thunberg or Per Gustaf Lindroth. Yet very few people realize that one of the most iconic of all Holarctic species, the Great Gray Owl (*Strix nebulosa*), was originally described and named from a specimen collected in Ontario and that the very first published record of a Great Gray Owl nest anywhere in the world was that of a nest also discovered in Canada.

The Great Gray Owl is one of the few owls living right across the globe in the Holarctic forest belt. The average population in Europe (including Russia east to the Ural Mountains) is estimated to be only 4,400 pairs (Mebs and Scherzinger 2008). It is clear that the North American population far exceeds that of Europe with an estimated population of 20,000 – 70,000 breeding pairs (Duncan 1997).

In 1966, when we started the Great Gray Owl studies in the University of Oulu, Finland, this owl was believed to be one of the rarest owls in the world and definitely the rarest in Europe (Mebs 1966). The rarity of the Great Gray Owl in the Old World was obviously a major contributing factor as to why the famous Swedish taxonomist Carl von Linné failed to describe it from Northern Europe while being able to describe the Northern Hawk Owl (*Surnia ulula*), Snowy Owl (*Bubo scandiacus*), Eurasian Eagle Owl (*Bubo bubo*), Common Scops Owl (*Otus scops*), Tawny Owl (*Strix aluco*), Eurasian Pygmy Owl (*Glaucidium passerinum*), Boreal [Tengmalm's] Owl (*Aegolius funereus*) and Long-eared Owl (*Asio otus*) by 1758.

The population of the Great Gray Owl being historically much greater in North America than in Europe must, therefore, also be viewed as a major factor in the explanation as to why *Strix nebulosa nebulosa* was first described by Johann Reinhold Forster (1772) from a specimen collected by Andrew Graham, the factor at Severn River, at Fort Severn, Ontario, Canada and that the first Great Gray Owl nest to be recorded anywhere in the world was discovered by Dr. John Richardson at Great Bear Lake in the Northwest Territories, Canada, on 23 May 1826 (Swainson and Richardson 1832:77-78). The Great Gray Owl was also later described from the Hudson Strait region of Canada as *Strix cinerea* by Johann Friedrich Gmelin (1788) but is now treated as a synonym.

In the Old World, *Strix nebulosa lapponica* was officially first described by Carl Peter Thunberg (1798) from Sweden in Konglica Svenska Vetenskaps-Akademiens nya Handlinger, Stock holm, twenty-six years after Forster's (1772) published description of the nominate *Strix nebulosa nebulosa*. While it seems that Carl von Linné did not

know of the Great Gray Owl, one of his students, Anders Sparrman, attempted to describe *Strix lapponica* when working with skins in the Swedish Museum Carlsonianum in the years 1786 – 1789 but, for some unknown reason, did not complete the work. Sparrman was the first to use the name *Strix lapponica* and painted a large owl with concentric circles in the facial disc and a distinct black moustache, for which the model must surely have been a Great Gray Owl (Figure 1). The specimen that Sparrman worked from certainly must have been collected before 1789, ten years earlier than Thunberg's published description.

John Latham (1790) published the description of a Great Gray Owl from the mountains of eastern Siberia and named it *Strix barbata* (obviously the origin of the German name for the Great Gray Owl: Der Bartkauz). Published eight years earlier than Thunberg's description, the European race of the Great Gray Owl should perhaps be *Strix nebulosa barbata*. However, thanks to the complicated rules of taxonomy and Anders Sparrman's unpublished work and earlier use of the name *lapponica*, Latham's *barbata* has given way to Thunberg's *lapponica* and is treated as a synonym.

The first published record of a nest of a Great Gray Owl from Sweden was from Luleå, North Sweden in 1843 (Löwenhjelm 1844), but some autumn observations were reported from further south in Södermanland in September 1832 and in November 1833 (Stefansson 1997). In the latter mentioned newspaper story, it was reported that Great Gray Owls had been shot in that area some 20-30 years earlier, maybe as early as 1812.

In Finland, the first recorded observations, in spring and early autumn (which could indicate breeding), are from Espoo (near Helsinki) in August 1846 and from Kirkkonummi (also near Helsinki) in April 1858 (Collin 1886). The famous English egg collector, John Wolley, collected eggs from Lapland in the years 1856–1862 from many Great Gray Owl nests (Von Haartman *et al.* 1967).

In the Berlin Museum of Natural History, the first Great Gray Owl specimen was collected just when breeding could have started in March 1832 from Schnekken, Krs. Niederung, (now in northern Poland). This Polish nest was discovered only six years after the first Canadian nest was reported.

While the population of Great Gray Owl has likely always been many times greater in North America than it has in Europe, one cannot take anything away from the outstanding work of Mr. Andrew Graham and Dr. John Richardson, whose overall importance in Canadian ornithological history has been admirably detailed by Houston *et al* (2003). The fact remains that the original description and naming of the Great Gray Owl and the very first record of a Great Gray Owl nest belongs to Canada.

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Literature Cited

Collin, O. 1886. Suomessa tavattavien pöllöjen pesimissuhteista (Breeding relationships of Finnish Owls). Hämeen Sanomat, Hämeenlinna (In Finnish).

Duncan, J.R. 1997. Great Gray Owls (*Strix nebulosa nebulosa*) and Forest Management in North America: A Review and Recommendations. Journal of Raptor Research 31(2):160 -166.

Forster, J.R. 1772. An account of the birds sent from Hudson's Bay: with observations relative to their natural history and Latin descriptions of some of the most uncommon. Philosophical Transactions of the Royal Society of London 62:382-434.

Gmelin, J.F. 1788. *Strix cinerea.* Systema Naturae, pt 1:291

Houston, S., T. Ball and **M. Houston.** 2003. Eighteenth-Century Naturalists of Hudson Bay. McGill-Queen's University Press, Montreal. 333 + xxiii pp.

Latham, J. 1790. *Strix barbata.* Index Ornithologicus 1:62.

Löwenhjelm, C.G. 1844. Anteckningar i Zoologi under en resa i Norrland och Luleå Lappmark sommaren 1843. KVA handlingar 1843, s. 385-411 (In Swedish).

Mebs, T. 1966. Eulen und Käuze. Kosmos-Naturführer, Stuttgart (In German). 134 pp.

Mebs, T. and **W. Scherzinger.** 2008. Die Eulen European. 2nd Edition, Kosmos, Stuttgart (In German). 398 pp.

Stefansson, O. 1997. Vagabond of the Northern Forest Lappugglan (*Strix nebulosa lapponica*). Ord and Visor, Skellefteå (In Swedish).

Swainson, W. and **J. Richardson**. 1832. The first North American nest of *Strix nebulosa.* Fauna Boreali-Americana, or, the zoology of the northern parts of British America. Part 2, Birds. John Murray, London, 524 pp.

Thunberg, C.P. 1798. Underrättelse om några Svenske Foglar. KVA handlingar 19:177-188 (In Swedish).

Von Hartman, L., O. Hildén, P. Linkola, P. Suomalainen and **R. Tenovuo**. 1967. Pohjolan Linnut Värikuvin (Nordic Birds in Colour). Otava, Helsinki (In Finnish).

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eBird: a proposed provincial standard for regional bird recordkeeping

Mike V.A. Burrell

SPANNING FROM the Carolinian forests and tall grass prairie remnants in the south, through the vast boreal forest and to the Arctic tundra along Hudson Bay, Ontario is a vast province of many habitats. Millions of migrants are concentrated along our thousands of kilometres of Great Lakes coastline and literally tens of millions of birds raise their young in our province every year (Cadman *et al.* 2007). We are also lucky to have a rich history of ornithologists documenting many aspects of Ontario's avifauna for over a hundred years (McNicholl and Cranmer-Byng 1994). Indeed, our understanding of the patterns of bird distribution and occurrence have benefitted greatly from the hundreds of birders who have painstakingly documented both the rare and the routine. We have benefited greatly from a few dedicated record keepers, who have meticulously compiled thousands, if not millions, of bird records, often into monumental works that are invaluable to the study of bird distribution in Ontario (Curry 2006, Black and Roy 2010, Tozer 2012).

Currently, the rarest of the rare are published in North American Birds or Ontario Birds — but the majority of species are either not documented, left in a notebook to gather dust, or perhaps, entered into one of our regional records databases. These databases, while all quite functional, are as varied as Ontario's birdlife. Some may be vetted by a single compiler, while others in more populated areas may be vetted and maintained by a committee of sorts. What happens when these roles change hands may be a period of difficult transition as the new reviewers may favour a different system of recording and/or vetting records.

I would like to propose a provincial standard for incorporating regional record-keeping into a province-wide network. The vessel for this feat is the popular online bird database project known as eBird (www.ebird.ca). Until the last couple of years, the growth of eBird has been concentrated largely in the United States, where promotion and adoption by state birding organizations has been fairly high. In Ontario, we have just recently seen exponential growth in eBird users and the trend promises to continue as more birders come "onboard" (Figure 1 and 2). In addition to tremendous growth in individuals using eBird, several organizations have begun keeping records with eBird as it presents an easy, free system for recording bird observations. Some of these organizations are the very same ones that we have traditionally been relied upon to keep regional records, such as the Kitchener-Waterloo Field Naturalists Club (KWFN), Kingston Field Naturalists Club (KFN), Toronto Ornithological Club (TOC), Long Point Bird Observatory (LPBO), and Northumberland Bird Records, to name a few. Some of these organizations (KWFN, KFN and LPBO) have already adopted the method (to varying extents) I am suggesting here for gathering and keeping bird records.

How does it work?

eBird works by collecting daily checklists from users. Each checklist contains several pieces of information, most importantly a species list with a date and location. The species list submitted can include counts or presence/absence data for each species and can include as many species as the user wishes (i.e. they don't have to include every species they saw, although they are encouraged to do so). While this basic information may seem trivial to the average birder, multiplied by the one hundred checklists submitted per day in Ontario in

What is eBird?

It is an online database project initially started by the National Audubon Society and Cornell Lab of Ornithology in 2002. Bird Studies Canada entered into a formal partnership to create the Canadian eBird portal in 2006. eBird is now world-wide, although use is still most evident in North America. It was initially designed as a way to collect the millions of bird observations that are being documented by bird watchers and use these data in the conservation of birds. Since its initial days, it has grown tremendously, thanks largely to the products (bar graphs, mapping tools, etc.) that serve the very birders who are contributing data to the project (Wood *et al.* 2011). While it is still early, the data collected by eBird are influencing state, provincial and even federal and continental bird conservation decisions (*e.g.* North American Bird Conservation Initiative, U.S. Committee 2011). Some impressive animated occurrence maps are already being produced.
(see: http://ebird.org/content/ebird/about/occurrence-maps/occurrence-maps).

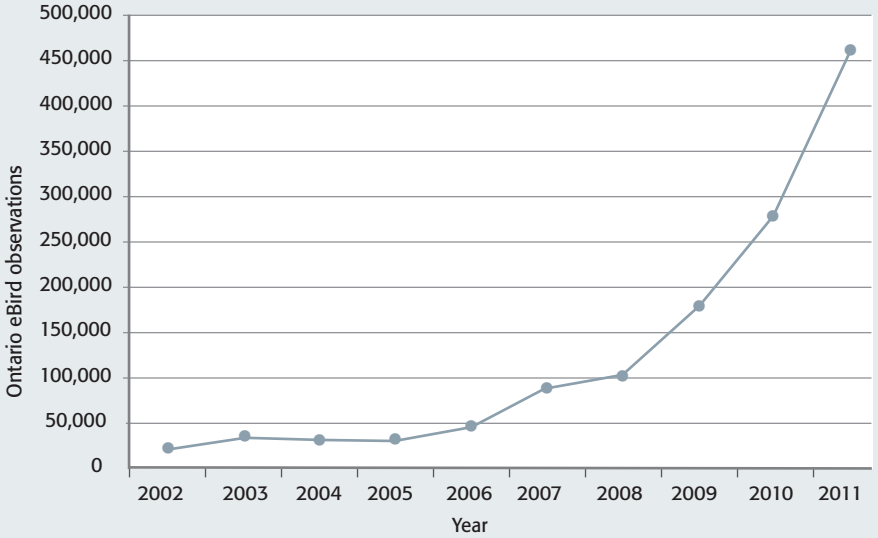

Figure 1: Number of bird records for Ontario by year, 2002-2011

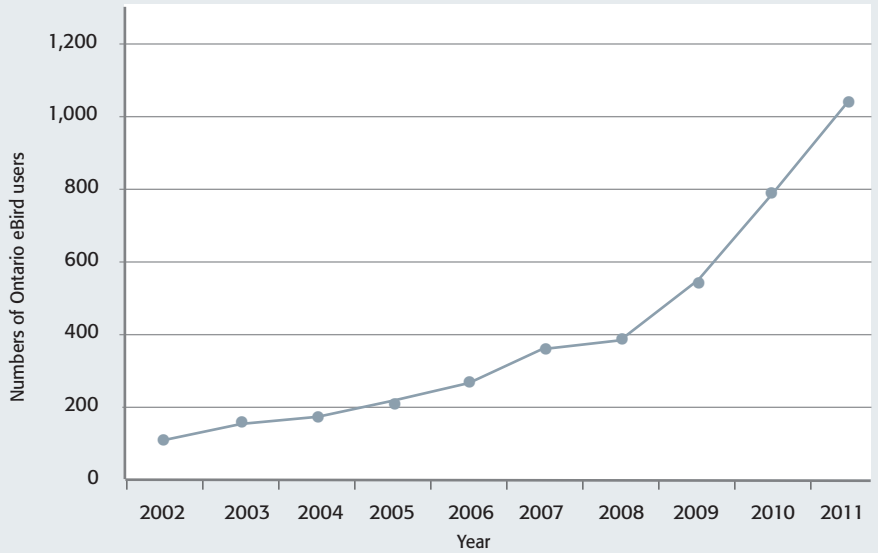

Figure 2: Users submitting at least one checklist to eBird in Ontario, 2002-2011

2011 these data shed a light on the occurrence patterns of Ontario's birds rather quickly. Birding is often a social event and so is eBird. eBird has made it easy for users to submit a checklist and then share that checklist with the other birders that accompanied them with one click, bringing the records into both users' eBird accounts, but more importantly, flagging the two identical checklists as duplicates so that they aren't both used for data analyses. Any users who share a checklist can make changes to the checklist, since, as we all know, you never see as much as your birding partner! This is also an easy way for clubs/groups to keep records, with each member "sharing" their checklists with the group's central account.

As mentioned previously, the recent success and growth in eBird has been largely thanks to the output tools which allow birders to naturally express their competitive sides. You can instantly see where you rank next to other users with year and all time lists at every level from American Birding Association area down to the sub-provincial jurisdictions (counties, regional municipalities and districts). Keeping your own lists is even more diverse, with life and year lists for any location a click away — all kept automatically when you submit your records. At first, this is a deterrent for some people to start using eBird, since they feel like they would have to start their lists from scratch, but eBird allows you to upload your existing lists in a few short steps.

The lists and fun keep me coming back, but some of the real powers of the eBird outputs are the bar charts (think seasonal checklists on steroids) and mapping features that make bird-finding a cinch. Combine these tools with smart phone technology, and you can be guided right to that much-needed tick on your next birding trip in California. eBird is also in the process of expanding its email alert system. Currently, I receive an email alert any time someone reports a rare species or a species in Waterloo Region that I haven't observed yet. Those email alerts can be customized to geographic area. Needless to say, the rewards of becoming an eBird user are much greater than simply becoming better at keeping your own personal records.

eBird data is submitted online, so a user needs access to the internet to participate. This allows you to enter or explore your sightings anywhere with a computer and internet access. It also means that your data are more secure than if they were kept on your home or work computer, since they are being stored and backed-up constantly on secure servers. Any user who wishes can download their full dataset at any time. Some people may think the internet requirement poses a problem, but you can always save your sightings to be entered later, or store your sightings temporarily in a spreadsheet (this is made very easy with some tools that have been developed — see: http://ebird.org/content/ebird/ news/ new-ms-excel-tool-to-simplify-data- upload) or with another

bird records program and later uploaded to eBird by interface. Currently, you can upload large datasets from a spreadsheet or from several bird records programs, such as Avibase (see: http://ebird.org/content/ ebird/about/using-the-ebird-data-import-tool). This means that no matter the digital format, data can be relatively easily formatted for mass upload to eBird.

How does the vetting process work?

Many of the concerns with eBird in the past have focused on data quality. eBird has come a long way in this regard as well, at least partially thanks to increased usage and interest. The eBird vetting protocol is simple, yet effective. Essentially, each county (or equivalent) in the province has its own filter. Each filter has a maximum number of individuals per month and per species that is "allowed". If the number exceeds the limit set on the filter, the user is asked to confirm that it was not a mistake, and then the record becomes marked as not valid and does not immediately enter the public database (but appears instantly in the user's account and is used for calculating their list totals). The flagged record then sits in a review environment awaiting an eBird reviewer's evaluation of the record. During this process, the reviewer can ask the user who submitted the record to provide more details (eBird now allows users to include links to photos in their checklists) before they make a decision about the record. For most records, it is simply a matter of checking the species comments which the user may have already optionally included. Every decision about a particular record made by a reviewer requires the reviewer to give a reason for the decision they changed the record to valid or not valid and leaves space for the reviewer to type out their notes explaining the decision. All of this information is saved, along with a timestamp, so that future researchers or reviewers can see why a decision was made. If the record is validated by the reviewer, it enters the public database and can be seen by anyone exploring the eBird database. If not, the user will always retain the record in their personal database (unless they choose to delete it). At any time, if a reviewer or eBird user notices a questionable record, they are encouraged to contact the appropriate reviewer.

Filters and reviewers

A network of very competent regional reviewers is already in place for much of Ontario. Where possible, existing bird records committees have been asked to designate individuals to be responsible for this role. At any time in the future, these roles can be passed along to new people. The filters for each Ontario county (or equivalent) were painstakingly prepared by incorporating much of the work done previously by local compilers in the form of published books and seasonal checklists. The filters can be edited "on the fly" by regional reviewers and are meant to be evolving.

What would a regional records keeping organization look like under eBird?

I propose that organizations create a group eBird account (such as has been done by the organizations that I have already listed). This allows legacy data to be uploaded to eBird, and in the future, regular contributors can share their eBird checklists with this group account so all of the details associated with a record can be downloaded easily and viewed by account administrators. For any observers that do not have an eBird account, the current record-keeper(s) can enter their sightings with the group account. This could be done one sighting at a time or via regular mass uploads from a spreadsheet. The regional reviewers would ideally be the same people or group that traditionally keeps these records and/or votes on records. In the future, this could become an option for record submission to the Ontario Bird Records Committee (OBRC), as some state records committees have already begun.

What would the benefits be?

While the system I am proposing would certainly need to have the "kinks" worked out, it offers many benefits. It has already been implemented successfully in some areas, despite the number of birders using eBird still growing rapidly in Ontario. Some of the benefits include:

1. Standardized approach province-wide.
2. Data would be available to everyone, including visiting birders
3. Gaps filled in where historically no one has kept detailed records
4. Easy transitions from one record keeper to the next
5. Easy to contribute records (do not "need to know the right person")
6. Documentation of regional avifauna to a greater detail than previously possible
7. Ability to document range shifts and changes in abundance of common species not traditionally tracked by regional bird records-keepers
8. Automatic taxonomic updates
9. Uncovering of bird records from people who wouldn't normally report to traditional sources (several examples of OBRC Review List species have already occurred)
10. Streamlined data collection for regional bird reports (*e.g.* North American Birds)

Acknowledgements

I would like to thank the thousands of people who have submitted bird records to eBird, the eBird teams at Cornell and Bird Studies Canada for making an incredible product, and my wife for putting up with my newest obsession. Of course, I'd also like to thank the hundreds of birders who have bought in to eBird and encourage others to do the same. And finally, thanks to all of those existing and past birders who have kept the detailed notes to put together regional books and checklists that inspire and teach us about the birds of Ontario.

Literature Cited

Black, J.E. and **K.J. Roy** (Eds.). 2010. Niagara Birds: a compendium of articles and species accounts of the birds of the Niagara Region in Ontario. Brock University printing and digital services, Ontario, 703 pp.

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.

Curry, R (Ed.). 2006. Birds of Hamilton and surrounding areas: including all or parts of Brant, Halton, Haldimand, Niagara, Norfolk, Peel, Waterloo and Wellington. Hamilton Naturalists' Club, Hamilton, xx + 647 pp.

McNicholl, M.K. and **J.L. Cranmer-Byng** (Eds.). 1994. Ornithology in Ontario. Special publication number 1, Ontario Field Ornithologists. Hawk Owl publishing, Whitby, xix + 400 pp.

North American Bird Conservation Initiative, U.S. Committee. 2011. The State of the Birds 2011 Report on Public Lands and Waters. U.S. Department of Interior: Washington, DC. 48 pp.

Tozer, R. 2012 (in prep.). Birds of Algonquin Park. The Friends of Algonquin Park, Whitney, Ontario.

Wood, C., B. **Sullivan, M**. **Iliff**, **D. Fink** and **S. Kelling**. 2011. eBird: Engaging Birders in Science and Conservation. PLoS Biol 9(12): e1001220. doi:10.1371/journal. pbio. 1001220
Available online at: http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.1001220

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Spring migration of Great Egrets into Ontario: an eBird analysis

D.V. Chip Weseloh and Tyler Hoar

Introduction

In spring, Great Egrets (*Ardea alba*, henceforth egrets) are known to arrive in Ontario in late March and early April (Speirs 1985, Curry 2006, Weir 2008, Black and Roy 2010). Both Bent (1926) and McCrimmon *et al.* (2011) gave spring dates by which egrets reached certain northerly migration points, *e.g.* 20 March in Ohio. So, although there is good information on the timing of the egrets' arrival in or near Ontario,

there is little specific information available on where they arrive from or the routes that they use to enter Ontario. Considering that there are nesting colonies of egrets in Ontario located in western Lake Erie, on the north shore of Lake Ontario, on the west shore of the Bruce Peninsula and in southern Georgian Bay, there are several possible routes of arrival. For example, egrets could arrive predominantly from New York via the Niagara Peninsula, from Michigan and Ohio through Essex County and the Lake Erie islands, from upstate New York around the east end of Lake Ontario or they could come on a broad front across all these areas and lakes Ontario and Erie. The main wintering area of egrets in eastern North America is along the southern Atlantic coast from North Carolina through Florida and into the Caribbean islands as well as along the Gulf of Mexico (Bystrack 1974, Root 1988).

Spring observations of egrets at various provincial locations have been recorded by Ontario birders for decades (see above) but these observations were not available widely until well after the fact. In recent years, Ontbirds, the listserv of the Ontario Field Ornithologists, has facilitated greatly the immediate and widespread reporting of arriving migrants. Now, however, a new online tool, eBird, makes it possible to track species-specific migration (spring or autumn) in real-time and to portray that information visually on maps to a wide audience immediately. eBird is an internet-based method of recording bird observations (Burrell 2012, Cadman 2012, eBird. com); it accepts current as well as historical bird observation records in the form of "checklists" for given areas. More importantly for one who may want to analyze bird data, if species-specific records are requested for sequential time periods (*e.g.* the first week of April, second week of April, and third week of April), eBird will plot the distribution of sightings for those time periods on individual maps.

Comparing the maps sequentially shows the progression of migratory movements for the requested species. eBird can also provide data on flock size and the number of individuals per checklist. These kinds of data contribute to interesting information on the migration strategy for individual species. In this paper, we demonstrate how eBird can be used to track the spring migration of Great Egrets from their wintering grounds (in February), through spring migration (March and April) and into June, when they are resident on their colonies and migration has ceased. The Great Egret is a very suitable species for this exercise as it is large, very visible, often reported and easy to identify.

Methods

eBird data were retrieved and analyzed through the Avian Knowledge Network (AKN,http://www.avianknowledge.net/content/contribute/the-bird-monitoring- data-exchange). For this paper, our study area was the Great Lakes Basin

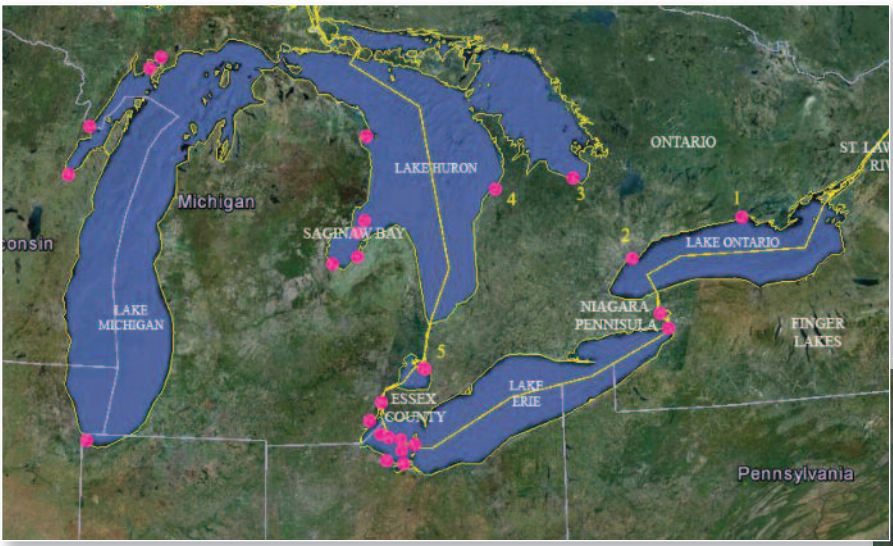


Figure 1. The Great Lakes study area including state/provincial boundaries, place names and locations of breeding colonies of Great Egrets (purple dots, those in Canada are numbered). 1. Gull Island, Presqu'ile Provincial Park, Brighton, 2. Toronto Harbour, 3. Nottawasaga Island, Collingwood, 4. Chantry Island, Southampton, 5. Walpole Island, Wallaceburg.

though larger areas were often used to show a show a broader perspective. We requested all eBird records of Great Egrets for North America (AKN accessed 26 February 2012). This provided a dataset in excess of 400,000 records and allowed for analysis of daily egret records from the study area.

From the above records, we screened for reports of egrets for six time periods for the years 1900 – 2012. Taking late March as the earliest average arrival dates for egrets in southern Ontario (see above), we estimated that records from the first week of March onwards, would show the migration towards and into Ontario. We chose the dates 1 – 15 and 16 – 31 March and 1 – 10 and 11 – 20 April to reflect the initial and ongoing stages of spring migration into Ontario. We used the shorter time periods in April to allow for a finer presentation and analysis of the data and for the greater volume of reports as migration into the Great Lakes Basin progressed. We also used data from 1 – 15 February to show the winter distribution of egrets in eastern North America and data from 1 – 15 June to show the summer distribution of egrets in southern Ontario after migration was over.

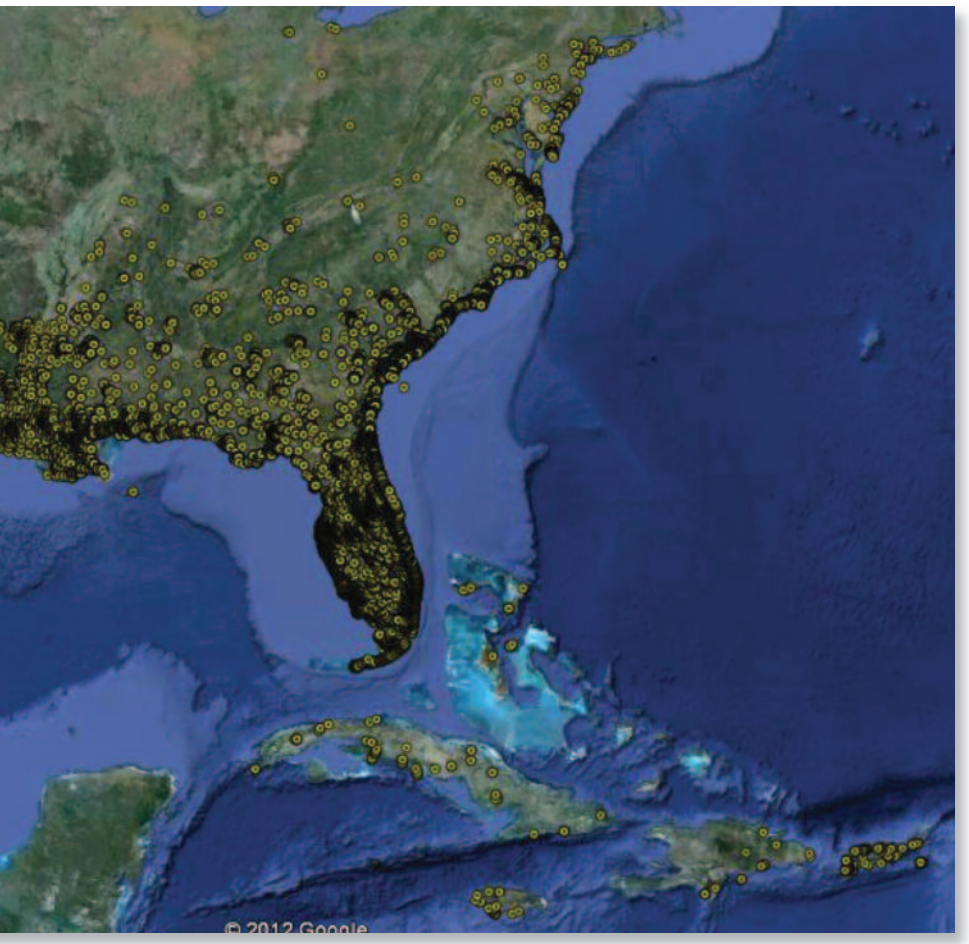
The locations of checklists reporting egrets were plotted on maps. Political jurisdictions, geographical place names and locations of breeding colonies of egrets within the study area (Peck 2007,

CWS unpubl. data, F. Cuthbert unpubldata), to which at least some of these birds probably were headed, are shown in Figure 1. For clarity's sake, these are only shown on Figure 1 and not on Figures 2–7.

Figure 2. The distribution of eBird checklists reporting Great Egrets from the area east of the Mississippi River during the winter period 1 – 15 February.

Results

The winter distribution (1–15 February) of egrets in eastern North America is shown in Figure 2. There are three sightings from Ohio (south of Lake Erie) but the rest of the sightings come from the U.S. coast from New York to New Orleans, the inland half of the southeastern U.S. and the Caribbean Islands.



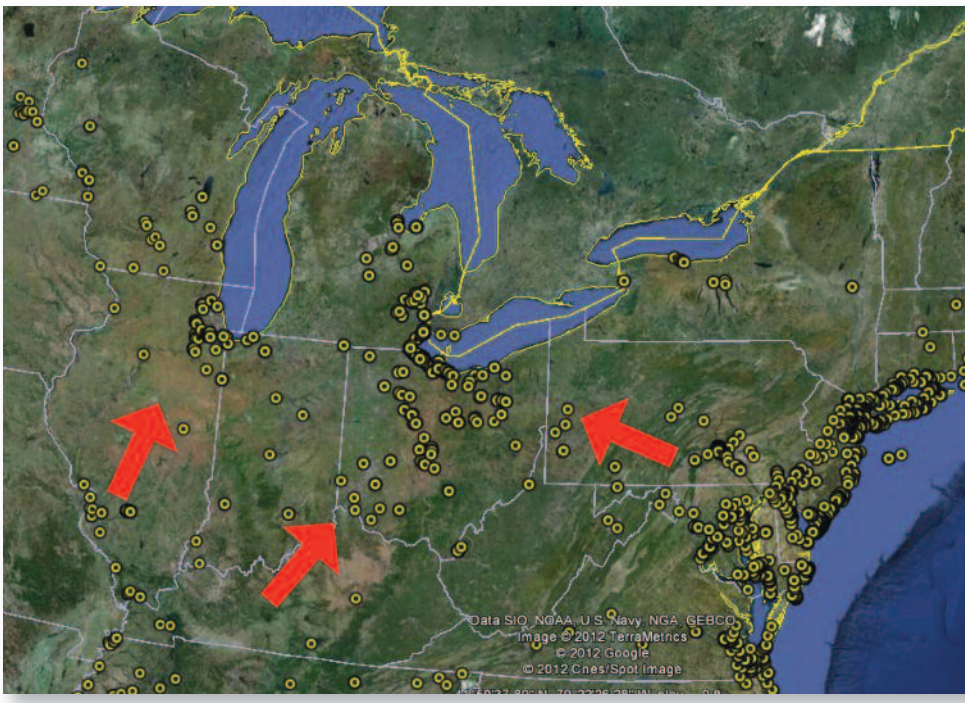

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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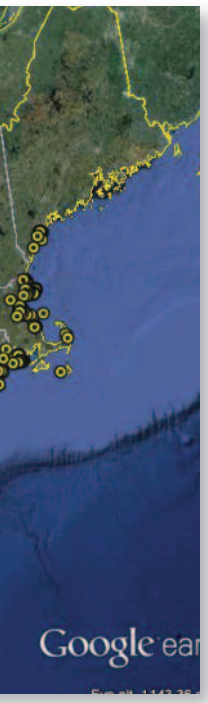
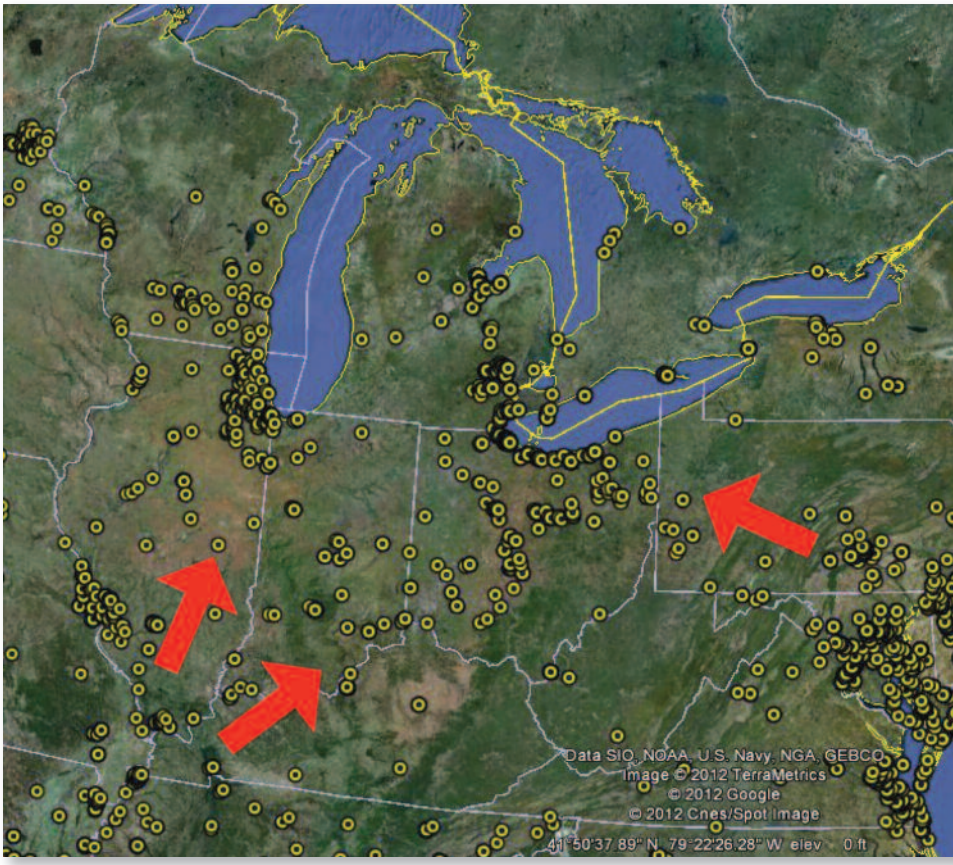
Figure 3. The distribution of eBird checklists reporting Great Egrets from the Great Lakes Basin during 1 – 15 March.

Figure 4. The distribution of eBird checklists reporting Great Egrets from the area east of the Mississippi River during 16 – 31 March. Arrows indicate possible areas of concentrated migration (see text).

For the period 1 – 15 March (Figure 3), eBird data showed 10 locations where egrets were reported: five from Ohio, two from Michigan and one each from Indiana, Illinois and Wisconsin. None were reported in Ontario and none were reported from the Niagara Peninsula or along the eastern end of Lake Ontario. For the latter half of March (16 – 31 March, Figure 4), there was a massive increase in the number of checklists which reported egrets in the Great Lakes Basin area (on each checklist the number of egrets reported is variable). Along the Great Lakes, there were major areas of concentration in western Lake Erie and southern Lake Michigan. There is evidence of a line of observations (a migration corridor/ route?) from just north of Chesapeake Bay in Maryland northwest towards western Lake Erie. There is also evidence of an area of concentration in southern Illinois with possible lines of observation moving northeast towards both southern Lake Michigan and, slightly more easterly, towards western Lake Erie. It also appears that there is a line of observations northward along the west coast of Lake Michigan. There are a few reports of egrets from the Niagara Peninsula-Finger Lakes. This may be suggestive of a minor migration corridor along this route as well. It is noteworthy to see that there are no reports from the eastern two-thirds of the south shore of Lake Erie or the eastern end and north shore of Lake Ontario.



During the first ten days of April (Figure 5), the areas of intense egret reporting and the lines of observation observed in late March are still evident. Areas of concentration include south/southwestern Lake Michigan and western Lake Erie. Lines of egret reporting extend from southwestern Illinois at the Missouri border to southern Lake Michigan and then up the west shore of that lake to southern Green Bay and into south-central Wisconsin. A line of observation also extends from southern Illinois to the northeast towards western Lake Erie. This line seems to be joined by one extending northwestward from the area of Delaware-Maryland and the Chesapeake Bay on the Atlantic coast. Once at the western end of Lake Erie, lines of observation go NNW towards Saginaw Bay (Michigan) and to the east and northeast into Ontario. The minor line of observation through the Finger Lakes-Niagara Peninsula still persists and may be originating in Massachusetts.



For 11–20 April (Figure 6), all of the apparent lines of observation described for 1 – 10 April (Figure 5) are still present. The concentration of egret reports in S/SW Lake Michigan have expanded northwestward into SE Minnesota. The two-pronged movement NE out of southern Illinois is still evident. The movement out of the Chesapeake Bay areas appears to be on more of a broad front than previously. There are more egret reports in central southern Ontario and along the north shore of Lake Ontario than previously, as well.

There are still noteworthy areas of few if any reports: the eastern shore of Lake Michigan and the upper peninsula of Michigan and all of eastern Ontario and the Adirondack mountains in northern New York. There are a small number of reports up the east side of New York State, perhaps following the Hudson

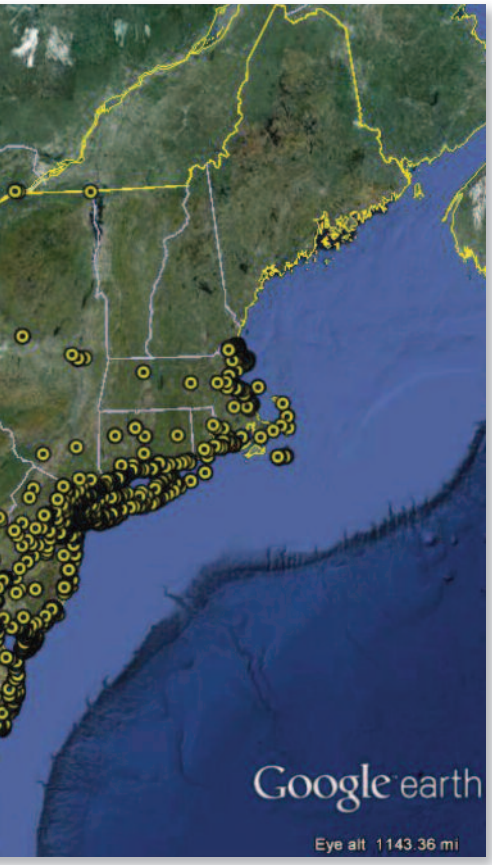


Figure 5. The distribution of eBird checklists reporting Great Egrets from the area east of the Mississippi River during 1 – 10 April. Arrows indicate possible areas of concentrated migration.

River and Lake Champlain valleys. To the northwest of there, egrets appear again in the St. Lawrence River and the Ottawa River. It remains to be seen, however, if that is a continuous migration corridor. Back on the Atlantic coast, egrets have moved into coastal Maine during this period.

The data for 1 –15 June (Figure 7) show the summer distribution of egret sightings in southern Ontario and the Great Lakes. The major areas of reporting are the corridor from western Lake Erie to Saginaw Bay and the entire western shore of Lake Michigan and inland in central Wisconsin. Lesser areas of reporting are the north shore of lake Ontario, the base of the Bruce Peninsula and surrounding area and the area from the Niagara River east to the Finger Lakes.

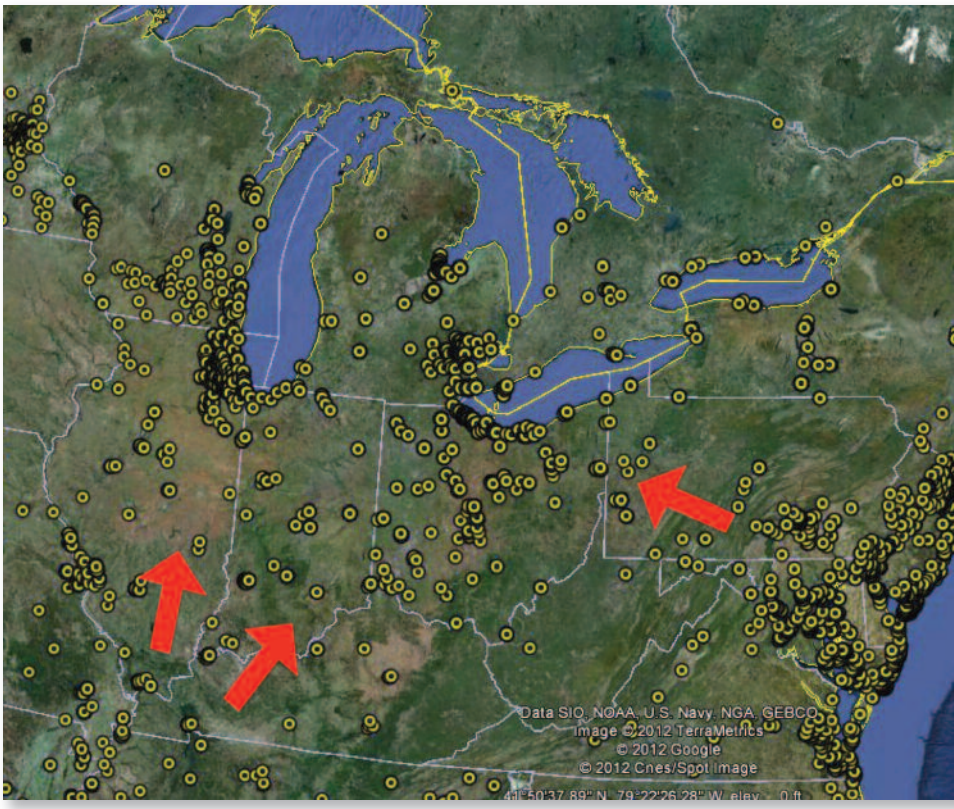
Discussion

The eBird data for early spring migration (March – mid-April) of egrets into the Great Lakes Basin show the largest area of reporting comes from the western end of Lake Erie after arriving from the southeast and the southwest. From there, there is a strong movement NNW towards Saginaw Bay (Michigan) and, once around the west end of Lake Erie, egrets also appear to go eastward along the north shore of Lake Erie, where there could be a mixing with egrets who have crossed Lake Erie via the archipelago of the western Lake Erie islands. The south end of Lake Michigan (though not of consequence for Ontario) is a second area of major arrivals. Egrets may have arrived there via a NW movement from (or before reaching) western Lake Erie but also via a strong line of observation from southern Illinois. Such a movement

would suggest those birds originated from the Gulf of Mexico as opposed to the birds at the west end of Lake Erie which probably arrived from the Atlantic coast. There appears to be a small and not very concentrated movement of egrets westward through the Niagara Peninsula and little or no movement around the east end of Lake Ontario. Thus, most Great Egrets would appear to come into Ontario via Essex County.

In using eBird data, it must be remembered that records come from where birders submit their checklists. When an area does not show any birds (egrets) present, the first question one must ask is "Does the lack of reports indicate no birds or no birders in a given area?" For example, the few reports of egrets in spring from the Ontario portion of the Niagara Peninsula is probably reflective

Figure 6. The distribution of eBird checklists reporting Great Egrets from the area east of the Mississippi River during 11 – 20 April. Arrows indicate possible areas of concentrated migration.



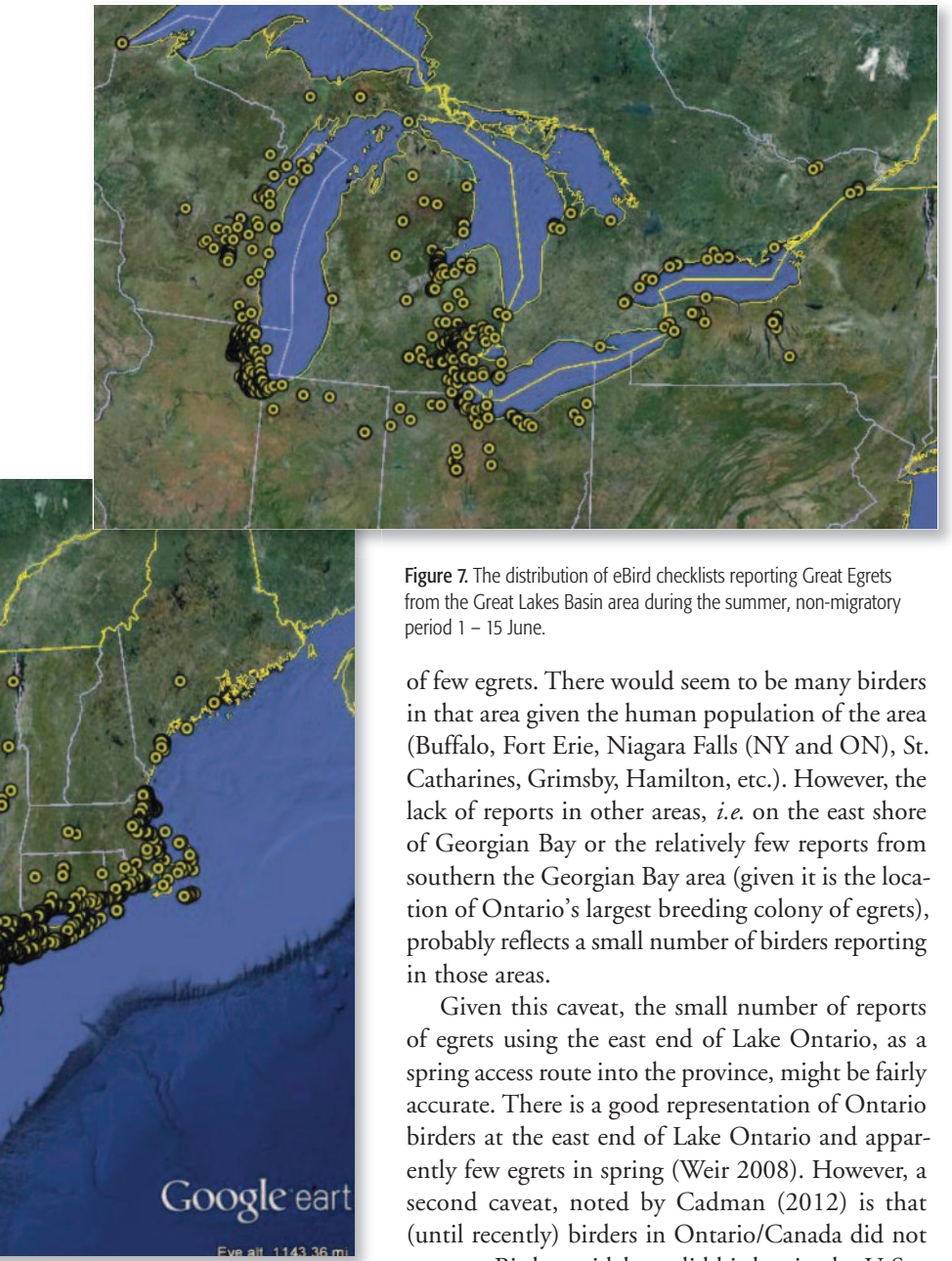


Figure 7. The distribution of eBird checklists reporting Great Egrets from the Great Lakes Basin area during the summer, non-migratory period 1 – 15 June.

of few egrets. There would seem to be many birders in that area given the human population of the area (Buffalo, Fort Erie, Niagara Falls (NY and ON), St. Catharines, Grimsby, Hamilton, etc.). However, the lack of reports in other areas, *i.e.* on the east shore of Georgian Bay or the relatively few reports from southern the Georgian Bay area (given it is the location of Ontario's largest breeding colony of egrets), probably reflects a small number of birders reporting in those areas.

Given this caveat, the small number of reports of egrets using the east end of Lake Ontario, as a spring access route into the province, might be fairly accurate. There is a good representation of Ontario birders at the east end of Lake Ontario and apparently few egrets in spring (Weir 2008). However, a second caveat, noted by Cadman (2012) is that (until recently) birders in Ontario/Canada did not yet use eBird as widely as did birders in the U.S.

This has changed dramatically in the last year; eBird reports from Ontario birders are now second only to those from birders in California (see eBird.com).

Another interesting feature contributed by this eBird analysis pertains to the use of roost sites by egrets in spring. Birders reporting egrets on the Ontbirds listserv and other Ontario birders have helped us locate upwards of 40 autumn roosting sites of egrets in the Lower Great Lakes Basin (DVCW unpubl. data). Very few of these roosts appear to be occupied in the spring, though our coverage then is somewhat limited. However, one of the roosts that is active in spring is at Muddy Creek in eastern Essex County (Weseloh and Wormington 2010). It stands to reason that there could be large numbers of egrets in the Essex County area in the spring, as a result of a major movement of birds eastward along the north shore of Lake Erie from the Detroit River and northward across the Pelee Island archipelago. The roost site at Muddy Creek might be one of the first traditional and safe overnight resting areas egrets encounter as they come from northern Ohio, following the migration routes proposed here.

Hopefully, this account gives our readers a first-hand view of the type of information and analysis that is available by contributing their checklists of bird observations to eBird. We also encourage Ontario birders to visit eBird and the AKN and investigate the data for their favourite species.

Acknowledgements

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Literature Cited

Bent, A.C. 1926. Life histories of North American marsh birds. Bulletin of the U.S. National Museum, No.135, Washington, D.C. 392 pp. (Dover reprint 1963).

Black, J. E. and **K. J. Roy**. [Eds.]. 2010. Niagara Birds: a compendium of articles and species accounts of the birds of the Niagara Region in Ontario. Brock University Printing and Digital Service, St. Catharines, Ontario. 703 pp.

Burrell, M.V.A. 2012. eBird: a proposed provincial standard for regional bird record-keeping. Ontario Birds 30: 30-35

Bystrack, D. [Ed.] 1974. Wintering areas of bird species potentially hazardous to aircraft. National Audubon Society and the U.S. Fish and Wildlife Service. 156 pp.

Cadman, M. 2012. Your local birding can help conserve Canada's Boreal Birds. OFO News 30:6-7

Curry, R. 2006. Birds of Hamilton and surrounding area. Hamilton Naturalists Club. Hamilton, Ontario. 647 pp.

McCrimmon, D. A., Jr., J.C. Ogden and **G.T. Bancroft**. 2011. Great Egret. (*Ardea alba*). In Birds of North America, No. 570 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pa.

Peck, G.K. 2007. Great Egret, pp 160-161 *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."

Root, T. 1988. Atlas of wintering North American birds: an analysis of Christmas Bird Count data. University of Chicago Press, Chicago. 312 pp.

Speirs, J.M. 1985. Birds of Ontario. Natural Heritage/Natural History Inc., Toronto, Ontario. 986 pp.

Weir, R.D. 2008. Birds of the Kingston Region. 2nd Ed. Kingston Field naturalists. Kingston, Ontario. 611 pp.

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Changes in Summer Abundance and Distribution of Mute Swans along the Lower Great Lakes of Ontario, 1986 – 2011

Mute Swan *Photo: Homer Caliwag*

Shawn W. Meyer, Shannon S. Badzinski, Michael L. Schummer and Christopher M. Sharp

Introduction

The Mute Swan (*Cygnus olor*) is one of three swan species that occur in North America, but is the only swan that is not native to the continent. Near the beginning of the 20th century, Mute Swans were transported into North America from Europe and Asia where they were released intentionally or escaped from captive or semi-captive collections leading to establishment of feral populations along the mid-Atlantic coast of the U.S., portions of the Pacific coast and the Great Lakes region (Ciaranca *et al.* 1997). Breeding populations became established within coastal and inland marshes in portions of the Great Lakes region of the U.S. and Canada during the late 1950s through the 1970s (Petrie and Francis 2003). In Ontario, the first Mute Swan nest was documented in the

southwestern part of the province in 1958 and swans were first observed on the lower Great Lakes (LGL) (Lakes Ontario, Erie, St. Clair and their connecting rivers) during the 1960s (Peck 1966, Knapton 1993). Since that time, their abundance and distribution has increased substantially in Ontario, particularly along the shorelines, marshes and rivers associated with lakes St. Clair, Erie and Ontario (Petrie and Francis 2003, Badzinski 2007).

The LGL are an important spring and autumn staging area, providing feeding and resting habitat for millions of waterfowl and other waterbirds (Dennis *et al.* 1984, Schummer and Petrie 2011). Substantial and increasing numbers of Mute Swans have the potential to affect waterfowl (and other wetland-dependent and aquatic organisms) and their habitat in the LGL region in a variety of ways (Petrie and Francis 2003). As one of the larger-bodied waterfowl nesting in North America, Mute Swans aggressively defend nest sites, broods and foraging areas. Thus, they compete with other wildlife for critical habitat resources and can cause physical harm to humans (Ciaranca *et al.* 1997, Therres and Brinker 2004). Mute Swans also consume and uproot substantial quantities of aquatic vegetation during foraging which can reduce availability of food to native herbivores and alter abundance and composition of aquatic plants in aquatic ecosystems (Cobb and Harlan 1980, Allin and Husband 2003, Tatu *et al.* 2007). Thus, an increasing population of Mute Swans is a conservation concern in the LGL region and elsewhere in North America.

Despite being an invasive, non-native species, Mute Swans are protected currently under the *Migratory Birds Convention Act,* 1994 in Canada. Mute Swans and other non-native species, however, are not federally protected in the U.S. since enactment of the *Migratory Bird Treaty Reform Act* in 2004 (United States Fish and Wildlife Service 2005). Petrie and Francis (2003) and Bailey *et al.* (2008) suggested removing Mute Swans from the list of federally protected species in Canada to facilitate control before populations attained levels that could affect health and function of the LGL coastal marsh ecosystem, components which are critical to sustaining populations of native fish and wildlife. Canada is currently reviewing the federal protection status of Mute Swans. In the meantime, accurately monitoring abundance and distribution of these swans over time is critical in the development of management strategies for Mute Swans and the habitats they negatively affect in Ontario and throughout Canada.

The population and range expansion of Mute Swans in the LGL region and throughout Ontario has been well documented using data from several different long-term, multi-species surveys. Petrie and Francis (2003) used data collected between 1980 and 2000 from the Breeding Bird Survey (BBS), Christmas Bird Count (CBC), the Midwinter

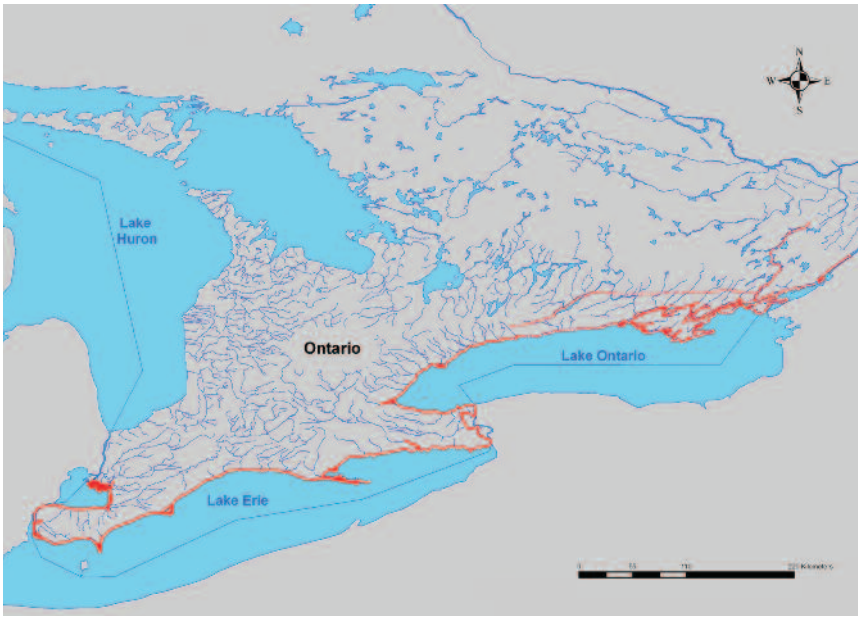


Figure 1. The lower Great Lakes shoreline, marsh complexes, rivers, and inland lakes surveyed during the Mid-Summer Mute Swan Survey in Ontario. The red line indicates the aircraft flight path recorded by an onboard Global Positioning System (GPS) during the 2011 survey. Produced by CWS–ON under licence with OMNR. Queen's Printer (c) 2011

Waterfowl Survey (MWS) and 1971 – 2000 aerial surveys of migrant waterfowl at Long Point – Lake Erie, Ontario, to document a rapid increase in Mute Swan abundance in the LGL region. It was estimated that the population of Mute Swans on the LGL increased by 10% to 18% per year between 1980 and 2000 and it was predicted that it could double by 2010 (Petrie and Francis 2003). The first and second Breeding Bird Atlases of Ontario showed that Mute Swans became more common and widely distributed along the LGL coastline, particularly around Lake Ontario and at inland locations in southern Ontario from the 1980s through 2000s (Badzinski 2007). None of the above-mentioned surveys, however, were designed specifically to monitor the Mute Swan population in the province.

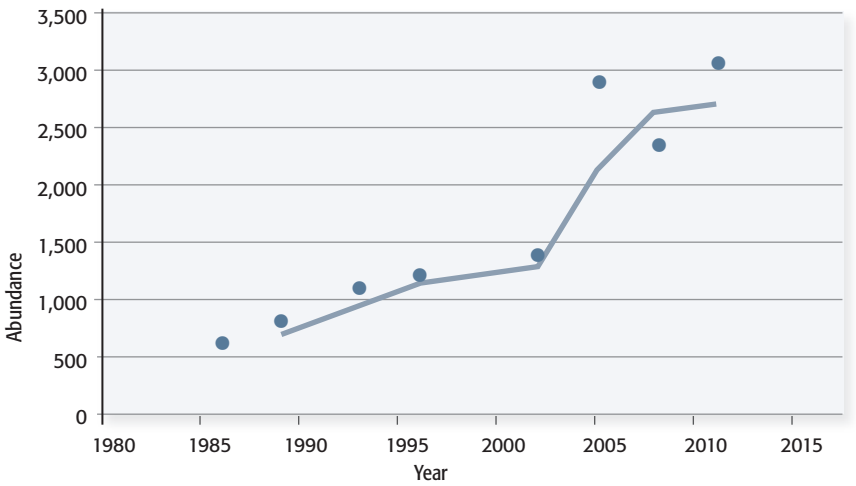
The Mid-Summer Mute Swan Survey (MSMSS) is a broad scale, coordinated, international monitoring initiative conducted throughout states and provinces in the Atlantic Flyway at three-year intervals since 1986 to determine abundance, productivity and distribution of Mute Swans in various jurisdictions and regions. Data collected during the survey are used to track and monitor population size and, in some

states, to set and evaluate population management goals for Mute Swans. In Ontario, the survey traditionally has covered the northern shoreline of the St. Lawrence River and the LGL, including the associated coastal marsh complexes. This survey provides the most current and detailed information on abundance and distribution of Mute Swans in the province. The purpose of this paper is to describe changes in Mute Swan abundance between 1986 and 2011 and distribution between 2002 and 2011 in the LGL region of Ontario.

Methods

The MSMSS is an internationally coordinated aerial survey that is conducted at three year intervals between 1 and 30 August in northeastern North America. In Ontario, this survey has been flown, traditionally, along the shorelines of the St. Lawrence River, Lake Ontario (including East Lake, West Lake and Lake Consecon), Niagara River, Lake Erie, Detroit River, and Lake St. Clair, as well as over associated or nearby marsh complexes (Figure 1). During 2011, the survey area was expanded inland to include Rice Lake, Odessa Lake, and the Rideau Canal system between Kingston and Ottawa. The survey is conducted from a fixed-winged aircraft flying at an altitude of ~100 m, at a speed of ~150 kph and 250 m off of the shoreline. Survey routes over large wetland complexes and inland lakes are flown to maximize coverage of suitable habitat where swans may occur. The shoreline and inland survey area is divided into sectors, which are smaller geographic units based on landscape features and readily identifiable landmarks that enable determination of abundance and distribution of swans at finer scales.

Figure 2. Number of Mute Swans observed along the lower Great Lakes of Ontario during the Mid-Summer Mute Swan Survey 1986 – 2011. Trend line indicates 2-yr moving average.



Two observers, one on each side of the aircraft, use a tape or digital voice recorder to record abundance of adults (including sub-adults), cygnets and broods/family groups, as well as associated information on date, time, general location (*e.g.*, name of lake, river, bay), survey segment, general habitat type (*e.g.*, lake, impoundment, river, marsh), development zone (as of 2008: urban, suburban, rural), and latitude / longitude (as of 2011). Data are transcribed following surveys, entered into a standard electronic database and archived on a centralized server with Environment Canada. ArcGIS was used to create maps showing temporal and spatial patterns in abundance and distribution of Mute Swans in the LGL region of Ontario.

Results

Between 1986 and 2011, eight Mute Swan surveys were conducted on the LGL. Over this timeframe, the total abundance of Mute Swans increased from 615 to 3,062 in the traditional LGL survey area in Ontario; this represents an average increase of 15.9% per year (Table 1). Since 2005, the Mute Swan population in the LGL has increased at a slower rate (approximately 1.0% per year) (Figure 2 and Table 2). Abundance of adults and cygnets was not recorded separately until 2002, after which time the age classes increased by approximately 14.4% and 7.7% per year, respectively (Table 1). Since 2005, the number of broods has been counted in the traditional survey area. The surveys of 2005 and 2011 showed an increase from 85 to 126 broods, representing about an 8.0% per year increase (Table 1).

The local abundance of Mute Swans changed at several areas within the traditional LGL survey area between 2002 and 2011 (Figure 3). On Lake Ontario, the greatest rates of increase occurred at the east end in the vicinity of Prince Edward County (including East Lake, West Lake, Bay of Quinte, and Kingston area), whereas decreases occurred in central Lake Ontario just west of Prince Edward County and at Hamilton Harbour (Figure 3a). The greatest rate of increase was approximately 170% per year at West Lake – Prince Edward County, whereas the greatest decrease was approximately 18% per year along the shoreline between Presqu'ile Bay and Bowmanville.

Table 2. Abundance and average percent change per year the Midwinter Survey - Lower Great Lakes (MWS-LGL) and

	1986	1989	1993	1996
Survey				
MSMSS Ontario	615	811	1,100	1,200
MWS-LGL Ontario	-	-	-	-
CBC - Ontario	63	100	227	202

* = not all survey sectors flown

Table 1. Number and average percent per year (% / Yr) of swans and broods observed during the Mid-Summer Mute Swan Survey in Ontario

	1986	1989	1993	1996	2002	2005	2008*	2011	% / Yr
Number of swans									
Adults	-	-	-	-	1,224	2,477	2,087	2,810	14.4 (since 2002
Cygnets	-	-	-	-	149	417	270	252	7.7 (since 2002)
Total	615	811	1,100	1,200	1,373	2,894	2,357	3,062	15.9 (since 1986)
Total Number of Broods	-	-	-	-	-	85	79	126	8.0 (since 2005)
Average Number of Cygnets per Brood	-	-	-	-	-	4.91	3.42	2.00	

– = incomplete data * = not all survey sectors flown

(%/Yr) of Mute Swans observed in Ontario during the Mid-Summer Mute Swan Survey (MSMSS), the Christmas Bird Count (CBC) from 1986-2011.

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	% / Yr
1,373	-	-	2,894	-	-	2,357*	-	-	3,062	-	15.9 (since 1986) 13.7 (since 2002) 1.0 (since 2005)
1,369	1,485	1,282*	2,928*	4,727	3,847*	374*	1,558*	2,371*	2,914*	2,787*	10.4 (since 2002) -0.7% (since 2005)
974	1,231	884	789	1,236	1,234	1,279	1,529	1,582	-	-	100.5 (since 1986)

CBC data accessed from the National Audubon Society website 23 January 2012.

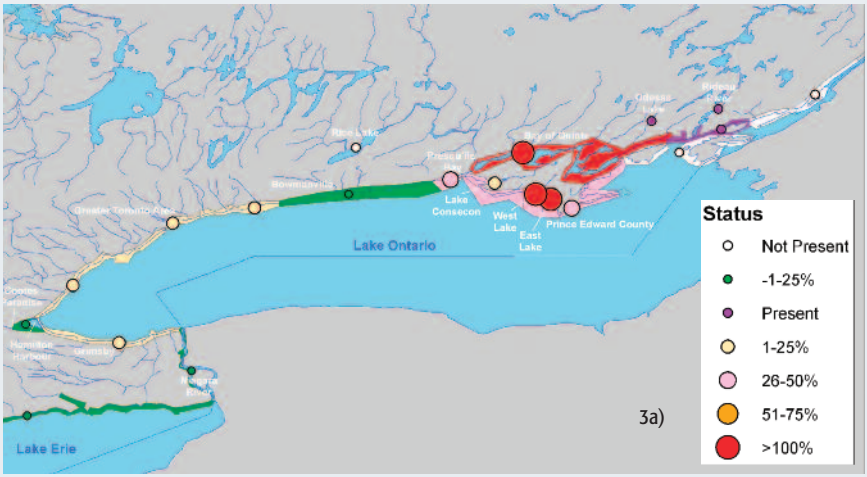
Two pairs of swans each with four cygnets were observed on the Rideau Canal system and a single pair with four cygnets was observed on Odessa Lake (Figure 3a). Notable areas of increase further west in the LGL region, included Rondeau Bay and Holiday Beach – Lake Erie and the upper Detroit River and Lake St. Clair (Figure 3b). Decreases have occurred between 2002 and 2011 across a large part of southern Ontario from the Niagara River including the shoreline of Lake Erie between Fort Erie and Long Point, Point Pelee marsh and the lower Detroit River (Figure 3b).

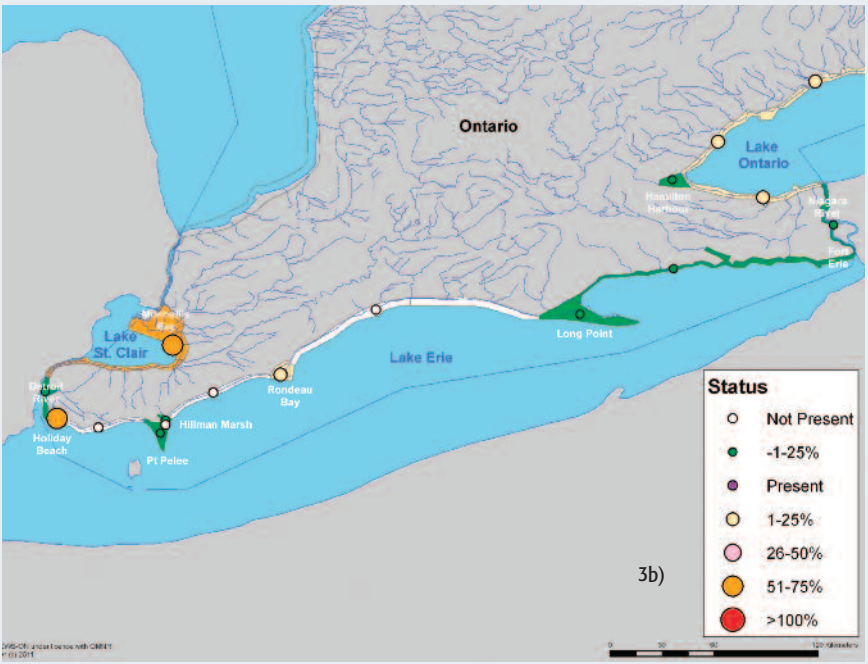
Discussion

Between 1986 and 2011, the abundance of Mute Swans along the Ontario side of the LGL during the MSMSS has increased from 615 to an all-time high of 3,062 swans, which represents an average increase of nearly 16% per year over that time. Although our observations suggest that the LGL population of Mute Swans has increased more than predicted by Petrie and Francis (2003) since 1986, the rate of increase has slowed since 2005 in the traditional survey area. Petrie and Francis (2003) calculated that with a conservative growth-rate estimate of 10%per year, the population of Mute Swans on the LGL would double every 7-8 years (*i.e.*, 2010). Results from the 2011 MSMSS show that the population in 2010 was likely around 2,700 swans, approximately double the 2002 estimate. Although counts of Mute Swans in Ontario from the MWS generally correlate closely with data from the MSMSS, CBC data show an increase of approximately 100% per year since 1986 – likely due to the fact that very few swans were detected in CBC circles in the mid-1980s (Table 2). The slower growth rate, or potential declining rate of Mute Swans in the LGL (see Table 2 – MWS), in recent years suggests that these highly territorial swans may either be reaching a level that is restricting future population growth (*i.e.*, carrying capacity) in the LGL, at least in their core use areas that are traditionally surveyed, or that annual control initiatives on the U.S. side of the Huron-Erie Corridor may be limiting population growth. At inland wetlands and lakes, however, the population appears to be rapidly increasing as the range of the Mute Swan expands beyond the shorelines of the Great Lakes towards interior portions of Ontario. The continued increase in the population and range of Mute Swans in Ontario is a concern because it could reach a level where local ecosystem degradation is possible and management options could not effectively curtail population growth.

Since 2002, MSMSS data have shown localized population changes in several areas along the LGL shoreline.The greatest rate of increase in Mute Swans has occurred around and within Prince Edward County in eastern Lake Ontario.

Figure 3. Change (percent per year) in Mute Swan (*Cygnus olor*) abundance between the 2002 and 2011 Mid-Summer Mute Swan Surveys within shoreline sectors and marsh complexes at: **3a)** St. Lawrence River and Lake Ontario (including the Rideau River system – Kingston to Ottawa, Odessa Lake, and Rice Lake – 2010 only) and **3b)** Niagara River, Lake Erie, Detroit River and Lake St. Clair.

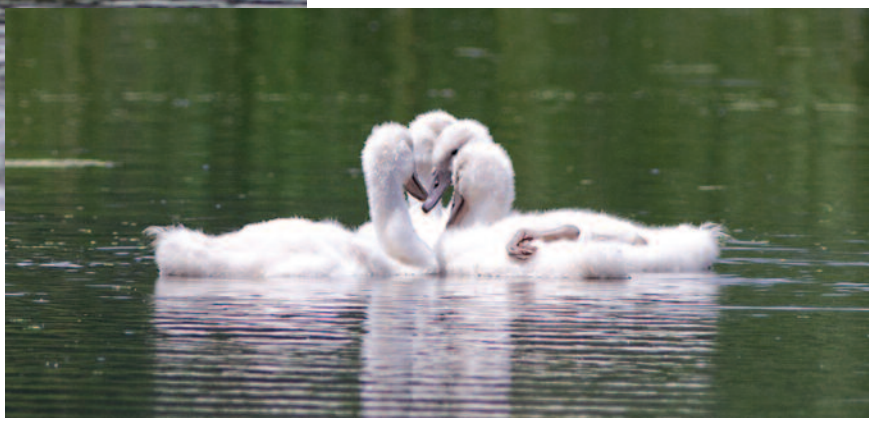




The greatest rate of increase in Mute Swans has occurred around and within Prince Edward County in eastern Lake Ontario.

Mute Swan and cygnets *Photo: Ann Brokelman*

The expansion of Mute Swans into this area probably is due to emigration from nearby high density nesting areas, such as Presqu'ile Bay; a predicted response when optimal breeding habitat is filled with territorial breeding pairs and nesting habitat becomes limiting. Data from the Ontario Breeding Bird Atlas also suggest that birds from the Presqu'ile Bay area have begun to breed in adjacent atlas squares thereby contributing to the eastward range expansion that has occurred since the early 1980s (Badzinski 2007). The area contains a considerable amount of shallow, productive emergent marshes with substantial submerged aquatic vegetation available to swans and relatively disturbance-free habitat, which are attractive habitats to breeding and moulting swans. For example, the number of broods increased from 0 to 12 between 2005 and 2011 at the Bay of Quinte. Similarly, the abundance of adults has increased over the same period at the Bay of Quinte, Smith Bay, Point Petre, and Lake Consecon. Mute Swans typically reach sexual maturity after 2 or 3 years (Ciaranca *et al.* 1997), so many of these non-breeding swans likely will have established territories and begun to breed in these wetlands by the time of the next MSMSS in 2014.



With improvements in aquatic vegetation, the abundance of Mute Swans breeding and using Cootes Paradise has increased considerably to the extent that now Mute Swan management is being implemented.

The decline in the abundance of Mute Swans between Presqu'ile Bay in the east and Bowmanville in the west (-18% per year) may be due to limited breeding and molting habitat. There are only a few harbours, such as Cobourg and Port Hope, and small isolated wetlands in this area, so few areas exist for swans to nest or seek refuge from the wind and waves on Lake Ontario (Environment Canada and Ontario Ministry of Natural Resources 2003). Movement of Mute Swans from these areas into suitable marsh habitats, such as Weller's Bay, East Lake, West Lake, Lake Consecon, Oshawa Second Marsh, Cranberry Marsh, Frenchman's Bay and the Rouge River may partly account for the decrease in this area but also for the increases in Prince Edward County and the area west of Bowmanville to the Niagara River (excluding Hamilton Harbour). Unlike Prince Edward County, marshes of central and western Lake Ontario are relatively small in size, have limited emergent vegetation (nesting habitat) and some have sparse submerged aquatic vegetation communities (brood rearing habitat) (Environment Canada and Central Lake Ontario Conservation Authority 2010), which may affect territory size, abundance and distribution of Mute Swan breeding pairs (Ciaranca *et al.* 1997). Notably, between 2002 and 2011, there was a trend of low and stable abundance of broods in central and western Lake Ontario, particularly the Greater Toronto area where 4, 7, 9 and 8 broods were counted during the four MSMSS conducted over that period. Habitat limitations, in conjunction with ongoing egg control initiatives in this region, likely has reduced recruitment so growth in the area between Bowmanville and Niagara River is mainly due to an increase in subadults moving from other locations.

The slight decline (-2.5% per year) in the abundance of Mute Swans in Hamilton Harbour may be due to the redistribution of swans from Hamilton Harbour into Cootes Paradise (adjacent marsh approximately 250 hectares in size that is not included in the MSMSS) or other inland locations. In the 1990s, the restoration of Cootes Paradise began in order to improve the quantity and quality of aquatic vegetation; since then water quality and marsh/aquatic habitats have improved greatly with the implementation of Project Paradise (Royal Botanical Gardens 1998, Environment Canada 2002). With improvements in aquatic vegetation, however, the abundance of Mute Swans breeding and using Cootes Paradise has increased

considerably to the extent that now Mute Swan management is being implemented. For example, between 2000 and 2003 there was an average of approximately four pairs of Mute Swans nesting in Cootes Paradise while this number increased to approximately seven pairs between 2008 and 2011. In addition, there are typically 25 – 50 Mute Swans using the marsh during mid-summer (T. Theysmeyer, pers. comm.). Although Trumpeter Swans were re-introduced into Cootes Paradise in 1982 with the hopes that they would displace and exclude Mute Swans, to date, this has not happened. Instead, Mute Swans appear to be outcompeting Trumpeter Swans for nesting sites.

The abundance of Mute Swans at the Niagara River has declined by approximately 11% per year since the 2002 MSMSS. This area has very little, if any, breeding habitat and limited foraging habitat due to the high river flow rate, depth and linearity. This likely explains the sporadic and infrequent use by relatively few adults (only five adults were observed during the MSMSS in 2002) and why no broods have been reported since 2002. Data from the Ontario Breeding Bird Atlas also confirm the lack of breeding in the Niagara River, but reports possible breeding evidence near the mouth at Lake Ontario during the 2001 – 2005 survey (Badzinski 2007).

The area west of the upper Niagara River at Fort Erie to Long Point on Lake Erie experienced a decline of 7-10% per year in the abundance of Mute Swans between 2002 and 2011. Much of the highest quality emergent marsh habitat and shallow productive bays in this area are located at the Long Point coastal marsh complex, where annual permits were issued to property owners and wetland managers to facilitate localized control of Mute Swans during that period. Moreover, between 2001 and 2004, Mute Swans were collected at Long Point – Lake Erie and the Canadian side of the Detroit River and Lake St. Clair by Long Point Waterfowl as part of Mute Swan diet study (Bailey *et al.* 2008). These activities may explain the decrease in the number of adults from 67 to 15 individuals in this area between 2002 and 2011, which effectively reduced the local breeding population and recruitment in the area. Similarly, localized population control programs on the U.S. side of the Detroit River and Lake St. Clair area have resulted in fewer swans in these areas in recent years. For example, 1,237 Mute Swans were removed from the Detroit River and Lake St. Clair area between 2009 and 2011 (D. Marks, pers. comm.); this may explain part of the large decline from 898 to 264 birds between 2008 and 2011 surveys.

Further west of Long Point, the abundance of Mute Swans has increased at considerable rates at Rondeau Bay and Holiday Beach – Lake Erie near the lower Detroit River and Lake St. Clair, each of which contain optimal breeding and foraging habitats. For example, the largest wetland complex in the Great

Lakes, nearly 6,900 ha on Walpole Island First Nation, occurs at the north end of Lake St. Clair (United States Army Corps of Engineers 2004). Immediately south of this delta, Mitchell's Bay and St. Luke's Bay are shallow embayments that contain large quantities of submerged aquatic vegetation available to swans. As a result, the north end of Lake St. Clair consistently is where the majority of Mute Swans occur in western Ontario and throughout the entire LGL region of Canada. Movement of swans due to disturbance from egg control and culling activities in nearby private wetlands and the Detroit River may also partly account for the nearly 10 fold increase in Mute Swans between 2008 and 2011 at Lake St. Clair.

Although some localized culls and egg control programs have reduced the number of pairs, non-breeding adults, and cygnets in some areas, such as Long Point – Lake Erie and the lower Detroit River, the population of Mute Swans using the LGL continues to slowly increase (Table 1) and expand its range within Ontario (Badzinski 2007). This increase and expansion is a concern for biologists and wetland managers in the LGL region and elsewhere for several reasons. First, the LGL population of Mute Swans provides a source of swans for continued colonization of suitable marsh habitats associated with the LGL and suitable inland habitats. Range expansion within Ontario (north and east) is already occurring as well as in adjacent States such as Michigan. If predicted warmer winters and reduced lake ice occur in the LGL region in the future (Mortsch *et al.* 2006), range expansion is likely to occur rapidly and perhaps even further north. Second, more breeding pairs of Mute Swans over time will result in more conflicts with native wildlife and humans because of their aggressive behaviour. Third, large and increasing numbers of Mute Swans may cause localized wetland degradation due to their significant food requirements and foraging activities (Therres and Brinker 2004, Tatu *et al.* 2007). Consequently, reduced quality and quantity of food resulting from local wetland degradation or indirect competition with Mute Swans may negatively affect a multitude of native waterfowl, waterbirds and fish that depend on LGL coastal wetlands during portions of their annual life cycle. Thus, monitoring the growth and expansion of the population of Mute Swans in Ontario (and elsewhere) is paramount for ensuring that appropriate management actions can be prescribed and undertaken quickly enough to minimize ecosystem-related and human conflicts caused by this non-native species.

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Literature Cited

Allin, C.C., and **T.P. Husband**. 2003. Mute swan impact on submerged aquatic vegetation and macroinvertebrates in a Rhode Island coastal pond. Northeastern Naturalist 10:305–318.

Badzinski, S.S. 2007. Mute Swan (*Cygnus olor*). Pages 64 – 65 in M.D. Cadman, D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, editors. Atlas of the Breeding Birds of Ontario, 2001–2007. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature.

Bailey, M., S. A. Petrie, and **S. S. Badzinski**. 2008. Diet of Mute Swans in Lower Great Lakes Coastal Marshes. Journal of Wildlife Management 72:726-732.

Ciaranca, M.A., C.C. Allin, and **G.S. Jones**. 1997. Mute swan (*Cygnus olor*). *In* The Birds of North America, No.273 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pa, USA.

Cobb, J.S., and **M.M. Harlan**. 1980. Mute swan (*Cygnus olor*) feeding and territoriality affects diversity and density of rooted aquatic vegetation. American Zoologist 20:882.

Dennis, D.G., **G.B. McCullough**, **N.R. North**, and **R.K. Ross**. 1984. An updated assessment of migrant waterfowl use of Ontario shorelines of the southern Great Lakes. Pages 37–42 *in* Waterfowl Studies in Ontario, S.G. Curtis, D.G. Dennis, and H. Boyd, editors. Canadian Wildlife Service Occasional Paper 54, Ottawa, Ontario, Canada.

Environment Canada. 2002. Where Land Meets Water: Understanding Wetlands of the Great Lakes. Environment Canada, Toronto, Ontario, Canada. 72 pp. ISBN 0-662-32455-2.

Environment Canada and **Central Lake Ontario Conservation Authority**. 2010. Durham Region Coastal Wetland Monitoring Project: 6-Yr Technical Report. Module 3 – Biological Condition. Unpublished Report. Oshawa, Ontario, Canada.

Environment Canada and Ontario Ministry of Natural Resources (OMNR). 2003. The Ontario Great Lakes Coastal Wetland Atlas: A Summary of Information (1983-1997). Toronto, Ontario, Canada. ISBN 0-662-33822-7.

Knapton, R.W. 1993. Population status and reproductive biology of the mute swan, *Cygnus olor*, at Long Point, Lake Erie, Ontario. Canadian Field-Naturalist 107:354–356.

Mortsch, L., J. Ingram, A. Hebb, and **S. Doka** (eds.). 2006. Great Lakes Coastal Wetland Communities: Vulnerability to Climate Change and Response to Adaptation Strategies. Final report submitted to the Climate Change Impacts and Adaptation Program, Natural Resources Canada. Environment Canada and the Department of Fisheries and Oceans, Toronto, Ontario. 251 pp.

Peck, G.K. 1966. First published breeding record of Mute Swan for Ontario. Ontario Field Biologist 20:43.

Petrie, S.A., and **C.M. Francis**. 2003. Rapid increase in the lower Great Lakes population of feral mute swans: a review and a recommendation. Wildlife Society Bulletin 31:407–416.

Royal Botanical Gardens. 1998. Waterbirds of Cootes Paradise – Waterbird Restoration and Monitoring at Royal Botanical Gardens, Hamilton, Ontario, Canada. Royal Botanical Gardens. http://www.rbg.ca.

Schummer, M.L., and **S.A. Petrie**. 2011. The role of waterfowl in Lower Great Lakes aquatic food webs. LakeLine Magazine. Summer 2011: 36-40.

Tatu, K.S., **J.T. Anderson**, **L.J. Hindman**, and **G. Seidel**. 2007. Mute Swans' impact on submerged aquatic vegetation in Chesapeake Bay. Journal of Wildlife Management 71:1431-1439.

Therres, G., and **D. Brinker**. 2004. Mute swan interactions with other birds in Chesapeake Bay. Pages 43–46 *in* M.C. Perry, editor. Mute swans and their Chesapeake Bay habitats: proceedings of a symposium. U.S. Geological Survey, Biological Resources Discipline Information and Technology Report USGS/BRD/ITR-2004-0005, Reston, Virginia, USA.

United States Army Corps of Engineers. 2004. St. Clair River and Lake St. Clair Comprehensive Management Plan. Detroit, Michigan, USA.

United States Fish and Wildlife Service. 2005. Final list of bird species to which the Migratory Bird Treaty Act does not apply. Federal Register 70:12710–12716.

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