ONTARIO BIRDS

VOLUME 34 NUMBER 2
AUGUST 2016

CELEBRATING OUR 100TH *Issue*

JOURNAL OF THE ONTARIO FIELD ORNITHOLOGISTS

Ontario Field Ornithologists (OFO) is dedicated to the study of birdlife in Ontario

OFO was formed in 1982 to unify the ever-growing numbers of field ornithologists (birders/birdwatchers) across the province, and to provide a forum for the exchange of ideas and information among its members.

The Ontario Field Ornithologists officially oversees the activities of the Ontario Bird Records Committee (OBRC); publishes a newsletter *(OFO News*) and this journal (*Ontario Birds*); operates a bird sightings listserv (ONTBIRDS), coordinated by Mark Cranford; hosts field trips throughout Ontario; and holds an Annual Convention and Banquet in the autumn. Current information on all OFO activities is on the OFO website (www.ofo.ca), coordinated by Doug Woods. Comments or questions can be directed to OFO by e-mail (ofo@ofo.ca).

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

OFO
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Welcome to the 100th issue of *Ontario Birds*. This tremendous milestone celebrates over 33 years of continuous publication.

Photo: Mark Peck

ONTARIO BIRDS

JOURNAL OF THE ONTARIO FIELD ORNITHOLOGISTS

Vermilion Flycatcher. Photo: P. Allen Woodliffe
Great Canadian Birdathon, 2014. Photo: Jeff Gordon
Red-bellied Woodpecker. Photo: Homer Caliwag

CELEBRATING OUR 100TH *Issue*

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Red Knot. Photo: Yves Aubry

Cover: Blue-winged Teal by Barry Kent MacKay

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President's message

Through articles in *Ontario Birds*, our understanding and appreciation of Ontario's bird life has been enhanced immeasurably.

Welcome to the 100th issue of *Ontario Birds*. This tremendous milestone celebrates over 33 years of continuous publication — an enormous accomplishment.

The Ontario Field Ornithologists (OFO) was founded in November 1982 as an organization dedicated to the study of bird life in Ontario. In the journal's first issue, then editors Chip and Linda Weseloh (yes, the same Chip who is an editor today) explained that the OFO executive envisaged a journal similar to the Saskatchewan Natural History Society's *Blue Jay* but devoted entirely to birds and directed solely at field ornithologists. *Ontario Birds* provided a unique outlet for original research and observations by both professional and amateur field ornithologists/birders (i.e., those who didn't earn a living from birding/field ornithology).

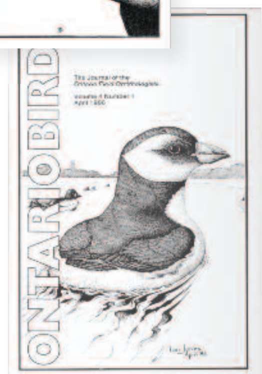
Since 1983, *Ontario Birds* has ably fulfilled its mandate. The quality of the reporting of the observations and research is so high that it has been cited in academic journals and was recently included in SORA, the Searchable Ornithological Research Archive database (https://sora. unm. edu/), which provides open access to ornithological research. Through articles in *Ontario Birds,* our understanding and appreciation of Ontario's bird life has been enhanced immeasurably.

I applaud the editors, past and present, who have devoted countless hours of their time to ensure that the content of *Ontario Birds* is relevant, accurate and meets the highest standards. My hope is that *Ontario Birds* will inspire more of Ontario's birders to conduct their own observations and research and share them with others in the years to come.

Lynne Freeman
OFO President

Celebrating 100 Issues of *Ontario Birds*

1983. Ross James



1986. Ian Jones

In its first year (1983), *Ontario Birds* had two issues published in black and white containing 20 articles in 76 pages. It now has three issues per year published in colour containing fewer articles but more pages. *Ontario Birds* maintains its practice of publishing unique and interesting observations from Ontario birders and ornithologists, but it has also developed a greater focus on in-depth inquiry from Ontario-based research on individual species and populations. To celebrate this growth, we thought it would be exciting to review some of the ornithological happenings in Ontario over the last 33 years.

In the following 100-plus pages of this, our 100th issue, we present several invited papers that examine birding and ornithology in Ontario since 1983. These include reviews of how our knowledge of Ontario's birds has changed, how the study of ornithology has advanced, how the practice of birding has changed and how birders themselves have become subjects of study. We include reviews of the status of selected bird species and groups, a review of the growth of the Ontario bird checklist as well as some reminiscences of a few of the birds "new-to-Ontario" since 1983. In addition to these special features of the 100th issue, we also include our normal August content (the report of the Ontario Bird Records Committee) and more of the kind of contributed papers that have been the backbone of *Ontario Birds* over the years.

One of the main purposes of *Ontario Birds* is to document the occurrences of new species of birds in Ontario. Mike and Ken Burrell accepted the challenge of reviewing those 79 species that have been added to the Ontario checklist since the inception of *Ontario Birds* and produced an analysis of their possible origin and the timing of their arrival in Ontario.

1994. Peter Burke

2001. Christine Kerrigan

2010. Barry Kent MacKay

We thought it would be interesting to reminisce and re-examine (through previously unpublished colour images) some of these new species. Mark Peck identified and located several of these and has produced an interesting collection and brief narrative.

Another goal of *Ontario Birds* is to report on the status of bird populations in Ontario: to identify which species are increasing, decreasing or holding steady. We asked Mike Cadman, Don Sutherland, Andrew Couturier and Jon McCracken to coordinate this aspect of our 100th issue and they have done so admirably by recruiting several of Ontario's leading bird specialists to report on these trends.

We felt it would be of interest to our readers, and fitting for this issue of *Ontario Birds* , to review how the scientific study of birds has changed over the course of our 100 issues. To achieve that end, we contacted several Ontario ornithologists and asked them to elaborate on some of the new research methods of the last 33 years.

We can all appreciate how our own experiences with birding have changed over our lifetimes, but we thought it would be interesting to get different perspectives on how birding has changed in Ontario since the 1980s. We asked Bob Curry and Jody Allair to address birding in the "good 'ole days" and compare it to birding in the electronic age; they have produced two interesting essays. The growth of birding as an activity over the three decades is no surprise to any of our readers, but it may come as a surprise that birders themselves have become the subject of study. Gavan Watson, who examined this topic for his Ph.D., has provided us with an essay that explores perspectives on birders that we think you will find novel and interesting.

Finally, we would be hugely remiss if we did not pay tribute to the dozens of volunteers and professionals who have put in hours and hours of time to produce our 100 high quality issues of *Ontario Birds* — and that is after the notes and manuscripts have been written and received. So, from the very first issues of *Ontario Birds*, when Chip and Linda sat down with Carol (Fox) Sabean and her design assistants Helen Pillonen, John Cormier and John Sabean to cut and past text onto "boards" to go to the printers, to today's high-tech electronic production and publishing, we would like to acknowledge and thank the individuals listed below.

We have not included all the authors — there are hundreds of them — but they are acknowledged on the OFO website in the indices and the back issues posted there; nor, unfortunately, are we able to include the many reviewers of articles as we simply did not record all of them, but to both groups we offer a huge "Thank you". Special recognition should go to Bill Crins, Ron Pittaway and Ron Tozer, who served as editors for 16 years, from 1990 to 2006 (an editorial reign which may never be equaled), and brought about much advancement in the content and appearance of *Ontario Birds*. They basically took the journal from a black and white entity to a full colour and glossy entity; thank you Bill, Ron and Ron! Special recognition should also go to Barry Kent MacKay who has produced 40 of the 100 cover illustrations to date and all of them since 2007; thanks Barry!

Last but not least, we thank Judie Shore and Jean Iron for noting, several months ago, that the August issue would be *Ontario Birds* 100th issue, in time for us to put together this special issue.

Even after all these years, *Ontario Birds* remains committed to publishing articles by amateur and professional ornithologists alike. We support them when they send in contributions and seek out others who may have contributions to make but need encouragement. We see it as our role as editors to provide advice on how to turn an observation into a note or an article by helping potential authors find the relevant literature, undertake statistical analysis where appropriate and write in the style needed in scientific journals. No matter if it's just an interesting behavior you saw or a report you prepared that might be suitable for publication and needs review, we editors are here to support you.

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2015. Barry Kent MacKay

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New species added to the Checklist of the Birds of Ontario: 1983-2016

Mike V.A. Burrell and Kenneth G.D. Burrell

Introduction

Perhaps the most regular annual feature of *Ontario Birds*, over its 33 years of production, has been the report of the Ontario Bird Records Committee (OBRC). These reports have been carefully prepared by the 13 different Secretaries who served OBRC throughout this time period. As relatively young birders, we can remember poring over these reports to bring ourselves up-to-speed on the patterns of vagrancy in Ontario. The annual reports remain a great source of information, containing interesting records, including first records for the province.

In this paper, we have conducted an analysis of the species that have been added to the Checklist of the Birds of Ontario since 1983 (i.e., over the life of *Ontario Birds*) for which the details establishing each addition were published in OBRC annual reports. We investigated the timing of these records and the trends in the geographic and taxonomic origin of these species to give the reader a better appreciation of the amazing list of birds which have been recorded in Ontario.

Ontario's third Sulphur-bellied Flycatcher, Thunder Cape, Thunder Bay on 30 September 2010.
Photo: Sachiko L. Schott.

Methods

We assembled the list of species added to the OBRC approved Checklist of the Birds of Ontario (hereafter called the Ontario checklist) based on the year in which the records were published in the annual reports from the OBRC for simplicity. This included some species which were observed prior to 1983. We did not include species resulting solely from taxonomic splits (Spotted Towhee [*Pipilo maculatus*] and Cackling Goose [*Branta hutchinsii*]) because they were not actually new to the province. We also excluded birds that could not be identified to the species level, (i.e., Tropical/Couch's Kingbird [*Tyrannus melancholicus/couchii*] and Sooty/Short-tailed Shearwater [*Puffinus griseus/tenuirostri*]).

Using eBird (2016), we assigned each species a geographic area of likely origin based on its known range. We then grouped species based on similar geographic area of origin for the purpose of discussing each source area separately. We included species in more than one geographic area of origin in cases where that species' range encompassed multiple areas. Definitions for the geographic areas of origin used are presented in Table 1 and the full list of species is presented in Table 2. We also analyzed the species' Order using the American Ornithologists' Union ([AOU] 1998) check-list of North American Birds up to the fifty-sixth supplement (Chesser *et al.* 2015).

Table 1: Geographic areas of origin and definitions for inclusion

Area	Definition
Southwest	Southwestern North America including southern California, Arizona, New Mexico and Mexico
Atlantic	Atlantic Ocean: north of the equator (seabirds)
Midwest	Midwestern North America covering the southern prairie provinces, the area east of the Rockies, west of the Mississippi River and north of Texas and New Mexico
Northwest	Northwestern North America, including the states and provinces north of and including northern California which border the Pacific Ocean.
Southeast	Southeastern North America, including the states east of Texas and south of Kentucky and West Virginia, and the Caribbean
Asia	The continent of Asia
Europe and Greenland	The continent of Europe, including Greenland
Central America	Central America (not including Mexico)
South America	The continent of South America

Table 2: New species added to the Ontario checklist with date of first observation, OBRC report publication year and possible geographic area(s).

Common Name	Scientific Name	First observed	Year	Geographic origin
Ash-throated Flycatcher	*Myiarchus cinerascens*	24 Nov 1962	1983	Southwest
Fish Crow	*Corvus ossifragus*	15 May 1978	1983	Southeast
California Gull	*Larus californicus*	14 May 1981	1983	Midwest
Golden-crowned Sparrow	*Zonotrichia atricapilla*	03 Jan 1982	1983	Northwest
Common Poorwill	*Phalaenoptilus nuttallii*	04 June 1982	1983	Southwest/Midwest
Lesser Goldfinch	*Spinus psaltria*	10 Aug 1982	1983	Southwest/Northwest
Sooty Tern	*Onychoprion fuscatus*	14 Aug 1955	1984	Southeast
Royal Tern	*Thalasseus maximus*	22 Aug 1974	1984	Southeast
Eurasian Blackbird	*Turdus merula*	12 April 1981	1984	Europe
Ross's Gull	*Rhodostethia rosea*	14 May 1983	1984	Other
Carolina Chickadee	*Poecile carolinensis*	18 May 1983	1984	Southeast
Siberian Rubythroat	*Luscinia calliope*	26 Dec 1983	1984	Asia
Swainson's Warbler	*Limnothlypis swainsonii*	22 May 1975	1985	Southeast
Lesser Sand Plover	*Charadrius mongolus*	04 May 1984	1985	Asia
Crested Caracara	*Caracara cheriway*	18 July 1892	1986	Southwest
Eurasian Jackdaw	*Corvus monedula*	13 April 1985	1986	Europe
Atlantic Puffin	*Fratercula arctica*	15 Dec 1985	1986	Atlantic
Long-billed Curlew	*Numenius americanus*	15 Oct 1959	1987	Midwest
Sulphur-bellied Flycatcher	*Myiodynastes luteiventris*	28 Sept 1986	1987	Southwest/Central America
Western Wood-Pewee	*Contopus sordidulus*	18 June 1984	1988	Northwest
Snowy Plover	*Charadrius nivosus*	04 May 1987	1988	Southwest/Midwest/ Southeast
Hermit Warbler	*Setophaga occidentalis*	10 Sept 1978	1989	Northwest
Brambling	*Fringilla montifringilla*	12 Nov 1980	1989	Asia/Europe
Great-tailed Grackle	*Quiscalus mexicanus*	07 Oct 1987	1989	Southwest
Magnificent Frigatebird	*Fregata magnificens*	28 Sept 1988	1990	Southeast/Central America
Cave Swallow	*Petrochelidon fulva*	21 April 1989	1990	Southwest
Broad-billed Hummingbird	*Cyanthus latirostris*	16 Oct 1989	1990	Southwest
Black Rail	*Laterallus jamaicensis*	14 June 1987	1991	Southeast
Ferruginous Hawk	*Buteo regalis*	17 March 1990	1991	Midwest
Black-chinned Hummingbird	*Archilochus alexandri*	25 May 1990	1991	Southwest
Wilson's Plover	*Charadrius wilsonia*	26 May 1990	1991	Southwest/Southeast
Cassin's Finch	*Haemorhous cassinii*	13 Aug 1990	1991	Southwest/Northwest
Black-capped Vireo	*Vireo atricapilla*	27 April 1991	1992	Southwest
White-winged Tern	*Chlidonias leucopterus*	08 May 1991	1992	Asia/Europe
Green Violetear	*Colibri thalassinus*	30 June 1991	1992	Central America
Painted Bunting	*Passerina ciris*	21 May 1978	1993	Southeast
Slaty-backed Gull	*Larus schistisagus*	24 Nov 1991	1993	Asia
Pyrrhuloxia	*Cardinalis sinuatus*	23 Dec 2004	2012	Southwest

Common Name	Scientific Name	First observed	Year	Geographic origin
Hooded Oriole	*Icterus cucullatus*	19 May 1992	1993	Southwest
Black-throated Sparrow	*Amphispiza bilineata*	02 Oct 1992	1993	Southwest
Inca Dove	*Columbina inca*	07 Oct 1992	1993	Southwest
Violet-green Swallow	*Tachycineta thalassina*	28 Oct 1992	1993	Southwest/Northwest
Garganey	*Anas querquedula*	18 April 1993	1994	Asia/Europe
Dusky Flycatcher	*Empidonax oberholseri*	12 Sept 1993	1994	Northwest
Variegated Flycatcher	*Empidonomus varius*	07 Oct 1993	1994	South America
Long-billed Murrelet	*Brachyramphus perdix*	11 Oct 1993	1994	Asia
Black-bellied Whistling-Duck	*Dendrocygna autumnalis*	17 June 1993	1995	Southwest
Eurasian Tree Sparrow	*Passer montanus*	16 Feb 1994	1995	Midwest
Prairie Falcon	*Falco mexicanus*	19 April 1995	1996	Southwest/Midwest
Varied Bunting	*Passerina versicolor*	07 May 1995	1996	Southwest
White-faced Ibis	*Plegadis chihi*	20 July 1995	1996	Southwest
Black-tailed Godwit	*Limosa limosa*	10 Sept 1995	1996	Europe
Bullock's Oriole	*Icterus bullockii*	13 Nov 1977	1997	Southwest/Midwest
Bicknell's Thrush	*Catharus bicknelli*	19 Sept 1979	1997	Other
Baird's Sparrow	*Ammodramus bairdii*	02 July 1996	1998	Midwest
Plumbeous Vireo	*Vireo plumbeus*	03 June 1997	1998	Southwest
Great Shearwater	*Puffinus gravis*	20 Aug 1997	1998	Atlantic
Eurasian Collared-Dove	*Streptopelia decaocto*	25 July 1993	1999	Southeast
Heermann's Gull	*Larus heermanni*	14 Nov 1999	2000	Southwest
Manx Shearwater	*Puffinus puffinus*	26 Aug 2001	2002	Atlantic
White-collared Swift	*Streptoprocne zonaris*	10 June 2002	2003	Central America
Tropical Kingbird	*Tyrannus melancholicus*	26 Oct 2002	2003	Southwest/Central America/ South America
Brewer's Sparrow	*Spizella breweri*	27 May 2003	2004	Northwest
Neotropic Cormorant	*Phalacrocorax brasilianus*	03 May 2005	2006	Southeast/Central America
McCown's Longspur	*Rhynchophanes mccownii*	21 June 2005	2006	Midwest
Black Swift	*Cypseloides niger*	21 May 2006	2008	Northwest
Barnacle Goose	*Branta leucopsis*	20 Nov 2005	2009	Europe
Mottled Duck	*Anas fulvigula*	01 May 2008	2009	Southeast
Roseate Spoonbill	*Platalea ajaja*	13 June 2009	2010	Southeast
Black-tailed Gull	*Larus crassirostris*	28 Sept 2009	2010	Asia
Yellow-nosed Albatross	*Thalassarche chlororhynchos*	04 July 2010	2011	Other
Anna's Hummingbird	*Calypte anna*	25 Oct 2010	2011	Southwest/Northwest
Thick-billed Kingbird	*Tyrannus crassirostris*	28 Aug 2012	2013	Southwest/Central America
Brown Booby	*Sula leucogaster*	07 Oct 2013	2014	Southeast
Elegant Tern	*Sterna elegans*	21 Nov 2013	2014	Southwest
Kelp Gull	*Larus dominicanus*	07 Sept 2012	2016	South America
Little Egret	*Egretta garzetta*	02 June 2015	2016	Europe
Eurasian Dotterel	*Charadrius morinellus*	03 Oct 2015	2016	Asia
Pink-footed Goose	*Anser brachyrhynchus*	30 Oct 2015	2016	Europe

Results and Discussion

With the exclusions outlined above, 79 species were added to the Ontario checklist by publication in OBRC annual reports in *Ontario Birds*. The actual years when the "new" species were observed ranged from 1892 to 2015. Seventeen species were first observed from 1892 to 1982 while 62 species were observed from 1983 to 2015 (Table 2). One would expect it to be harder to add new species over time, and while this trend over the long term is evident (Figure 1), it is still remarkable that the pace of species additions in recent years is not much lower than it was in the 1980s. The 62 species added in recent years averages out to 1.9 new species per year. The 2015 OBRC report (Burrell and Charlton 2016) is noteworthy in that it is the first year with more than two additions since 1998).

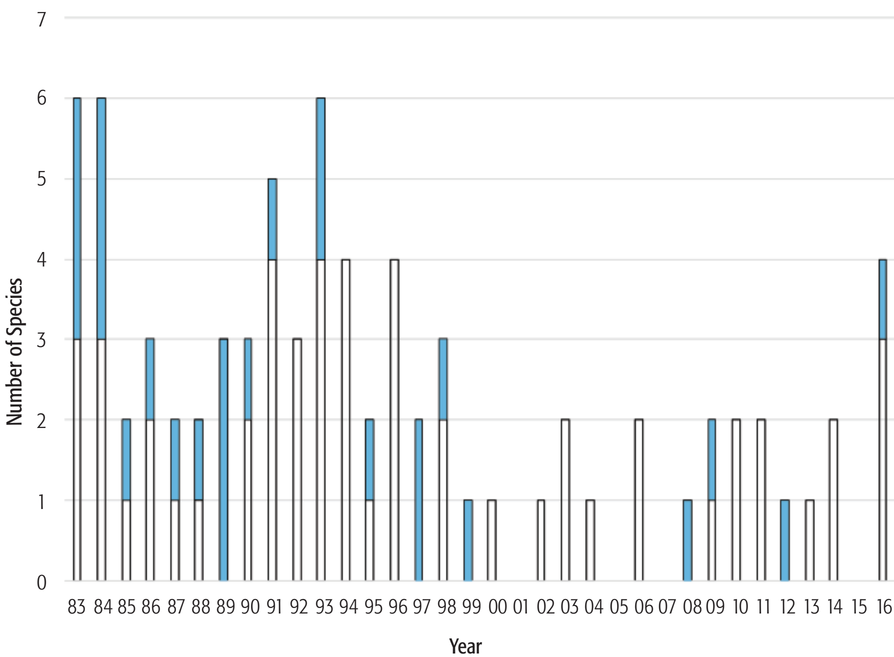

Figure 1: Number of new species added to the Ontario checklist per year based on the publication year of the OBRC report that included the records. The open portion of each column represents the number of new species that were seen in the previous year (e.g., seen in 2005 and published in 2006). The shaded portion of each column represents the number of new species that were seen prior to the previous year (e.g., seen in 2002 but published in 2005).

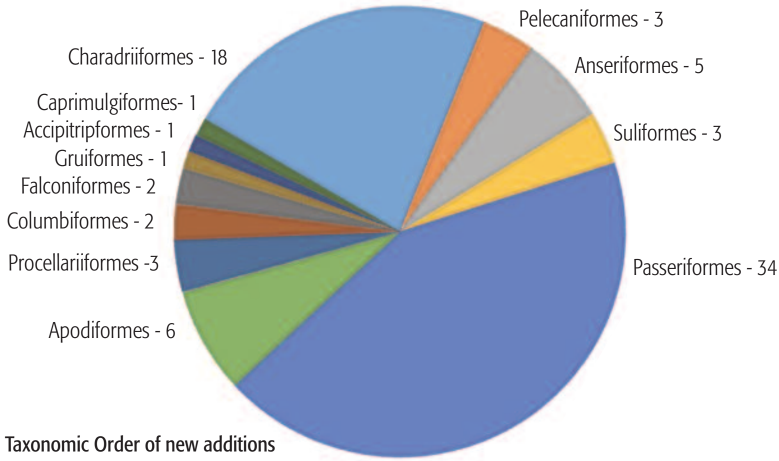

Figure 2: Taxonomic Order of new additions to the Ontario checklist, 1983-2016. The number shown is the number of species in the corresponding Order.

From a taxonomic perspective, the vast majority of new species have been members of either the Passeriformes [songbirds] (43%) or Charadriiformes [gulls, terns and shorebirds] (23%); the remaining one third of the species are fairly evenly split among ten other Orders (Figure 2).

Most Ontario birders are unlikely to be surprised that the monthly distribution pattern of first records of the 79 new species corresponds to the times of year that birders are most active (Figure 3). There were 33 new species added to the checklist during spring migration from April to June. New additions during fall migration overall are more spread out with 35 new species between August and November (the 5 new species in July could also pertain to fall migrants). The two best months during spring and fall migration were May (17 species) and October (13 species), respectively.

Possible Geographic Origin

Based on possible geographic areas of origin, new species have come from a variety of regions (Figure 4).

Southwest

Southwestern North America leads the way for possible origins of new additions to the Checklist of the Birds of Ontario, with 37% (29 species) of the species thought to have originated there. Most of the new species from this area have a well-developed pattern of vagrancy to northeastern North America, and several have now occurred on multiple occasions in Ontario. Cave Swallow (*Petrochelidon fulva*), which was first observed in 1989 (Wormington and Curry 1990), subsequently had 62 additional records published in OBRC reports up to 2010, at which point it was removed from the southern Ontario review list; however, it is now back on the review list, due to few records since 2011 (Burrell and Charlton

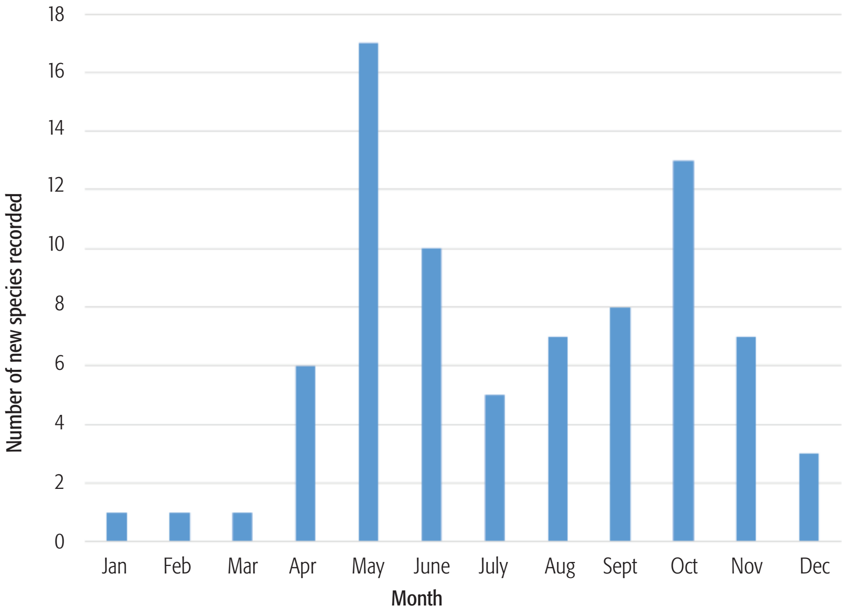

Figure 3: Month of first observation of new additions to the Ontario checklist, 1983-2016.

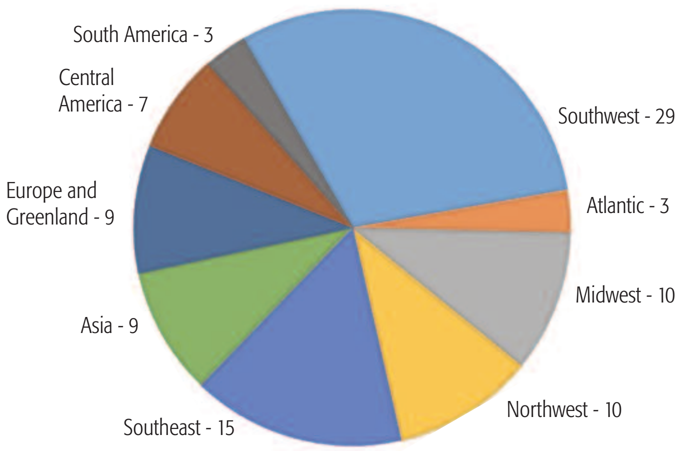

Figure 4: Possible geographic areas of origin of new additions to the Ontario checklist, 1983-2016. The number shown is the number of species possibly originating from this area. Note that the total number adds up to more than the number of new species because a species could be listed for more than one area.

2016). White-faced Ibis (*Plegadis chihi*) (21 published records) and Ash-throated Flycatcher (*Myiarchus cinerascens*) (12 published records) both have also developed patterns of regularly occurring rarities in Ontario although not in such a striking fashion.

Despite many species from the Southwest being reasonably expected, there have been some really exceptional vagrant birds within this group. If you polled many Ontario birders, birds like Heermann's Gull (*Larus heermanni*), Elegant Tern (*Thalasseus elegans*), Black-capped Vireo (*Vireo atricapilla*) and Varied Bunting (*Passerina versicolor*) are unlikely to have been on their lists of potential species to be seen.

Southeast

Southeastern North America is the possible place of origin for 19% (15 species) of additions to the Ontario checklist. It might come as a surprise to some that there are more species from the Southwest than the Southeast, given the proximity of the latter, but this is likely because many vagrants from the southeast had been observed in Ontario prior to the inception of the OBRC and *Ontario Birds*. Several of the species on the southeastern list are species that are expanding their ranges northward or increasingly being detected as vagrants north of their core range; these include Fish Crow (*Corvus ossifragus*), Eurasian Collared-Dove (*Streptopelia decaocto*), Mottled Duck (*Anas fulvigula*) and Neotropic Cormorant (*Phalacrocorax brasilianus*). Interestingly, but perhaps not surprisingly, all of these species were recorded in 2015 (Burrell and Charlton 2016) and many Ontario birders predict that Fish Crow and Eurasian Collared-Dove will breed soon, while Neotropic Cormorant may not be far behind.

While it is not surprising that many on this list have shown up in Ontario, the same cannot be said for Brown Booby (*Sula leucogaster*), although even this species seems to be occurring more frequently at inland sites (eBird 2016).

Midwest

Midwestern North America is the possible geographic source of 13% (10 species) of additions to the Ontario checklist. One species on this list really stands out — California Gull (*Larus californicus*). With 65 published records, it is hard to imagine that the first observation only came in 1981 (James 1983). This species does not seem to have increased in Ontario appreciably in the last few years; rather, Ontario birders have gotten better at finding it, particularly along the Niagara River corridor. The number of records of Eurasian Tree Sparrow (*Passer montanus*) has exploded in the province in the past two years, with seven of the total of 11 records; presumably these are from the St. Louis, Missouri, area where it was introduced in the nineteenth century and where it is now well-established (Barlow and Leckie 2000).

Each remaining species on the midwestern list, Common Poorwill (*Phalaenoptilus nuttallii*), Baird's Sparrow (*Ammodramus bairdii*) and McCown's Longspur (*Rhynchophanes mccownii*), has occurred just once and is not turning up regularly elsewhere in northeastern North America.

Northwest

Northwestern North America is the possible source for 13% (10 species) of additions to the Ontario checklist . Most of these species are still quite rare in Ontario with their rate of occurrence here having remained relatively stable throughout the study period. Many of the vagrants that show up regularly from the Northwest had already been added to the Ontario checklist prior to 1983, so we suspect the species that are the most recent additions listed in this paper are only the very rarest. The main exception to this status is the Golden-crowned Sparrow (*Zonotrichia atricapilla*), which was first observed in 1982 (James 1983) and has since been recorded 13 times. Some of the more exceptional species from this region include Dusky Flycatcher (*Empidonax oberholseri*), Brewer's Sparrow (*Spizella breweri*) and Cassin's Finch (*Haemorhous cassinii*). While any of those could occur again in Ontario, it would certainly be a big deal!

Asia

Asia is the possible source for 11% (9 species) of additions to the Ontario checklist. Asia may seem like a long way away, but seven of the nine species must have come from there. The eighth species, Brambling (*Fringilla montifringilla*), occurs in Europe, but also likely originated in Asia. Howell *et al.* (2014) illustrate the decreasing trend of this species from west to east in North America.

The list of Asian vagrants to Ontario is impressive and includes some truly remarkable species such as Siberian Rubythroat (*Luscinia calliope*), Lesser Sand-Plover (*Charadrius mongolus*), Long-billed Murrelet (*Brachyramphus perdix*) and Eurasian Dotterel (*Charadrius morinellus*). In fact, Ontario is among the few places in North America to record any of these species.

Of the Asian species, only Garganey (*Anas querquedula*), Slaty-backed Gull (*Larus schistisagus*) and Brambling have occurred in Ontario more than once. White-winged Tern (*Zenaida asiatica*) has been observed twice, though it is probable that both of these records involved a single bird returning in back-to-back years (Bain 1993).

Europe and Greenland

Like Asia, Europe and Greenland is the possible source of 11% (9 species) of additions to the Ontario checklist. Two of these species, Barnacle Goose (*Branta leucopsis*) and Pink-footed Goose (*Anser brachyrhynchus*), are increasingly showing up throughout eastern North America (Sherony 2008). The Eurasian Blackbird (*Turdus merula*) is perhaps the least likely of those on this list to ever show up in Ontario again; in fact, Howell *et al.* (2014) only list two other records for North America.

Central America

Nine percent (7 species) of the new additions have their possible origin in Central America. These amazing rarities include Green Violetear (*Colibri thalassinus*), White-collared Swift (*Streptoprocne zonaris*), Tropical Kingbird and Thick-billed Kingbird (*Tyrannus crassirostris*).

Most of these have occurred in Ontario only once and are not likely to occur again, at least for quite some time. Of course, everyone said the same thing about the province's first Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*) (also presumably from Central America), but we now have three records!

South America

We listed 4% (3 species) of new additions as having their possible origins in South America. These include Tropical Kingbird and Variegated Flycatcher (*Empidonomus varius*); both species have shown up in the fall and may be the result of "overshooting" in spring migration (fall in our hemisphere). The Variegated Flycatcher is one of the rarest species to ever show up in the province, being just one of four records listed for all of North America (Howell *et al.* 2014). The third species in this list is Kelp Gull (*Larus dominicanus*), which has been observed in the province in 2012 and 2013) (Burrell and Charlton 2016); however, both records could pertain to the same individual, given the age of the individual and dates seen.

Atlantic Ocean

There are three species (4%) of seabirds which have been added to the Ontario checklist. These include Atlantic Puffin (*Fratercula arctica*) (3 records), Manx Shearwater (*Puffinus puffinus*) (2 records) and Great Shearwater (*Puffinus gravis*) (1 record). Interestingly, two of the puffin records are speculated to have involved birds from James Bay heading overland and recent records of other Atlantic Ocean seabirds from southern James Bay suggests this is a possible source for other species.

Misfits

There were two species that did not fit well into any of the above categories. The first is Ross's Gull (*Rhodostethia rosea*), which was first recorded in 1983 at Moosonee, and published in the 1983 OBRC report (James 1984). This species was nearly mythical when *Ontario Birds* began but has since been discovered to nest in at least several scattered locations in the Arctic and in northwestern Asia; it has been recorded eleven times in Ontario. The second species is Yellow-nosed Albatross (*Thalassarche chlororhynchos*), a seabird of the southern Atlantic Ocean and one of the most unbelievable birds to ever be found in the province, given the species' population, range and pelagic nature (Martin and DiLabio 2011).

Summary

The list of species added to the Ontario checklist over the life of the OBRC and *Ontario Birds* is large and very impressive and includes species originating from a wide geographical area. New additions to the list over the past 33 years have been most likely to originate from the southwestern portion of North America (37%), be members of the order Passeriformes (43%), and occur in May or October. This paper reveals a few of the interesting patterns to be seen from exploring this list and could be used as a starting point for guessing at what the next 33 years of *Ontario Birds* might bring us.

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Changes in Ontario bird populations: 1983-2016

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Wild Turkey. *Photo: Daniel Cadieux*

Introduction

There have been many changes to Ontario bird populations since the publication of the first issue of *Ontario Birds* in 1983. Some of these, such as the dramatic increase in Wild Turkey (*Meleagris gallopavo*) across southern and central Ontario, are evident to most observers, while others, such as the near extirpation of the Henslow's Sparrow (*Ammodramus henslowii)* have slipped by largely unnoticed by any but the most involved or informed. In this article, through a series of 11 brief summaries by Ontario experts, an overview is provided of some of the major changes that have taken place to individual species and groups of birds over the past three decades. The goal is not to provide a comprehensive analysis of bird population change, but to highlight certain species and/or groups that will help provide insight into changes of interest to readers of *Ontario Birds*. To better understand the information provided here, and for a broader perspective on how Ontario's birds are faring relative to those across the country and the continent, we highly recommend two recent publications: *The State of Canada's Birds* (NABCI-Canada 2012) and *The State of North America's Birds* (NABCI 2016).

The State of Canada's Birds (NABCI-Canada 2012) found that, on average, Canadian breeding bird populations have decreased 12% since 1983, when effective monitoring began for most species. For species with sufficient data to monitor their status, 44% have decreased, 33% have increased and 23% have shown little overall change. Some groups, such as grassland birds, aerial insectivores and shorebirds, show substantial declines. Other groups such as waterfowl, raptors and colonial waterbirds are increasing, due to careful management, changes in habitat and reductions in environmental contaminants (NABCI-Canada 2012).

The situation at the continental scale provides additional cause for concern. *The State of North America's Birds* (NABCI 2016) — an unprecedented vulnerability assessment of our continent's birds, including Canada, the United States and Mexico — concludes that 432 of North America's 1,154 native bird species (37%) require urgent conservation action. In particular, birds that depend on oceans and tropical forests are most imperiled due to severe habitat threats, restricted ranges and declining populations. Species that rely on coasts, grasslands and arid lands are faring poorly on average, while results for temperate forests, tundra, wetlands and the boreal forest are mixed.

Familiar Ontario bird species can be found among the list of winners and losers at both the national and continental scales. Interestingly, the 22% of Canada's bird species that stay primarily year-round in Canada are doing very well generally, with an overall increase of 50% since 1970. But the 15% that winter in South America have declined by 60% in Canada in the same period (NABCI-Canada 2012). The reasons for this pattern are unknown, but it suggests that significant changes are underway either in the wintering areas, along migratory routes or both, and it is evident that the fate of migratory birds is intertwined with that of resident species and habitats outside of the province. A full lifecycle approach, addressing species' needs during breeding, migration and wintering, is essential for conserving Ontario's (and Canada's) birds.

The 25 species that have increased and decreased the most in Ontario since 1983 according to the Breeding Bird Survey (BBS) are shown in Table 1. The BBS is a road-side survey, so it represents terrestrial landbirds better than wetland and colonial species, and can only provide trends for areas with roads. As a result, some significant changes in numbers, such as those of the Trumpeter Swan (*Cygnus buccinator*) are not shown in this table, and there is no coverage for vast areas of northern Ontario's boreal forest and Hudson Bay Lowlands. Note also that some terrestrial species, such as the Northern Bobwhite (*Colinus virginianus*) and Yellow-breasted Chat (*Icteria virens*) do not appear on the table, despite their near extirpation from the province over the past 30 years, because they are encountered so infrequently that BBS does not track them reliably. Some of the patterns revealed in the table, such as the large increases in many "big" birds, the expansion of species edging northward into and within the province, and the decline of the grassland and aerial insectivore species are expanded on in the accounts that follow.

Table 1. The 25 species showing (a) the largest increases and (b) the largest decreases in Ontario in the period 1983-2013 according to the Breeding Bird Survey (Sauer *et al.* 2014). Nomenclature follows American Ornithologists' Union (2015). Trend shown is annual % change.

a) Largest Increases 1983-2013

Rank	Species	Trend
1	Wild Turkey	31.4
2	Canada Goose	18.1
3	Double-crested Cormorant	18.0
4	Sandhill Crane	16.5
5	Bald Eagle	14.5
6	House Finch	13.8
7	Red-bellied Woodpecker	11.6
8	Turkey Vulture	8.9
9	Palm Warbler	7.7
10	Northern Parula	7.3
11	Blue-winged Warbler	7.2
12	Orchard Oriole	5.1
13	Osprey	4.8
14	Philadelphia Vireo	4.7
15	Wood Duck	4.6
16	Blue-headed Vireo	4.4
17	Hooded Merganser	4.2
18	Pine Warbler	3.8
19	Cooper's Hawk	3.7
20	Brown Creeper	3.6
21	Yellow-bellied Flycatcher	3.5
22	Ring-billed Gull	3.5
23	Merlin	3.5
24	Northern Cardinal	3.2
25	Mallard	2.8

b) Largest Decreases 1983-2013

Rank	Species	Trend
1	Loggerhead Shrike	-11.0
2	Chimney Swift	-7.8
3	Cliff Swallow	-7.4
4	Common Gallinule	-6.7
5	Bank Swallow	-6.3
6	Evening Grosbeak	-6.1
7	Rusty Blackbird	-5.9
8	Black Tern	-5.7
9	Blue-winged Teal	-4.9
10	Purple Martin	-4.7
11	Western Meadowlark	-4.5
12	House Sparrow	-4.3
13	Ring-necked Pheasant	-4.2
14	Herring Gull	-3.8
15	Tennessee Warbler	-3.7
16	Tree Swallow	-3.7
17	Red-headed Woodpecker	-3.7
18	Brown-headed Cowbird	-3.7
19	Killdeer	-3.6
20	Bobolink	-3.5
21	Spotted Sandpiper	-3.5
22	Vesper Sparrow	-3.5
23	American Black Duck	-3.3
24	Upland Sandpiper	-3.2
25	Eastern Whip-poor-will	-3.0

Greater Snow Geese. *Photo: Brian Morin*

Species Accounts

Ontario's Goose Populations

The story of geese in Ontario since the first issue of *Ontario Birds* is one of an overall dramatic and positive response to human-caused landscape changes. Changes both within and beyond Ontario have resulted in more geese almost everywhere. The main cause is that the geese adopted new diets in the mid to late 20th century by foraging in agriculturally dominated habitats. With a single exception among regularly occurring species, diets of geese during migration and winter now consist primarily of cereal grains left after harvesting, and green forage plants in managed rural and urban grasslands. For temperate breeding Canada Geese (*Branta canadensis maxima*), this adaptation extends to all seasons as they also nest and rear young in agricultural and urban areas. Secondary causes of population increases include lower harvest rates/higher survival rates for Canada, Cackling (*B. hutchinsii*), Lesser Snow (*Chen caerulescens caerulescens*) and Greater Snow Geese (*C. c. atlantica*), a reflection of changing demographics among hunter populations.

Canada Geese in Ontario include temperate breeders of the south and near north, and subarctic breeders of the Hudson Bay Lowlands (HBL). Temperate breeders increased from about 10,000 to 180,000 breeding adults from 1980 to 2006, but have since declined somewhat (CWSWC 2015). Subarctic breeders increased throughout the mid 20th century to the late 1980s, to over 900,000 birds, but have declined gradually since then and have been relatively stable for the past decade at about 400,000 breeding adults (CWSWC 2015).

The Cackling Goose became recognized as a separate species from Canada Goose in 2004 (Banks *et al.* 2004). Ontario-observed Cackling Geese come from the Baffin Island breeding segment of the Mid-Continent Population (Abraham 2005), which grew from about 1 million in 1987 to almost 4 million in 2013 (CWSWC 2015).

Lesser Snow Geese breeding in Ontario's portion of the HBL increased from 120,000 in 1979 to over 400,000 breeding adults in the mid 1990s (Abraham *et al.* 1998), part of a continental population explosion. The number has since declined (Abraham 2007a) to about 300,000 birds.

One of the most dramatic goose status changes we have witnessed is the range expansion of Greater Snow Goose in extreme southeastern Ontario, an area which now hosts 70,000-100,000 birds for short periods during spring and fall migration to and from their breeding grounds in the eastern high arctic (Morin and Hughes 2010). This, too, is part of a continental growth spurt from 300,000 birds in the mid 1980s to 1.4 million in 2009.

In similar fashion, the Ross's Goose (*C. rossii*) has increased as both a migrant and a breeder in Ontario. A noteworthy rarity in 1982, it was removed from the review list of the Ontario Bird Records Committee (OBRC) for southern Ontario in 2006 (Crins 2007). The number of breeders in the Ontario HBL was estimated to be a few hundred pairs as of 2005 (Abraham 2007b), but has likely increased since then. Its Ontario status reflects an increase from about only 6,000 birds continentally in the 1940s to over 2.7 million in 2014 and a large-scale eastward range expansion (CWSWC 2015).

In Ontario, the pattern of increased observations of migrating White-fronted Geese (*Anser albifrons*) mimics the Ross's Goose story. The Mid-Continent Population, from which Ontario white-fronts are derived, increased from about 1 million to nearly 2.5 million between 1986 and 2013 (CWSWC 2015); it is being observed in Ontario in increasing numbers annually each spring.

The lone exception to this story of agriculturally-subsidized population growth is the Brant (*Branta bernicla*), which continues to rely on native habitats in all seasons for its diet and nutritional needs. It regularly migrates to and from its low arctic breeding grounds through eastern Ontario and James Bay in spring and fall, but does not nest in Ontario (but see Lumsden 1987a). The continental population has been stable with a long-term winter index average of 136,000 birds (CWSWC 2015).

Wood Duck. *Photo: Saul Bocian*

Ontario's Duck Populations

Ontario's duck picture over the last 33 years is mostly good news, with only one exception. Populations of almost all of Ontario's breeding species are either stable or increasing in numbers. Among the dabblers, the Mallard (*Anas platyrhynchos*) has increased the most since the early 1980s, especially in the north. Data from the Southern Ontario Waterfowl Plot Survey, ongoing through the early 1980s, shows a slight increase in the number of breeding pairs per year in the south (i.e., 0.5%), but both the Waterfowl Breeding Population and Habitat Survey (from the early 1980s in northwestern Ontario) and the Eastern Waterfowl Survey (ongoing since 1990 in northeastern Ontario) show an approximate two-fold and 1.2-fold increase in the breeding population of Mallards in the north (CWSWC 2015; USFWS 2016). At the same time, American Black Ducks (*Anas rubripes*) declined dramatically by close to 30% in the south from the early 1980s and approximately by 20% in the north since 1990. Recently, however, the breeding population appears to have stabilized (CWSWC 2015). Whether the increase in Mallards has caused the decline in black ducks is still unclear as landscape change and disturbance from cottage encroachment have also occurred concurrently.

For the divers, Ring-necked Duck (*Aythya collaris*) increased by almost 20% in the northeast and over 200% in the northwest, with an overall increase in all regions between breeding bird atlas periods (Leckie 2007). Similarly, the probability of observation for cavity-nesting species, such as Wood Duck *(Aix sponsa*), Hooded Merganser (*Lophodytes cucullatus*) and Bufflehead (*Bucephala albeola*), also increased in all regions between the two atlases (Bouvier 2007, Mallory 2007, Zimmerling 2007). For example, the Wood Duck has increased by close to 10% and 40% in the northern and southern parts of its range in Ontario while the Hooded Merganser has increased by 12% and 20% in these respective areas (CWSWC 2015).

Undoubtedly, some of the above changes stem from the creation of the North American Waterfowl Management Plan in 1986, which laid the foundation for species and habitat Joint Ventures, such as the Ontario Eastern Habitat Joint Venture. This partnership supports "on the ground" habitat work, landowner stewardship and public education and outreach, which have all greatly benefited Ontario's ducks.

The Blue-winged Teal (*Anas discors*) is the exception to the positive outlook for Ontario's ducks. In southern Ontario, it declined by close to 8% per year since 1981, with large losses occurring in the last 10 years (~14.8% per year) (CWSWC 2015). Similarly, a large decline in the probability of observation occurred in all regions between the two atlas periods (Ross 2007). Breeding numbers in northwestern Ontario, however, show an opposite trend, with an approximate two-fold increase in the population between the early 1980s and recent time periods (USFWS 2016). This result highlights the need to better understand factors driving Blue-winged Teal numbers in southern versus northern Ontario.

With respect to staging birds, major changes have occurred in the distribution and abundance of ducks on the lower Great Lakes since the early 1980s. For bay ducks (e.g., scaup [*Aythya* spp.], Redhead [*Aythya americana*] and Canvasback [*Aythya valisineria*]), numbers increased from the 1980s, then peaked in the mid to late 1990s, and since then have declined back to 1980 levels. Some of this change is related to steep declines in the continental scaup population since the 1980s, as many of these birds stage in Ontario (CWSWC 2015). Some areas (e.g., Rondeau Bay and Lake St. Clair), however, continue to have large numbers of bay ducks which may explain losses in other areas (e.g., Long Point) (Smith *et al.* 2013). Similarly, numbers of sea ducks (e.g., Black Scoter [*Melanitta americana*], White-winged Scoter [*Melanitta fusca*] and Long-tailed Ducks [*Clangula hyemalis*]) staging on the lower Great Lakes increased from the 1980s to the 1990s, but unlike bay ducks, continue to be found in high numbers, especially in the western and eastern basin of Lake Ontario. Presumably, the introduction of exotic Zebra (*Dreissena polymorpha*) and Quagga mussels (*Dreissena bugensis*) into the lower Great Lakes in the early 1990s explains some of these changes. These introductions and their subsequent colonization greatly changed the lower Great Lakes ecosystem by

Great Egret.
Photo: Brandon Holden

increasing water clarity and changing biotic communities (Skubinna *et al.* 1995). This, in addition to a new mussel food source and changes in winter ice cover, has opened up new opportunities for ducks to "short stop" during their migration. For example, during warm winters more than 100,000 Canvasbacks overwinter on the lower Great Lakes (Canadian Wildlife Service 2016).

Overall, Ontario's duck populations have improved since the 1980s and their future continues to look bright.

Great Lakes Colonial Waterbirds

The Great Lakes are home to more than two million colonially-nesting waterbirds: 13 species of gulls, terns, cormorants, pelicans and herons (Weseloh *et al.* 2003, unpubl. data). Since the mid-1970s, the nests of these species have been counted, Great Lakes-wide, by the U.S. Fish and Wildlife Service and the Canadian Wildlife Service approximately every decade. It is a huge undertaking that takes two to three years to complete. The methods and results of the counts for the first three decades, the 1970s, 1980s and 1990s, have been published widely (Weseloh *et al.* 1986; Blokpoel and Tessier 1997, 1998; Morris *et al.* 2011, Rush *et al.* 2015 and references therein). The goal of this paper is to present the general results of the fourth decadal survey (2007-08) in the Canadian Great Lakes for three representative species: the Double-crested Cormorant (*Phalacrocorax auritus,* henceforth cormorant), the Great Egret (*Ardea alba,* henceforth egret) and the Herring Gull (*Larus argentatus*), and to discuss the change in nest numbers of those species particularly during the years of *Ontario Birds*, 1983 – 2016.

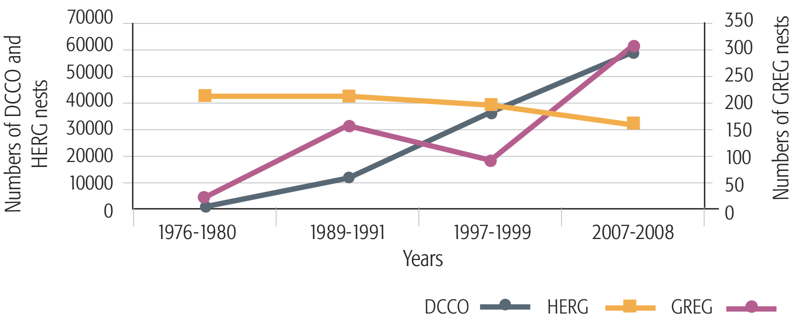
The study area included the shoreline and islands of the Canadian portions of Lakes Superior, Huron, St. Clair, Erie and Ontario as well as the St. Marys, Detroit, Niagara and St. Lawrence rivers, from the Minnesota-Ontario border to the Ontario-Quebec border. Virtually all nest sites were accessed by boat (or truck) and ground counts of individual nests were recorded; a very few sites had to be estimated from boats due to rough mooring or landing conditions.

The results and years of the four decadal surveys for the three species are shown in Figure 1. Within the *Ontario Birds* years, nest numbers of cormorants increased four-fold (405%) from 1989-2008. Nest numbers of egrets increased 99.4% (i.e., they nearly doubled) and nest numbers of Herring Gulls declined by nearly one quarter (23.7%).

The dramatic increase in cormorant nest numbers on the Great Lakes has been ongoing since the mid-1970s and has been well documented in both the US and Canada (Weseloh *et al.* 1995); from 1989 to 2008, nest numbers increased from 11,614 to 58,613. The main reasons cited for this species' increase are reduced contaminant levels in Great Lakes fish (the cormorants' main food), the abundant food supply in the Great Lakes due to the reduction of piscivorous predators during the 1950s to early 1970s and the increased protection for the species as a result of the *Migratory Bird Treaty Act* between the USA and Mexico in 1972 and Ontario provincial legislation (Price and Weseloh 1986, Keith 1995, Weseloh *et al.* 2002). Lake Huron and Lake Ontario had the largest number of cormorant nests in 2007-08 with just under 21,000 and 20,000 nests, respectively.

With the exception of 1997-99, nest numbers of egrets showed a steady increase (from 156 to 311 nests) but much slower than seen in cormorants. In 1997-99, the number of egret nests had declined by 39.7% since the previous survey with all of the decrease occurring on Lake Erie where the number of nests (at its two Canadian colonies) declined from 143 to 32. During that same period, the number of cormorant nests in Lake Erie increased by 280%, including at the two

Figure 1. Trends in nest numbers of Double-crested Cormorants (DCCO), Herring Gulls (HERG) and Great Egrets (GREG) on the Canadian Great Lakes, 1970s – 2000s.



egret colonies; presumably egret nests were usurped by cormorants as has been witnessed elsewhere (Gull Island, Presqu'ile Provincial Park, Brighton, Ontario, D. Moore, pers. obs.). In contrast, nest numbers have increased steadily on Lake Huron (217 nests in 2007-09; 70% of the Canadian Great Lakes total), due mainly to growth of a colony on Nottawasaga Island, near Collingwood, ON. The precise reason for the increase in egret nests is not known but the four egret colonies on the U.S. side of western Lake Erie supported over 1,400 nests in 1991 (Rush *et al.* 2015) and this was probably the nucleus from which egrets spread into Ontario.

In contrast to cormorants and egrets, Herring Gull nest numbers declined dramatically (from over 42,000 nests to under 32,000) on all waterbodies except Lake Ontario and the St. Lawrence River. The largest declines occurred in Georgian Bay (Lake Huron, a decline of over 4,200 nests) and in Lake Superior (over 2,900 nests). Lake Ontario and the St. Lawrence River, together, gained 120 nests. The decline in Herring Gulls has been attributed to several contributing factors: regime shifts within fish populations in Lake Huron (Ridgway and Middel 2015) and resulting shifts in Herring Gull diet and reproduction (Hebert *et al.* 2008, 2009), intentional release of raccoons and foxes on breeding colonies by fishermen to 'control' Double-crested Cormorants (Pekarik *et al.* 2016, C. Weseloh unpubl.) and destruction of gull nests and displacement by cormorants (e.g., Somers *et al.* 2011).

Colonially-nesting waterbirds are top-level predators in Ontario's aquatic environments, and as such are sentinels of ecosystem-wide changes in these habitats, especially on the Great Lakes. Dramatic increases, as seen in cormorants and egrets, or declines in iconic species like the Herring Gull, signal these ecosystem-level shifts. Continued long-term monitoring of these species is crucial for understanding the processes that are driving change, predicting population trajectories and conservation planning. The next wide-scale colonial waterbird census on the Great Lakes is planned to coincide with data collection for the third Ontario Breeding Bird Atlas (2021-2025).

Big Birds

One of the most evident changes in Ontario bird numbers since 1983, for birders and non-birders alike, is the increase in the "big" birds in Ontario. The 12 largest birds in the province by weight are shown in Table 2. All of these species, except the Great Blue Heron (*Ardea herodias*), increased substantially between the breeding bird atlas periods (1981-1985 and 2001-2005). Of the increasing species, all but the Tundra Swan (*Cygnus columbianus*) more than doubled the number of squares in which they were recorded between atlases, and the Tundra Swan increased by 67% (Abraham 2007c).

Important conservation activities of the past century have contributed significantly to these increases. Prior to the *Migratory Bird Convention Act* of 1916, large-scale market hunting of birds, particularly the larger species, was driving many birds towards extinction, and resulted in the extirpation of Ontario's

Sandhill Crane, Double-crested Cormorant.
Photos: Ken Newcombe

breeding populations of Wild Turkey and Trumpeter Swan. One hundred years later, the MBCA is still important. Species such as the Tundra Swan and Sandhill Crane (*Grus canadensis*) which, though still hunted in other parts of their range, are protected by the Act and its associated hunting regulations to ensure that populations continue to remain healthy. The crane, in particular, has become a familiar sight across much of southern Ontario, whereas during the early 1980s, its breeding range was just beginning to expand southwards onto Manitoulin Island and the northern tip of the Bruce Peninsula. The first breeding evidence for the Rondeau area, far outside its recently held range, was established during the year, 1983, that the first issue of *Ontario Birds* appeared (Lumsden 1987b).

Some of these large species, such as the Canada Goose, Trumpeter Swan and Wild Turkey, have benefited from reintroduction efforts designed to establish self-sustaining breeding populations in the province. In a highly human-modified environment, these birds have become widely re-established across and, in the case of the Wild Turkey, well beyond, much of their former southern and central Ontario range (Bowman 2007). The Wild Turkey reintroduction began in 1984 (Bowman 2007), and the species shows the largest increase in Ontario of any bird tracked by the Breeding Bird Survey since that time (Environment and Climate Change Canada, unpublished data).

The Bald Eagle (*Haliaeetus leucocephalus*) also benefitted from reintroduction programs, though the main reason for its increase in recent decades is another conservation milestone, the banning of the pesticide DDT (*dichloro diphenyl trichloroethane*) in the early 1970s in Canada and the US (Grier 1982). This ban also helped in the increase of the fish-eating Double-crested Cormorant

Table 2. The 12 largest birds in Ontario by weight (Cadman *et al.* 2007).

Species	Weight (g)
Trumpeter Swan	10,500
Mute Swan	10,000
American White Pelican	7,700
Tundra Swan	7,000
Wild Turkey	5,800
Golden Eagle	4,400
Bald Eagle	4,325
Sandhill Crane	4,100
Canada Goose	3,050
Great Blue Heron	2,400
Turkey Vulture	1,830
Double-crested Cormorant	1,700

(Weseloh *et al.* 1995), as well as the Golden Eagle (*Aquila chrysaetos*) and other smaller raptors such as the Peregrine Falcon (*Falco peregrinus*) and Merlin (*Falco columbarius*), both of which are also much more common in Ontario now than in 1983.

The Turkey Vulture (*Cathartes aura*) has been increasing in Ontario and across North America since the 1920s, perhaps due to the increase and northern expansion of the White-tailed Deer *(Odocoileus virginianus)*, at least in the east (Kirk and Mossman 1998). When *Ontario Birds* began in 1983, the Turkey Vulture was patchily distributed across southern Ontario, with extensive areas, such as much of eastern Ontario, with very few atlas records (Peck 2007). The species is now widespread across southern Ontario where the Turkey Vulture is now one of the most prominent birds in the sky and the expansion has continued into northwestern Ontario, though the numbers are far smaller than in the south.

The success of conservation measures in relation to these big birds should provide inspiration as we face increasing conservation challenges in the decades ahead.

Red Knot

The Red Knot (*Calidris canutus*) is a holarctic breeding shorebird with three recognized subspecies in North America, two of which nest in Canada. *C. c. roselaari* breeds in western Alaska, wintering on the west coast of the southern U.S., and Mexico, with smaller numbers in western Central America and northern South America. *C. c. islandica* breeds in Greenland and the higher latitudes of the Canadian Arctic, north of the Parry Channel, wintering in Western Europe. *C. c. rufa* nests in the central Canadian Arctic and winters predominantly in Tierra del Fuego, Argentina and Chile with smaller wintering populations in southeastern United States and northern Brazil (Clements *et al.* 2015). Banding results indicate *C. c. rufa* make up the vast majority of birds migrating and staging in Ontario (SBRDM 2015).

Since the 1970s, shorebird population numbers in Canada have been showing major declines (NABCI-Canada 2012). In the mid-1980s, *C. c. rufa* numbers were estimated to be between 100,000 – 150,000 birds, but have declined precipitously since then. The most recent *rufa* population estimate is 42,000 birds (Andres *et al.* 2012) and from 1994 to

2002, demographic studies showed that annual adult survival rates had declined from 85% to 56% (Niles *et al.* 2008). The reasons for the survival and population declines remain imperfectly known. Several factors have been implicated in the population decline, including reduced availability of food resources, deterioration of habitat along migration routes and climate change. For example, the overharvest of horseshoe crab eggs in Delaware Bay reduced the amount of available food to northbound migrants during their staging period. Without adequate food resources, individuals leave Delaware Bay for the breeding grounds less prepared for their journey (i.e., with insufficient fat reserves), resulting in a reduced survival rate (Baker *et al.* 2004). *Calidris canuta rufa* has been designated endangered in Canada under the *Species at Risk Act* (SARA) and in Ontario under the *Endangered Species Act, 2007* (ESA).

In southern Ontario, *C. c. rufa* is considered a rare spring and fall transient (Curry 2006, Black and Roy 2010), arriving individually or in small numbers with only occasional larger flocks forced down by poor weather onto the eastern shores of Lake Ontario and the St Lawrence River. However, farther to the north, the southwest James Bay coast is known to be a critical staging area for several shorebird species, including the Red Knot (Morrison *et al.* 2001, Ross *et al.* 2003). From mid-July to mid-August about 15% of the estimated population of *C. c. rufa* stages along James Bay during their southbound migration, gaining the necessary reserves to complete their migration to wintering areas.

Figure 2. Individually colour-marked Red Knot banded in Argentina. Flagged birds allow researchers to track individual knots throughout the flyway providing valuable data on sex, survival and staging times.
Photo: Mark Peck.

Figure 3. Red Knots, White-rumped Sandpiper (*Calidris fuscicollis*), Semipalmated Sandpiper (*C. pusilla*) and Dunlin (*C. alpina*) all stage in large numbers in southwest James Bay, Ontario, during southbound migration. *Photo: Mark Peck.*

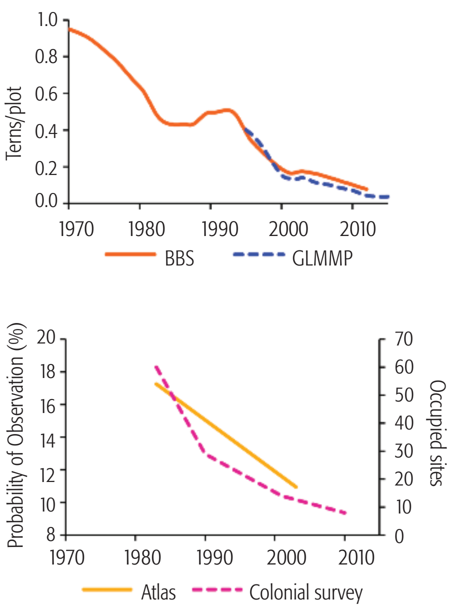
International teams, partnering throughout the Americas, have been working to determine reasons for declines observed in shorebird populations in the Western Hemisphere. With continued monitoring and the use of new technology (e.g., geolocators, molecular sexing and radio transmitter tags — see pages 134 and 124 in this issue), we now have a much better understanding of Red Knot ecology throughout the flyway. Due to this research and coordinated conservation efforts, the Red Knot population decline has leveled off and, we hope, will improve in the future.

Black Tern

This "restless waif of the air, flitting about hither and thither," as described by Bent (1921) was a common breeder in wetlands throughout southern Ontario until the early 1900s (McIlwraith 1894, Baillie and Harrington 1936). The Black Tern (*Chlidonias niger*) was still fairly common when standardized bird monitoring began in Ontario with the BBS in 1970, but by 1983, when *Ontario Birds* began, it had declined considerably (Figure 4). Today the species is even less common, as illustrated by various monitoring programs including the BBS (Environment Canada

2014a), Bird Studies Canada's Great Lakes Marsh Monitoring Program (Tozer 2013, 2016), the Ontario Breeding Bird Atlas projects (Weseloh 2007) and surveys focused on colonial marsh birds (Canadian Wildlife Service – Ontario Region, unpublished data) (Figure 4). While the species is listed as not at risk by the national body, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), it has been classified as special concern under Ontario's ESA.

Figure. 4. Top panel: Mean number of Black Terns detected by the Breeding Bird Survey (BBS) and Great Lakes Marsh Monitoring Program (GLMMP) in southern Ontario.
Bottom panel: Mean probability of observation of Black Terns within Ontario Breeding Bird Atlas squares in the Carolinian and Lake Simcoe-Rideau atlas regions and number of occupied sites detected during Great Lakes colonial marsh bird surveys.
See text for sources.



The population information for Ontario is grim, with declines of 90% over the past few decades in some areas (Austen *et al.* 1994). Most Ontario birders will personally attest to the disappearance of this attractive and sought-after species from their own "hither and thither" wanderings. Sadly, the grim story is not unique to the Black Tern. It is representative of declines in populations of several other marsh birds in southern Ontario including: American Bittern (*Botaurus lentiginosus*), American Coot (*Fulica americana*), Common Gallinule (*Gallinula galeata*), Least Bittern (*Ixobrychus exilis*), Pied-billed Grebe (*Podilymbus podiceps*), Sora (*Porzana carolina*) and Virginia Rail (*Rallus limicola*) (Tozer 2013, 2016). The Black Tern, however, is decreasing faster than any other marsh bird.

What has caused Black Terns and other marsh birds to decline? The answer is not straightforward. Like other groups of declining species, we can point to a long list of factors that are probably responsible, but there is no "smoking gun" explanation. This uncertainty has more to do with the complicated ways that ecological processes influence population declines than with any shortcomings in our efforts to understand the decreases.

Population declines in Black Terns and other marsh birds in southern Ontario have likely occurred due to loss and fragmentation of marshes, changes in water levels, encroachment by urban sprawl, pollution and the spread of invasive species (Chin *et al.* 2014; Tozer 2013, 2016). Loss and fragmentation of wetlands is particularly troublesome for Black Terns because they favour large wetlands

Black Tern *Photo: Daniel Cadieux*

surrounded by other wetlands (Naugle *et al.* 1999, 2000). Water level changes and associated spread of dense emergent vegetation, such as the invasive *Phragmites australis*, can negatively influence the Black Tern's specialized floating nest sites and surrounding open-water pools (Graham *et al.* 2002, Zimmerman *et al.* 2002). Urban sprawl and pollution may take a heavier toll on Black Terns because of the effects of surface runoff of excess nutrients and chemicals on large aquatic insects and small fish, which are more important for successful chick rearing by Black Terns than for many other species (Beintema 1997). Great Horned Owls (*Bubo virginianus*) have recently been identified as a significant egg predator of Black Terns in the Kawartha Lakes region (von Zuben and Nocera 2015), although this owl has declined in numbers in southern Ontario over the past couple of decades, which may suggest that it is not a major factor contributing to Black Tern declines (Bird Studies Canada's Ontario Nocturnal Owl Survey, unpublished data; Sleep 2007). Black Tern declines are also likely influenced by factors that occur during migration and on the wintering grounds (Heath *et al.* 2009).

Strategies have been prepared which outline activities needed to recover populations of species like Black Terns and Least Bitterns (Burke 2012, Environment Canada 2014b). Many of the recovery activities for these species will benefit the other declining species. We have proven with waterfowl and raptors that we are capable of bringing back bird populations when they are in trouble. The same will hopefully be true in the future for marsh birds in Ontario.

Chimney Swift

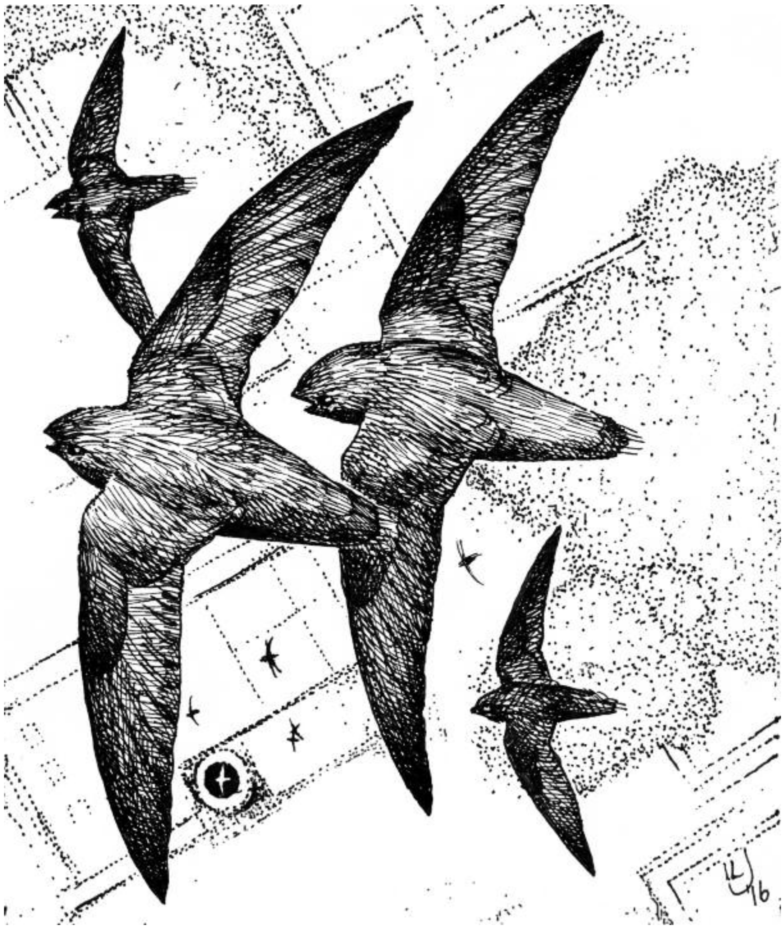
In 1983, when the first issue of *Ontario Birds* appeared, the Chimney Swift (*Chaetura pelagica*) was widespread across the southern half of the province, and was reported in 70% of the 10-km squares in southern Ontario during the first atlas (1981-1985) (Helleiner 1987). By the end of the second atlas (2001-2005), it was reported in only 44% of those same squares (Cadman 2007). From 2004, around the end of the second atlas, to 2014, the BBS has shown a further decline of 52% in the swift population, the 6th largest decline of any species in that period, and the largest of any aerial insectivore (Environment and Climate Change Canada, unpublished data).

The reasons for the decline are uncertain. The number of suitable chimneys is in decline, with old chimneys being destroyed or capped, and new chimneys having metal liners unsuitable for nesting or roosting birds. However, a study has shown that there are still a lot of suitable chimneys going unused, so that chimneys may not be the limiting factor (Fitzgerald *et al.* 2014). A study of Chimney Swift guano (Nocera *et al.* 2012) showed a shift in diet from primarily Beetles (Coleoptera) to less nutritious True Bugs (Hemiptera) that coincided with the advent of DDT use, and suggests that changing insect populations might be an important factor in aerial insectivore decline more generally.

Although swifts (and nighthawks) are now far less numerous in the skies over the cities than in 1982, large numbers of Chimney Swifts still roost communally in some places, with the largest Ontario roost occurring near the northern edge of its Ontario range in a 46 m tall chimney at the shutdown Nuclear Power Demonstration plant, near Chalk River. That roost was used by 2,563 birds on 1 June 2014 and 1,456 on 19 May 2015 (Canadian Nuclear Laboratories, unpublished data). Other cities such as Ottawa, Sault Ste. Marie and Toronto each had more than 1,000 swifts in large roosts on 20 May 2015 (BSC 2015), but those numbers pale next to some historical concentrations, such as 10,000 birds reported over Kingston on 14 May 1945 (Bowman 1952).

Other aerial insectivores such as the Bank Swallow (*Riparia riparia*) and Barn Swallow (*Hirundo rustica*) and the Common Nighthawk (*Chordeiles minor*), have shown similar trends to the swift. All have a diet of flying insects, and they all also winter in South America. This suggests either that changes in South American wintering areas might be important factors in aerial insectivore decline, or that long-distance migration

From 2004, around the end of the second atlas, to 2014, the BBS has shown a further decline of 52% in the swift population, the 6th largest decline of any species in that period, and the largest of any aerial insectivore ...



Chimney Swifts. *Illustration: Ian Jones*

is more hazardous than previously thought due to the increasing human footprint on the landscape and perhaps the rigours of climate change affecting the birds at all stages of their annual cycle. Other factors that may play a part include the availability of natural nesting cavities such as the large (<50 cm DBH) trees with "chimney" cavities in which pairs of swifts nest. Logged hardwood forests may have fewer of these rare trees (Zanchetta *et al.* 2014).

A recovery strategy is being written for the Chimney Swift, in hope that the decline can be halted in time for the 200th issue of *Ontario Birds*.

Wood Thrush. *Photo: Claude King*

Wood Thrush

The Wood Thrush (*Hylocichla mustelina*) breeds in deciduous and mixed forests throughout its North American breeding range. It was considered an uncommon breeding bird in southern Ontario in the 1930s (Baillie and Harrington 1937). However, the species underwent a significant northward range expansion from its population stronghold in the eastern United States during the first half of the 20th century and subsequently became well entrenched in Ontario. By the mid-1980s, the first *Atlas of the Breeding Birds of Ontario* reported that Wood Thrushes occurred in almost every square south of the Canadian Shield and that range expansion was still trending northwards (Sadler 1987). BBS data from that time also pointed to a significant population increase for the species in southern Ontario.

The second Atlas reported that the species' distribution had not changed significantly since the first Atlas (Friesen 2007). It also noted that although severe population declines had recently been reported in many parts of the species' North American breeding range, Ontario BBS data from 1981 to 2005 showed just the opposite — a significant increase! Several possible explanations were given for the population spike: a three-fold increase in forest cover south of the Canadian Shield in Ontario since the 1920s (Larson *et al.* 1999), and a widespread ice-storm in eastern Ontario in the late 1990s that, by opening the forest canopy, produced a flush of optimum Wood Thrush breeding habitat.

By 2012, however, BBS data from Ontario — where almost 80% of Canada's Wood Thrushes occurred — were painting a dramatically different picture of the species' population status. In Canada, the species had declined by 83% over the preceding 41 years, and by 38% in the 10 years from 2001 to 2011 alone (COSEWIC 2012a). Trends were similarly negative for the U.S., where BBS data showed declines of more than 60% from 1966 to 2011 (Sauer *et al.* 2014).

The plight of the Wood Thrush is puzzling for a number of reasons. It is one of the more fragmentation-tolerant forest birds, often found in areas having only small, isolated woodlots (Sadler 1987, Friesen *et al.* 1999). The Wood Thrush is not regarded as being a particular habitat specialist, as are other forest songbirds such as the Cerulean Warbler (*Setophaga cerulea*) and Acadian Flycatcher (*Empidonax virescens*). Moreover, the Wood Thrush produces two, and occasionally three, broods in a single breeding season (Friesen *et al.* 2000, 2001). This buffers it from some of the worst impacts of predation and nest parasitism, such that nesting success and productivity can be high, even in highly fragmented landscapes (Friesen *et al.* 1999).

In summary, the Wood Thrush is not a species one would have expected to be 'at risk' a few decades ago when *Ontario Birds* began. Nevertheless, it was designated as threatened by COSEWIC in 2012 and special concern by Ontario's Committee on the Status of Species at Risk in Ontario in 2014, because of the recent declines.

Identifying the reasons for the Wood Thrush's plight is full of complexities, not the least of which is that the species moves thousands of kilometers between its breeding and wintering ranges. Serious problems could lie at either end of the annual migratory cycle, or even in between, and the scientific pendulum has swung back and forth attempting to diagnose where the stresses are most severe. One view is that habitat loss and degradation on the breeding grounds may be the most important factors behind the decline of long-distance migrants, including Wood Thrushes (Sherry and Holmes 1992, Rushing *et al.* 2016). An alternative view is that Wood Thrushes and other songbirds are limited primarily by events on the wintering grounds (Terborgh 1989). Most of Ontario's Wood Thrushes overwinter in Nicaragua, Honduras and Costa Rica, where deforestation rates are relentless and accelerating (Stanley *et al.* 2014).

Unfortunately, the Wood Thrush is not the only temperate forest bird that has flown into trouble. Of the 144 species that breed in temperate forests across North America, 30 are on the 'Watch List' (NABCI 2016). The declines are most acute for long-distance migrants, with species that migrate the farthest distances tending to show the largest declines (NABCI-Canada 2012). The development of sound management plans to stem the declines will require continued monitoring and research of Wood Thrushes and other long-distance migrants throughout their annual life cycle to understand the relative importance of breeding/wintering ground effects.

Evening Grosbeak. *Photo: Ann Brokelman*

Evening Grosbeak

The Evening Grosbeak (*Coccothraustes vespertinus*) is perhaps one of North America's most itinerant year-round species, breeding across a vast expanse of the southern boreal and western coniferous forests in summer, and making occasional forays into the southern United States during winter. Considered to be an irruptive migrant, it is constantly on the move, tracking and capitalizing on highly ephemeral food resources. It is this penchant for movement that likely resulted in the significant expansion of its historical range from west of the Rocky Mountains to much of central and eastern Canada over a century ago (Brunton 1994). The human settlement of much of the prairies during this time may have facilitated this expansion due to the planting of shelterbelt trees, such as Manitoba maple (*Acer negundo*), which provided an abundant and reliable food source that enabled them to survive harsh winters (Forbush 1929). Even today, the species remains highly nomadic and its occurrence, while exciting, is often unpredictable and enigmatic.

While understanding this transient nature was the focus of widespread bird banding efforts in the last century, this aspect of the species' ecology also makes it difficult to track and systematically monitor. As a result, it has taken many decades of data from several monitoring programs to obtain credible status and trend data for Evening Grosbeak populations in Canada. According to long-term trend data from the BBS, populations in Canada declined by -4.6%/yr between 1970-2012, with more severe declines in Ontario (-5.9%/yr) during the same period (Environment Canada 2014a). Data from the second Ontario Breeding Bird Atlas also indicated a significant decline, with the probability of observation 30% less than during the first atlas (Hoar 2007). Christmas Bird Count (CBC) data also indicate a significant decline, especially between 1980 and 1998, with the most serious declines in the Great Lakes region (National Audubon Society 2010).

While these long-term and widespread declines are concerning, it's difficult to pinpoint a single mechanism or issue responsible (Bonter and Harvey 2008). Along with Bay-breasted Warbler (*Setophaga castanea*), Cape May Warbler (*S. tigrina*) and Tennessee Warbler (*Oreothlypis peregrina*), Evening Grosbeaks are thought to target the eastern spruce budworm (*Choristoneura fumiferana*) as a prey item. For these species, there is strong evidence that changes in their distribution and population size are tightly linked to the cyclical patterns in budworm outbreaks (Venier and Holmes 2010). All four species were much more abundant in the early 1970s, and the extent of their declines in recent decades mirror declines in the severity and extent of budworm outbreaks across Canada, suggesting a critical link between the birds and their insect prey. Forests dominated by spruce and fir, which the Evening Grosbeak prefers, have also declined over much of the northeast in recent decades, due to commercial timber harvest, outbreaks of other forest pests, pollution, anthropogenic development and climate change (Ralston *et al.* 2015). Finally, grosbeak mortality can also be relatively high in winter, along roads where birds aggregate to consume grit or salt, or through window-collisions at residential bird feeders (Gillihan and Byers 2001).

Given the trend of declining population and concerns over apparent range contraction in recent decades, COSEWIC will assess the conservation status of this species at its November 2016 meeting (COSEWIC 2016). COSEWIC will then forward its assessment to the Canadian government for consideration and possibly formal listing under SARA, invoking legal protection and initiating recovery planning. Hopefully, once the mechanisms responsible for these observed declines are identified, the current population trends can be reversed, and this charismatic and boisterous bird will once again be a common and widespread member of Canada's avifaunal community.

Bobolink and other Grassland Birds

Southern Ontario is home to about 13% of the world's Bobolink (*Dolichonyx oryzivorus*) population (Ontario Partners in Flight 2008). As with other grassland bird species, the Bobolink has experienced significant rangewide declines.

Before Europeans settled eastern North America, Bobolinks would have nested in native prairies, savannahs, alvar grasslands, coastal meadow marshes, beaver meadows, burned-over areas and areas that were originally cleared for agriculture by First Nations (Askins *et al.* 2007, Riley 2013). Most such habitat was destroyed following European settlement. For example, only 2% of native tallgrass prairie remains in North America (Samson *et al.* 2004) and even less remains in Ontario.

Bobolink. *Photo: Saul Bocian*

At about the same time, European settlement also brought sizable benefits to grassland birds in eastern North America. Many species adopted large acreages of newly-created surrogate grasslands (pastures and hayfields) as nesting habitat. Though still fairly common and widespread, the Bobolink is now designated as a threatened species in Ontario as a result of strong population declines. According to BBS results from 1983 to 2013, this species has been declining by about 3.5% per year in Ontario, which is equivalent to a loss of about 69% of the population since *Ontario Birds* began.

There are several factors responsible for Bobolink declines. Chief among them is loss of breeding habitat, especially pasturelands and hayfields, which have either been abandoned outright (especially in eastern Ontario) or have been converted to other crop types, notably corn and soy, with an attendant reduced emphasis on the production of beef and dairy cattle (McCracken *et al.* 2013, Smith 2015). Habitat loss also figures prominently on the Bobolink's wintering grounds and on migration routes. In addition, there have been changes in hayfield composition that negatively affect habitat quality for Bobolinks. In particular, there has been a dramatic move from grass-based forage crops over to alfalfa (McCracken *et al.* 2013).

Poor reproductive output is also an important factor. Nest losses are unsustainably high in hayfields when the mowing period overlaps with the peak of the Bobolink's breeding season (e.g., Nocera *et al.* 2005, 2007; Perlut *et al.* 2006; With *et al.* 2008). Bobolinks also face additional threats on their South American wintering grounds, where they may be exposed to direct human persecution and to toxic effects from insecticides used on rice crops (Basili 1997, Renfrew and Saavedra 2007, Renfrew *et al.* 2007).

A recovery strategy has been developed for Ontario's Bobolinks (McCracken *et al.* 2013). But even stabilizing the population at its current level presents a major conservation challenge, because we will somehow need to address the continued loss of agricultural grasslands in the face of global market forces. Creating increased market-demand for pasture-fed beef may be part of the path forward.

In the meantime, the Bobolink's plight in Ontario is mirrored by declines in many other grassland-obligate species, including Northern Bobwhite, Barn Owl (*Tyto alba*), Short-eared Owl (*Asio flammeus*), Loggerhead Shrike (*Lanius ludovicianus*), Henslow's Sparrow, Grasshopper Sparrow (*A. savannarum*) and Eastern (*Sturnella magna*) and Western (*S. neglecta*) meadowlarks. These declines began even before the first issue of *Ontario Birds* was printed, and are mostly due to loss of grassland habitat and agricultural intensification.

Carolinian Birds

The "Carolinian Zone" is the southernmost part of Ontario and Canada, extending as far south as 42°N. It is home to numerous "Carolinian species", the Canadian ranges of which are, or were, largely confined to that area extending roughly south and west of Toronto. Carolinian bird species, occurring primarily within the United States, reach the northern peripheries of their breeding ranges in this area. Several Carolinian species have shown notable changes since 1983. These include three forest and woodland species, the Hooded Warbler (*Setophaga citrina*), Tufted Titmouse (*Baeolophus bicolor*) and Red-bellied Woodpecker (*Melanerpes carolinus*), all of which have expanded northward and the Yellow-breasted Chat, a species of early-successional woodland, the range of which is retracting southward into the US.

The Hooded Warbler, Tufted Titmouse and Red-bellied Woodpecker, have all increased by >200% between atlases. The increase in the Hooded Warbler is rather remarkable given its apparent absence or near absence from the province as a breeding species prior to 1949 (Gartshore 1988). However, its recent history has been one of steady expansion, increasing from 21 to 81 squares with breeding evidence between atlases. Its breeding distribution was largely confined to the Carolinian Zone but now includes an extra-Carolinian distribution covering at least 17 municipalities. The censused population is 436 territorial males with a total estimated population comprising 1,000 to 2,000 individuals in 2011 (COSEWIC 2012b). This expansion is consistent with the US portion of this species' range where BBS data indicate a northward shift in the breeding distribution of 115 km during a 26-year period (Hitch and Leberg 2007). The reasons for this expansion are several and include increasing habitat availability, habitat connectivity and climatic favorability (Melles *et al.* 2011).

The increases for Tufted Titmouse and Red-bellied Woodpecker have been no less dramatic. Tufted Titmouse increased from 21 to 99 squares with breeding evidence and with a change in probability of observation of around 300% between atlases (Read 2007). Although subject to West Nile Virus which resulted in locally severe rates of mortality (Ladeau *et al.*

Red-bellied Woodpecker. *Photo: Homer Caliwag*

2007), Tufted Titmouse is nevertheless reasonably fecund with relatively high fledgling survival and with dispersal of young by as much as 75 km from natal territories (Ritchison *et al.* 2015). Similarly expanding populations in adjacent U.S. states combined with high dispersal rates of fledged young and increasing winter survival due to climate change and the availability of winter bird feeders are all thought to be factors in this species' increasing population (Price 2004, Ritchison *et al.* 2015).

Perhaps more conspicuous has been the increase in Red-bellied Woodpecker over the past 30 years. Highly vocal and easily detected, it formerly was known to be a relatively rare and consummately Carolinian species in the province. Between atlases, however, it increased by more than 250% in the number of squares with breeding evidence (from 115 to 441). Moreover, both its range-edge and core range expanded northward by 112 and 32 km, respectively (Bavrlic 2007). This pattern of expansion is consistent with that observed elsewhere along the northern edge of this species' range. While expansion in the northeast began prior to 1950, it has been most dramatic since the 1970s, facilitated by climate change, the forced dispersal of young from natal territories and increased winter survival, particularly of males, through supplementary food provided by bird feeders (Kirchman and Schneider 2014).

Among Carolinian species that have declined in the past 30 years, the case of the Yellow-breasted Chat is perhaps most compelling. While never common in the province, the chat has declined substantially since 1983. Recorded in 45 squares during the first atlas, breeding evidence was found in only 27 squares during the second atlas (Eagles 2007). This declining trend has continued unabated since the atlas and the species has now largely disappeared from its former strongholds within Point Pelee National Park and on Pelee Island and appears to be near extirpation in the province as a breeding species. This decline is consistent with observations in the adjacent US states of Michigan, Ohio, Pennsylvania and New York where BBS data indicate significant declines and a general southward retraction of the species' breeding range (COSEWIC 2011).

A scant three decades ago, who would have predicted that such common and widespread species as Barn Swallow, Bank Swallow, Eastern Whip-poor-will, Common Nighthawk and Chimney Swift would have landed on the provincial list of species at risk?

Concluding Discussion

The preceding accounts help illustrate how dynamic bird populations have been since 1983 in Ontario. While definitive explanations for many of these changes are not yet available, most of the changes outlined can be attributed with varying degrees of certainty to changes brought about by humanity. Although some species have benefitted from the development of large parts of the landscape, the overall pattern has been one of decline since the 1970s, even in a place like Ontario with large undeveloped areas. The "ecological footprint" of humanity continues to expand with human population, development of the land and intensification of land-use, and changes to the climate, so that birds are subject to loss of or increasing change to their habitat and in many cases their food supply. The patterns revealed in the *State of Canada's Birds* (NABCI-Canada 2012) suggest that dealing with such extensive change may be especially difficult for migratory species, and particularly those that migrate long distances, presenting challenges to their populations and even threats to the existence of some species.

Since the first issue of *Ontario Birds* appeared in 1983, we have seen large shifts in our thinking about species at risk and conservation priorities. Back then in Ontario, we were understandably very concerned about the plight of diurnal raptors (especially Bald Eagle, Peregrine Falcon and Red-shouldered Hawk (*Buteo lineatus*)). Those worries are now largely behind us, thanks to stricter controls on pesticides, better community understanding of the importance of raptors and a couple of very successful re-introduction programs. It may sound odd today, but back then we were also quite worried about populations of Eastern Bluebirds (*Sialia sialis*). Their populations have since rebounded magnificently, owing largely to the large network of bluebird enthusiasts and their nest box programs. We have also seen remarkable population increases stemming from the expansion and maturation of woodland in southern Ontario (Larson *et al.* 1999) and eastern North America (Askins 2000), perhaps coupled with a warming climate (e.g., witness the huge expansion of Hooded Warblers and several other Carolinian species of woodland birds). Waterfowl are also largely faring better, thanks to more effective wetland protection efforts and substantial financial commitments through the North American Waterfowl Management Plan. Despite this success, marsh birds such as the Black Tern and Common Gallinule continue to decline, suggesting that some of these more specialized wetland species will require more targeted conservation efforts.

On the downside, southern Ontario has more bird species at risk than any other region of Canada. We have seen the continued decline of grassland birds across most of the province. While not common in 1983, Loggerhead Shrike, Henslow's Sparrow, Barn Owl and Northern Bobwhite were once much more widespread and even fairly "easy to find". They are all now teetering on the edge of extirpation. Although still plentiful, Bobolink and Eastern Meadowlark seem to be on the same trajectory. Arguably the biggest conservation concern that has emerged since 1983 is the decline of aerial insectivores. A scant three decades ago, who would have predicted that such common and widespread species as Barn Swallow, Bank Swallow, Eastern Whip-poor-will (*Antrostomus vociferous*), Common Nighthawk and Chimney Swift would have landed on the provincial list of species at risk?

The success of the MBCA of 1916 and a ban on the use of DDT in Canada in 1972 indicate that much can be done to rectify the changes wrought by humanity, but it will require an unprecedented effort to prevent the projected climate changes from occurring and further reducing bird populations. We sincerely hope that by the time of the 200th issue of *Ontario Birds*, some of these processes will be well underway, paving the way for a bountiful future for our birds and those who enjoy them so much.

Acknowledgements

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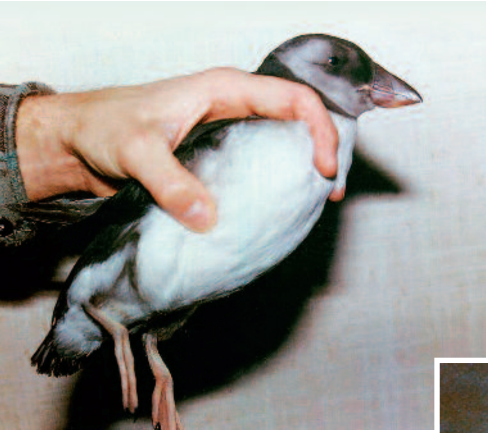
Reviewing the Records

Mark Peck



It is a difficult and thankless task being a member of the Ontario Bird Records Committee (OBRC). Being the Royal Ontario Museum Liaison and a non-voting member is much more enjoyable. So, when the editors of *Ontario Birds* asked if I would choose some of the more interesting records for the 100th Issue, I was more than happy to comply. The records sent to the OBRC contain not only the particulars related to a rare bird find but also provide a glimpse into the excitement and determination of the observer. These are a few of my favourites.

Atlantic Puffin (*Fratercula arctica*),
immature, 15 December 1985
Westmeath, Renfrew Co.

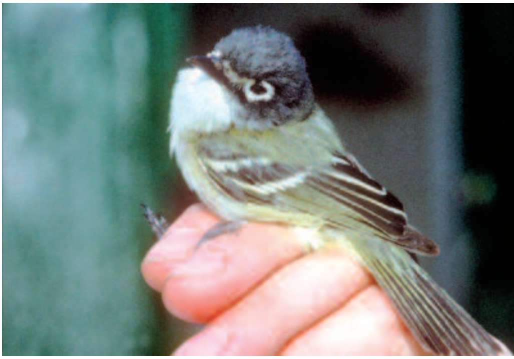
Ontario's first documented record of Atlantic Puffin was not without mystery. The bird was found moribund and partially frozen on a roadside in mid-December, 3 km from the Ottawa River (see *Ontario Birds,* April 1986). How does a marine bird, rarely found inland and almost never out of sight of water, end up on a road? Did the puffin finally collapse from exhaustion, did it mistake the road for a suitable waterbody and land, only to find itself stranded?

Above: **Atlantic Puffin, 1985.**
Photo: Jacques Bouvier
Right: **Snowy Plover, 1987.**
Photo: Edmund D. Johns

No one knows for sure but puffins ending up on roadsides is not as uncommon as you might think. In Newfoundland, fledgling puffins are often found along coastal roadsides and backyards in the fall. They are apparently confused by weather and artificial lights. This issue has led to the formation of the "Puffin Patrol" in Newfoundland which has now banded and released over 1,500 birds in the last five years. Ontario's first puffin had a similar fate. The bird was rescued, sent to Verona, Ontario, for rest and rehabilitation and then was sent back healthy to Newfoundland on a commercial flight in January of 1986.

Snowy Plover (*Charadrius nivosus*),
adult, male, 4-9 May 1987
Long Point Flats, Haldimand-Norfolk R.M.

Digital photography has certainly made confirmation of rare bird sightings easier than ever and made the work of the OBRC panel more decisive and less divisive than previously. Take for example, the "first record" of Snowy Plover found at Long Point in 1987. The report for the bird was carefully written up, photographs accompanied the report and plover experts from outside the province had been contacted to see if they could assist with sexing and identification of subspecies. The record was subsequently accepted as the first record for Ontario. However, there had in fact been two other reports previously considered but rejected. The first was of a bird reportedly collected at Toronto in May of 1880. Unfortunately, the specimen was destroyed and no description was left at the time. Another specimen, also missing, was reported to have originated from an unreliable collector and was not accepted.



Black-capped Vireo, 1991. *Photo: Julian R. Hough*

Black-capped Vireo (*Vireo atricapilla*),
adult, female, 27 April 1991
Long Point Peninsula, Haldimand-Norfolk R.M.

Have you ever wondered how many rarities pass through the province undetected? Banding laboratory results provide some interesting insights into the question and would suggest that the numbers may be greater than we think, despite the number of birders searching their favourite haunts regularly. In most years, the OBRC will decide on a number of records sent to them from banding labs across the province. One of our best records was a female Black-capped Vireo, the first record for Canada, mist-netted at the Breakwater Field Station, part of the Long Point Bird Observatory on Lake Erie. Only three volunteer migration assistants ever had a chance to see the bird before it was measured, banded and released back into the wild.

The bird was originally observed during a busy day of banding but not confidently identified. It was not until the bird was passively caught in a nearby mist net that the identification was confirmed. A fast moving northerly weather system was correlated with the arrival of this endangered, locally-restricted vireo from the southwest United States (*Ontario Birds*, December 1991).

Heerman's Gull, 1999-2000. *Photo: Kayo Roy*

Heerman's Gull *(Larus heermanni)*
first basic/first alternate
14 November 1999 – 16 September 2000
Toronto Harbour and Humber Bay Park, Toronto; Lasalle Park, Hamilton-Wentworth R.M. and Bronte Harbour, Halton R.M.

If you were a birder in 1999 and didn't see the Heerman's Gull, it was not for lack of opportunity. This first record for Ontario was fed, photographed and fawned over for 10 months. The famous bird was written up extensively on Ontbirds and in newspapers. Bob Yukich wrote an article in *Ontario Birds* detailing the finding and movement of the bird during its stay and Jean Iron and Ron Pittaway followed that with a detailed article on its molt pattern. Ten people submitted descriptions and photographs of the bird to the OBRC. Even the committee was impressed. Comments from committee members included; "Extensive documentation including excellent photos and video… Excellent photos and descriptions. I have seen the bird three times." And, my favourite; "How will we handle (this bird) if it stays six years?"

Most of the time, when rarities show up, birders must move quickly to even have a chance to see the bird. Every so often though, when a bird sticks around for a while, it is wonderful to see the birding community take the time to really enjoy and learn from the opportunity.

Manx Shearwater (*Puffinus puffinus*),
female, 26 August 2001
Shirley's Bay (along dike), Ottawa R.M.

The role of the OBRC is to adjudicate and accept provincial bird records supported by material evidence. This includes sighted, heard, collected or banded birds. In rare circumstances, this may include birds that will never be added to anyone's provincial bird list or big year. The first provincial record for Manx Shearwater is one such example. In the afternoon, Bruce Squirrel found a dead shearwater along the dike of Shirley's Bay. The bird was fresh and in good condition indicating it had died in the last 24 hours. The bird was carefully identified and photographed and then left with Bruce Di Labio. The bird was made into a study skin, the identification confirmed by Michel Gosselin of the Canadian Museum of Nature (CMN), and then deposited into the CMN collections (CMNAV 77920). Birders in the province would have to wait another five years before a live Manx Shearwater was observed and documented in Hamilton on 1 September 2006.

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Field birders at the Rondeau Provincial Park Interpretive Centre feeders on 4 May 2008. *Photo: Gavan Watson*

Ontario birding: a qualitative study on its practice in the field

Gavan P. L. Watson

In this paper, I describe the partial findings from my doctoral research (Watson 2010), with an emphasis on reporting how field birders I interviewed in Ontario were drawn to birding and socialized into its practices. Birding, as I mean it here, is the act of observing and (attempting to) identify wild birds. For the project, I investigated, in part, a particular subset of bird watching practices which others have called "field birding" (Bergin 2008): the activity of leaving the house, travelling to a location and identifying as many species of birds as possible. While the positive impact that Ontario birders have had on efforts to track bird populations had been recognized in the scientific scholarly literature (see, for example, Lepage and Francis 2002), when I began my research little work had been completed on exploring the characteristics of birding as a human activity and as a kind of environmental education. This was the gap in understanding that I attempted to address.

What followed was a qualitative study of birders and their relationship with and connection to the birds they watch. Beginning with spring migration in 2008, I visited Rondeau Provincial Park, then returned to Toronto and continued interviews, completing my data collection in December 2008. My research methods included collecting recorded interviews (n=25) from birders in the field conducted at Rondeau Provincial Park and locations within the Greater Toronto Area (see Table 1 for participant data). While at Rondeau, I sought research participants *in situ*, meaning that I approached birders as they were birding and asked them to participate in the project. In Toronto, I asked for participants from the Toronto Ornithological Club in addition to approaching birders in the field. The birders I interviewed had a wide variety of experience and included those new to birding as well as those with decades of experience. In this project, approved by my university's Ethics Review Board, informed consent was sought from all human interview participants and I had permission from the Ministry of Natural Resources to conduct research within Rondeau Provincial Park. Growing up in a family of birders, and a birder myself, I also included components of participant observation and field journals to my methods, including data collected as I went birding myself during this period of time.

This project was qualitative in nature, meaning that the research methods employed were not intended to lay bare a single "truth" about the activity of birding in Ontario. All participants' names were changed. Transcribed interviews were analysed using a modified grounded theory approach (after Clarke 2003) and field journals were analyzed with a naturalist auto-ethnographic lens (a novel method). While a methodological departure from more quantitative approaches to research, this project was designed and undertaken so that the findings are valid when understood to be dependent on the larger context of the project. Using these systematic approaches to look for emergent themes, I have gone on to make claims from the research for the broader practice of birding (Watson 2010, 2011). In the following work, I highlight components of this research I believe to be of interest to Ontario birders: the joy that draws people to the activity, the role of the environment in the act of bird identification and the tension in the activity of collecting and listing bird observations. I close with the contention that at its best, field birding opens birders up to the agency and subjectivity of the natural world around them.

On the joy of watching birds

When I asked birders what first drew their interest to bird watching, many described simply noticing or becoming aware of birds for the first time. Barbara, when reflecting on peering through binoculars at a Cedar Waxwing (*Bombycilla cedrorum*) on one of her first birding outings simply said, "I can't believe I spent my whole life not noticing." Given the central nature of sight in the suite of human senses, birders often describe birding primarily as a visual activity. She described how she was introduced to field birding by her current partner:

> "And of course he gave me the binoculars and I looked up. My first bird was the Cedar Waxwing and I was hooked. I couldn't breathe. I was like, 'My gosh look at that thing. Look at that thing.' So that was it. I had to know all of them from then on. I had to start my journey of getting to know. Not realizing the opportunity. What a variety. In fact the first time I saw a bird book [I] almost fell over. I thought, 'Is there that many birds? Oh my God.' I had no idea."

This experience encapsulates the obvious activities of field birding: first noticing, then watching and finally, identifying birds. Yet, there is something about Barbara's first time birding that suggests there is more to the activity than just that trio. There is an enthusiasm and excitement in Barbara's story that speaks to the quality of her first encounter with the waxwing. The moment when she first looked at the bird was literally breathtaking and her act of watching was as much emotional as it was sensory.

"My first bird was the Cedar Waxwing and I was hooked."

Cedar Waxwing.
Photo: Ann Brokelman

Table 1: Field birder interview participant data, Rondeau and Toronto, 2008.

Location	Name (as appears in research)	Date of Interview	Age (decade)	Sex	Length of Interview
Rondeau	David	April 28-08	70	M	01:02:34
Rondeau	Sonya	April 29-08	60	F	00:56:07
Rondeau	Darren		60	M	
Rondeau	Fred	April 30-08	60	M	00:32:02
Rondeau	Janette		60	F	
Rondeau	Don	April 30-08	70	M	01:33:53
Rondeau	Cynthia		70	F	
Rondeau	Chester	May 01-08	70	M	00:48:05
Rondeau	Helena	May 02-08	60	F	01:10:45
Rondeau	Gary		70	M	
Rondeau	Margret	May 02-08	50	F	00:53:06
Rondeau	Judy	May 03-08	50	F	01:11:44
Rondeau	Bill		50	M	
Rondeau	Pamela	May 03-08	60	F	01:39:45
Rondeau	Roger		60	M	
Rondeau	Barbara	May 04-08	60	F	00:40:00
Rondeau	Paul		40	M	
Rondeau	Jim	May 04-08	50	M	00:38:32
Rondeau	Melinda		50	F	
Rondeau	Jordan	May 05-08	30	M	01:09:03
Rondeau	Serena		20	F	
Rondeau	Raymond	May 05-08	60	M	00:55:42
Rondeau	Elizabeth		60	F	
Rondeau	Roland	May 06-08	40	M	00:27:47
Rondeau	Cameron	May 07-08	50	M	00:35:27
Rondeau	Niles	May 07-08	70	M	00:45:50
Greater Toronto Area (GTA)	Daniel	Sep 11-08	60	M	00:42:26
GTA	Mara	Sep 13-08	50	F	00:29:25
GTA	Shannon	Sep 13-08	60	F	00:32:32
GTA	Danny	Sep 14-08	30	M	00:23:30
GTA	Michelle	Sep 23-08	70	F	00:49:20
GTA	Josh		70	M	
GTA	Norman	Sep 23-08	80	M	00:56:09
GTA	Sheri	Sep 23-08	60	F	00:59:45
GTA	Amber	Sep 24-08	50	F	00:49:52
GTA	Chad	Dec-22-08	40	M	01:51:16

Another birder, Danny, replied to my questions about his feelings of excitement while watching birds:

> "Gavan: Right. So do you find that you do get excited when you see [birds]?
> D: Oh, yeah.
> G: Can you describe that feeling?
> D: I end up most of the time focusing all my energy on trying to make the most of the sighting and I'm sort of holding back on the excitement, and it's sort of after the sighting is over and I'm sort off on the trail walking away from the experience. That's when I'm excited and [if] I'm with someone, I can be talking to them. I don't know, it makes me conversational."

Birders want to know what it is that they are seeing and this curiosity leads them to the act of identification. Chad described a moment in his personal transition to becoming a birder when he needed to know the name of an unknown bird he later identified as a Black-throated Blue Warbler (*Setophaga caerulescens*):

> "I can distinctly remember seeing the Black-throated Blue Warbler and I was 14 or 15 and thinking, Okay, why... and it's so distinctive right? It's such a distinctive looking bird and I remember completely thinking...why the heck have I never seen that before? and looking it up in a bird book and talking to my parents about it. My parents didn't really know anything but they were really encouraging about all this stuff."

This act of naming works to fix a common identity to the observed bird, but, as in this case, also creates the opportunity to share what he has learned with others. This makes the act of identification an entry to knowing more about the natural world and an opportunity to share what birders have learned with others.

Beyond watching: identification in an ecological context

Beyond the sensations of seeing or hearing birds, it is clear that the larger ecological context in which a bird is found can play a role in identification. After spending an evening with local birders watching shorebirds at the Blenheim sewage lagoons, the notes in my field journal reflect on the act of identification:

> "Shorebirds are a confusing bunch for me. We could have spent more time identifying the different shorebirds, but Iris had left her scope in her car and David didn't have his with him. So, we had to be content with our binocular (8-10x) assisted-vision. As we drove back to Rondeau, we talked a little bit about identifying shorebirds. What struck me was that the identification was a combination of visual cues (e.g., Iris said that a Pectoral Sandpiper has a streaky breast that looks like they "took a ruler and decided the streaks should end just there") and observed behaviour (e.g., David suggested that Baird Sandpipers prefer to be further back from the water's edge rather than right in it); that identification was often the synergy between the two rather than just one or the other."

Identification, rather than simply an attempt to match an impression of a bird to an image in a book, appears to become a more complex act with experience. In birding, this larger context is a combination of many things: habitat, previous experiences, bird behaviour and even time of year. Awareness of these factors is awareness of an ecological context. Importantly, by ecology I mean "the relations of organisms to each other and their surroundings" (Ricklefs 1997) which does not exclude human and built environments and focuses on the relationships between the various components.

It is significant to notice that there is something about the Baird Sandpiper (*Calidris bairdii*) behaviour, shaped and supported by its environment, which causes the species to forage in drier places than some other shorebirds. It speaks to a kind of knowledge about birds that is integrated with the larger world and counters characterizations of birding as a narrowing of perspective (see Karnicky 2004 for an example of this kind of argument) and identification as an act driven more by the plates and range maps found in bird books than in the first-hand experience of birding (Wilkinson *et al.* 2014). While a bird cannot be identified to species by understanding this larger ecological context alone, it can firmly guide the act of identification.

The act of listing and collecting observations

Birds can elicit emotional responses in birders, with sightings and the subsequent feelings propelling the birder forward. While these emotional states may be an intrinsic motivation for birding, extrinsic motivation can come from a sense of (often implicit) competition that many field birders feel. As Raymond, a beginner, suggests:

> "It's just there are so many people and so many people trying to outdo other people. One thing I would never get into is the competitive aspect of birding. I'm not, like I wouldn't go out on a birdathon or anything like that. Because I'm not really a competitive type person."

Although birdathons are mostly characterized as a fund-raising event in a jovial atmosphere, counting the number of species seen is a key activity. More broadly for field birding, counting the number of species observed is a benchmark to compare your success to others. Field birding can be, in part, an activity that focuses on seeing the most number of bird species over a given unit of time: think of a "big year" or a "big day".

This act of counting often becomes an act of listing. Raymond and Elizabeth, both beginning field birders, describe what their listing looks like:

> "E: We have a couple of different lists. We have a life list and we have a little notebook that we keep as a daily thing if we're out somewhere.
> R: Our life list is really not – well, we have it in multiple forms. I kind of tick them off in our guide, but I also keep a photo list. Not necessarily all my own photos, in fact, very few of them are my own photos."

But numbers of identified birds do count — on a birding trip, for example, where field birders spend many days looking for birds, the best day is often the one where the highest number of species was seen. This focus on numbers, however, is not everyone's practice. For Cameron, it is not the quantity of bird species seen, but rather the quality:

> "G: Now, you said that you just started keeping a list of birds over the last couple of years?
> C: Yeah, and it's something that we just happened [unintelligible] but I don't keep a life list. I don't care about the numbers. Like, I don't push myself that I have to have this. And I'm not going to not look at a bird that looks nice [and say] 'Oh, I've seen that already.' I'm not doing that. If it's a pretty bird, I will — like I'm not into where I have to have the numbers. And I'm rushing around, and not getting a good look at one bird just to see something else. Maybe at some point I will, I don't know. I'd rather not. I'd rather just enjoy it as I go.
> G: Do you think that in that movement of collecting bird observations, you kind of lose some of the original [interest]?
> C: That's what I think. If the bird looks pretty and looks nice, I will sit there and look at it. I would just as soon be like that. Then if I miss a couple of birds, so be it. I'm not going to rush around to get a huge list. Like we keep it for our own but it doesn't matter. I am not keeping a life list or none of that stuff."

Significantly while he does not keep a life list, Cameron still lists. His particular practice of birding is directed more towards watching birds than collecting observations and, as a consequence, systematically keeping a list of all species seen does not match his beliefs about what birding is. It does, however, reinforce the underlying visual appeal to birding; Cameron is interested in getting good looks at pretty birds.

Amber, a Toronto field birder for less than ten years, "only casually" lists the birds she sees:

> "I like to look at, like at the end of the year, maybe. Go through the list. But like I am not a bird chaser. I'm not going to watch OntBirds and see that something somewhere that's a four-hour drive and hop in my car and go. So I am not that kind of a list keeper. But I am a list keeper in that I think it's helpful in terms of making things stay in my memory. And to have an idea of what I've seen and try and remind myself of the features and that."

Roland understands how the act of listing can appear to become a competition: "I come across people like that. They act like it is a competition and see how many birds they can get." Chasing after a bird, a particular narrow practice of field birding, becomes synonymous with keeping a particular kind of list. Birders' use of lists, whether a record of all birds seen or a casual tool to augment memory, appear as a proxy, acting as a representation of each individual birder's particular practice of watching birds.

The kind of birding that becomes a competition to "get" the most number of species is a particular political and ethical act. Birders' relationships with listing is varied and of those I interviewed, their listing rarely existed at an extreme of the behaviour. Yet, at its worst, listing can drive a kind of birding where the individual birds become inconsequential to a tick on a list. I asked Daniel if, while birding, he kept a list of birds he saw. He replied that he did not care for the act of list-keeping as it over-emphasizes the act of collection:

> "G: So why don't you care about that kind of stuff?

D: Because it's like stamp collecting. I thought that if you're collecting stamps it's the everyday stamps [that] are the interesting ones. I am much more interested in — I actually have quite a lot of fun watching House Sparrows (even though they are not a sparrow). Just because there are so many of them and they're highly successful which is really interesting. Why is that bird so successful? Why does it like human beings? And so on."

In Daniel's case, I interviewed him under the shade of a tree in High Park, Toronto. We met at Hawk Hill, where we were both spending a sunny and warm September afternoon watching for migrating raptors. Earlier in the day, we had sat in chairs watching the sky overhead, scanning with binoculars above the tree tops surrounding us for a speck that would slowly grow and "become" some species of hawk, vulture, eagle or falcon (or, more often a Ring-billed Gull, *Larus delawarensis*). Each raptor would be identified to the best of our collective abilities and marked down. On the hour, we would collate our species sightings for later submission to the Hawk Migration Association of North America, a citizen science organization which monitors raptor populations.

Birders engage with birds' immediate environments, and a bird's presence appears to be a catalyst for making the rest of the outdoors more meaningful.

I point this out to show the tension that exists within each birder's practice of birding. While he does not keep a list of birds in his personal practice, Daniel is involved with the monitoring of raptor migration, which as part of its practice involves, though standardized, list-keeping. Importantly, Daniel shows what birding is outside the collection of observations: it is watching birds for a purpose beyond identification. He is curious about behaviour, asks questions about the lives of the birds and is still interested when the species of bird, in this case the House Sparrow (*Passer domesticus*), is ubiquitous.

Beyond collecting observations: how birding can educate about the environment

Birders can collect more than just observations, in part, because they move through habitats and make observations, over days and years, on an ecosystem level, of the connections that matter significantly to the lives of birds. Birders engage with birds' immediate environments, and a bird's presence appears to be a catalyst for making the rest of the outdoors more meaningful. Knowledge about birds is always generated in-place, in relationship to the other living and non-living parts of the environment. Sonya told me that as she began to bird, she would look for:

"...photographs because I thought that I would go into the woods and see, um, a picture of a bird. But then, your first stage, moving from abject beginner you realize that there is a strata in the forest. You've got to [know] where to look for

> which bird. So you look for a Louisiana Waterthrush at the edge of the water or wherever, and you look for a woodpecker on the side of a tree."

Birding also changes personal perspectives. Jordan describes how the act of birding changed what he valued:

> "Because I took geology option in school and I was working exploration with a mining company for few years and I think if I hadn't...not sure how I stepped back from it, if I would have been obsessed with the marriage, the kids, the house, the things like that. I would have been working for one of these giants instead of...
>
> I could never work for [companies like] that any more, like we talked about the tar sands and talked about employment with that and now seeing that, I could have been involved with that as opposed to someone who is disgusted by it.
>
> In a way birding sort of saves you. Just having something to be attached to. That shows your appreciation or shows how precious the outdoor life is."

This suggests that birding is a practice that is deeply embedded in the living world around it. The kind of knowledge that comes through sustained observations is often called natural history. I am offering the term to describe contemporary practices that create the possibility for more meaningful relationships between the human and the natural. The larger ecological context is deeply implicated in the practice of field birding. To be a successful field birder requires an understanding of the lives of the bird species in which a particular birder is interested. Ecological context is key: simply put, a birder does not go to the woods when they want to see waterfowl. As a consequence, it can be said that birding is a practice that is deeply embedded in the living world around it. Bird watching, then, is a method of acquiring natural history knowledge. This understanding is created in the specific context of time and place, creating a personal space of engagement between humans, birds and the environment.

Attentiveness to the agency and subjectivity of the world beyond ourselves is an exceedingly important skill to cultivate. Acts of first noticing, then identifying birds can allow for experiences that open field birders to the agency of the natural world around them. A birder's experience with birds, and the birds' larger ecological context, offers birders the possibility to see beyond strict human-centred frames of reference.

Birders connecting to the greater world on behalf of birds

Nearly one third of North American adults consider themselves birdwatchers (Scott 2004). My research supports the contention that birders believe that their actions foster a connection to the birds they see and to the greater context in which the birds dwell and that this connection matters to both the bird species and the Ontario environments in which field birders find them. Birding can be more than recreation; it can be an act of education and conservation that reflects birders' own values of the natural world.

Many Ontario birders support the work by conservation organizations to protect habitat and argue for political change on behalf of birds. I would suggest that, in addition to these larger-scale efforts, birders should engage in personal actions that take an individual bird's well-being in mind. Expanding our imagination outward and thinking of other places, we can try to imagine what is it like to be a Cerulean Warbler (*Setophaga cerulea*) overwintering in Venezuela and ask, "How are our own lives linked to these places?" One way is through the choices we make away from the field: our consumption of items like coffee and toilet paper connects our daily lived experience to Central and South America and the Boreal Forest (Stutchbury 2007). Keeping bird lives in mind when away from the field is an opening to a larger effort to lay bare these links, but also demonstrates that those interested in birds can be involved in making daily decisions that arguably have an impact on the lives of birds beyond the places we go to bird.

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Birding in the 'Old Days' (pre-1980)

Bob Curry

Just as the status of birds has changed drastically since 1983, so too has the art and science of watching them.

Birding has changed since 1980! The way we watch birds, how we identify them and the resources we use to do so, how we record and report them and even our style of birding has changed over the past 33 years since the first issue of *Ontario Birds.* So let's return to the state-of-the-art circa 1980.

Even the name of our avocation, birding, came into common usage by practitioners and the general public alike in the 1970s. Before the advent/founding of the American Birding Association in 1968, we were bird watchers. It was argued that birding connoted a sportier more aggressive — dare I say — a sexier view of the hobby. The attempt was to exorcise the public view of bird watching as the pursuit of an effete group replete with tweeds and exaggerated excitement over every sighting: "Oh my Martha, I believe it's a Canadian Goose!"

The counter argument is that bird watching implies a more careful study of birds and their behavior. In fact, the appearance of a birder has changed. In 1980, we often wore old work clothes from the office or the shop. Oh, we might have some kind of rough field pants but shirts, sweaters, coats either served many purposes or when they were too worn for the original purpose were pressed into service as weekend bird watching clothes. I have a photograph of George Bryant on the Niagara River in a November pouring rain decked out in an old cloth dress coat. Most of our birding was done on weekends. The median age of the population, including birders, was younger and most people worked Monday to Friday. Often we crossed our fingers that rarities would hang in until Saturday as work time was more rigid than it is today.

Our equipment was pretty simple in those days. Like most things in life, there were far fewer choices. Many birders used either 7 x 50 or 10 x 50 binoculars, often great clunking things that resulted in permanent sore necks (there were no binocular harnesses). My 10 x 50 Bushnell Custom binos had excellent optics and were also useful to swing at attack dogs. During the first atlas, I drove over them — they needed merely to be re-aligned – the dents and scratches were a badge of honour. Don't try this with your modern high precision optics. Serious birders did have spotting scopes. All were straight through models. Many birders had a 20X wide eyepiece and a 30X eyepiece that could be interchanged. Changing eyepieces on a freezing January day often resulted in a hand and knees search in the snow for one or both eyepieces. Zoom scopes were coming in but the view at higher powers was generally fuzzy and dull and the field of view was restricted. That was it.

Only a limited few professional ornithologists had sound recording equipment — reel-to-reel, of course. We learned the birds' songs and calls by watching them vocalize. New dialects or variations had to be confirmed sometimes via a long chase through the woods. Certainly, such learning was ingrained in our minds, eyes and ears.

World birding was in its infancy in 1980. A tropical birding trip presented special problems with songs and calls. The first LPs presented some songs that had to be memorized ahead of the trip. There were song descriptions in the guide books so it was often a question of "is the mystery bird trilling or buzzing or is it three syllables or four"? As for cameras, in those days a person interested in photographing birds had to buy prohibitively expensive and bulky equipment. Birders were birders, not bird photographers. We prided ourselves in not photographing birds, which was then deemed to be a more passive form of nature study. Birders disparaged photographers and, indeed, to obtain 'perfect' images with huge equipment photographers often damaged habitat and spooked birds. We joked that photographers often had no clue as to the identity of their subjects. There was no love lost between the two groups. Sometimes harsh words were exchanged; sometimes bird locations were not revealed lest "the photographers" descend.

Bird identification was still in its infancy. Remember that up to the 1960s rare birds were often collected by 'museum men'. I can remember very upset bird watchers and vows that the collectors should not hear of any rarities. Worst was when museum collectors from Buffalo 'invaded' Canada to shoot a rarity and secrete the specimen off to their museum.

Even by 1980 there were only two field guides: the classic *Field Guide to the Birds of Eastern North America* by Roger Tory Peterson third edition and its only rival, the *Golden Guide to the Birds* by Chandler S. Robbins. Serious birders acquired *Birds of Canada* by Earl W. Godfrey. There was essentially no other source to aid in the field identification of birds.

Reporting of birds, rarities in particular, was laborious. The phone — land line, of course — was the only method of getting the word out. If you were out birding and a mega-rarity turned up, you were plum out of luck. Once I pulled up at George's house to be told by his wife, Stephanie, that he had gone to Fort Erie to look for a "Brown Puffin". I tore off and almost two hours later got to nearby Jaeger Rocks on Lake Erie and saw the Brown Pelican. And I was all alone with this mega-rarity!

Everybody missed birds one way or another. Hence, a phone tree was inaugurated in several places. Harry Kerr was at the top of the pyramid in Toronto. If you wanted to know what a trip to Toronto might yield, "call Harry". If you got a call, you would phone the next person on your list BEFORE heading out the door.

If that person didn't answer, you called the next person. Needless to say the phone tree, like democracy, wasn't perfect. In the excitement sometimes people took the phone message but forgot to call right away or if someone was out and missed the call, nobody remembered to call later. Worse still, a relative of the birder forgot to tell her/him about the bird! Friendships were tested and often failed the test. It was even rumoured that some Ontario big listers would stay home to be by the phone rather than go birding and risk dipping out on a mega!

When we went into the field, it was almost always "on spec" since we didn't know from the Internet that there was a fallout. We called it a "wave" in those days, and if I may be permitted to wax nostalgic for a moment, the waves were more frequent and consistently produced more birds than those of today. We weren't tempted to race out after local rarities because we didn't know about them. We just went birding. We didn't go to lake watches where new birds for the year were being reported in real time. Rather, we spent more time in ravines and patches of woods, especially in the fall. There was more interest in finding lasts-of-the-spring-migration and firsts-of-the-fall-migration. Of course, you might think you had found the first or last of the migration but it might be several months later when the local club bulletin came out when you learned that someone else had seen it two days earlier or a week later. On the obverse of the same coin, there were far fewer birders so one had a much better chance of being the finder of interesting birds than is the case today. It wasn't better; it was just different.

Birders kept records at various levels of detail. Some used a new field check-list for each year and entered the first date of sighting for each species and that was it. Some entered sightings on gridded paper — a spreadsheet before we knew that there was such a thing. Some kept notebooks with lists of species and numbers laboriously hand-written for each time in the field. Field sketching of birds was a rare practice in Ontario compared to the plethora of fine bird illustrators in Britain. Sightings were reported to the sub-regional editor for *Audubon Field Notes*, later called *American Birds*. Frequently, we read about the occurrence of a rarity elsewhere in the province half a year or more later when the seasonal report arrived in our mail box. It was up to the regional (Ontario) editor to decide whether any bird reported to him/her should be included in the seasonal report. Birders could see the need for some sort of repository and careful vetting of Ontario bird sightings and that gave rise to both the Ontario Bird Records Committee and the Ontario Field Ornithologists in 1982, to create an Ontario community of people interested in bird study and to whom the OBRC was accountable.

The 1970s and 1980s were an exciting period for changes in the art and process of bird watching. These changes are still reflected in the way we do things today. The big differences, like so many facets of life, pertain to changes in technology.

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2014 Great Canadian Birdathon. *Photo: Jeff Gordon*

Embracing change —the evolution of Ontario birding: mid-1990s to 2016

Jody Allair

Being out in nature and watching birds has always been an important part of my life. I was lucky to have very 'outdoorsy' parents who prioritized hiking, fishing and camping throughout the year. The exposure early on to the outdoors almost certainly ignited my interest in natural history. This interest quickly turned into an obsession for one particularly charismatic group of animals: birds.

I really became a birder during my teenage years. I already knew my common yard birds and waterfowl species, and was just getting a taste of more obscure groups like warblers and flycatchers when a fortuitous event happened. I watched a John and Janet Foster nature documentary on migratory birds that featured Long Point Bird Observatory (LPBO). Luckily within a year, LPBO's program manager, Jon McCracken, allowed me, a rather exuberant newcomer, to volunteer at LPBO for a month in August of 1994. The phrase may be overused, but it must be said — this experience changed my life. I now wanted to become not only a serious birder, but also a bird biologist working in the conservation field.

Very quickly, I came to understand that there was a whole community of incredible and generous birders and naturalists across Ontario. More than any technology that existed in the mid-1990s, this group of people provided the tools and lessons I needed to become the birder I am today.

Quite a lot has changed in the 20 years since then. There are more birding products and ways to engage with birds than ever before. We've even had our first big Hollywood movie about birding — *The Big Year*. New technologies, and particularly the emergence of the smartphone, have given birders an almost limitless supply of resources, literally at our fingertips. Gone are the days when a birder only had one field guide (my first was the *National Geographic Field Guide to the Birds of North America* 2nd edition published in 1987) and a pair of binoculars. There are now dozens of field guides (many available in electronic formats for smartphones and tablets), in addition to easier access to audio recordings of birds.

The electronic age also means that eBird is now a household name. Although it was established in 2002, this Citizen Science program geared toward birders has only really taken off over the past six years. This incredibly successful crowd-sourced bird data collection tool was launched by the Cornell Lab of Ornithology and National Audubon Society and is administered in Canada by Bird Studies Canada. eBird is not just a place to enter and keep track of observations; it also has numerous 'explore' features that help birders find birds and see the latest observations from birding hotspots around the world. The alert notifications feature enables people to find out about rarities anywhere in the world within an hour of their being found; eBird is a game changer.

The increasingly sophisticated cameras of smartphones, along with the almost endless array of digital camera options, have ramped up the prominence of photography in birding. What we have now is a blending of these two pastimes. In fact, many of the best bird photographers I have ever met are also among the best birders I know.

Another significant change over the last decade has been the increase in binocular options available to birders. Sure the big three (Swarovski, Leica and Zeiss) are the dominant high-end brands, but in the past few years several excellent options have emerged at the mid-price range. This expansion of the optics market has made a real impact on new and younger birders. You don't need to pay a huge amount of money in order to have a quality pair of binoculars.

What do these developments have in common? They are helping to increase engagement with birds and birding among a whole new cohort of birders. But these tools pale in comparison with the single biggest change to the birding landscape...the emergence of social media, particularly Facebook. At present, the Ontario Birds Facebook group has over 5,200 members. What this forum is doing quite successfully is giving people the opportunity to engage directly with the birding community across Ontario and North America. The key component to this engagement is photography. People are taking photos of birds at an unprecedented rate, and Facebook, Twitter and Instagram provide forums where people can get help identifying the birds in their photographs. Embracing this burgeoning demand, the American Birding Association recently started using the hashtag #whatsthisbird on Twitter, encouraging people to post birds they've photographed but cannot identify.

Whether you're a fan of social media or not, the bottom line is that these platforms are hugely popular, and they are connecting birders in new and exciting ways. Beginners and younger birders are a big demographic on social media channels. If you tried, you would have a hard time designing a better tool to build connections among young birders and to create awareness and enthusiasm for birds in the next generation.

Birding has evolved over the last 33 years. What has changed most are the ways people are engaging with birds. Birding tours, Big Days, field naturalist outings, birdathons, Christmas Bird Counts, Young Birder camps, reporting sightings to Ontbirds, eBird and posting photos to Instagram and Facebook — it's now all part of the broad birding spectrum. Sure, we may now have a larger contingent of people engaging with the birding community who still have a lot to learn, but this shouldn't be perceived as a negative development. It presents an opportunity for Ontario Field Ornithologists (OFO) members to play a bigger role in mentoring the next generation, and not just in the fine art of bird identification, but in the challenges that many populations of birds currently face. I believe the excellent OFO field trip offerings and annual convention have been doing this very successfully for many years, and I am particularly excited to see OFO embracing younger birders with the new Ontario Young Birders club and the dedicated young birder field trips.

All this change does create some issues for the birding community. A few of the big challenges include the overuse of playback via smartphones, the risk of disturbance to birds and bird habitat by people trying to get that perfect photo, the reliability of identifications reported on various internet sites and the reporting of at-risk species to eBird or Ontbirds. All are increasingly part of the new birding landscape. All of these issues, and more, are addressed in the OFO Code of Ethics. This code should be referenced regularly and introduced early to new birders.

At a time when society is arguably more disconnected from the natural world than it has ever been, the emergence of birding as a bridge to the natural world could be exactly what we need. It's an exciting time — and I am looking forward to the next 30 years!

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Changes in ornithological methods in the past 33 years

The Editors

The techniques used in ornithology have changed considerably since 1983. Most field researchers gathered data with notebooks and pencils, used low power scopes and took pictures with single lens reflex cameras and massive telephoto lens. Photography was a hit or miss exercise due to the need to develop the slides at a later date. Those wanting to track movements of birds with transmitters were limited to large birds due to the heavy weight of the batteries and the need to re-encounter the birds in real time. The internet was still a dream, computers were generally large mainframes or if they were desktops they were owned by only a few. Apple and PC computers were just starting and there was no home computer market. Most ornithologists still used typewriters to produce articles, but some were using mainframe computers for word processing and data analysis.

There is now a book on techniques for field ornithology (Sutherland *et al.* 2004) and an older book on techniques, which has been revised seven times (Silvy 2012). As techniques have developed greatly, we decided to give readers a feel for some of the new ones and how they have changed ornithology. The next four papers examine several techniques now which weren't frequently used or didn't exist in 1983. Two new monitoring devices, one a transmitter (Motus) and the other a data logger (geolocator), provide types of information that were previously unobtainable for smaller birds. Information on stress hormones provides insight on natural behaviour and measurements of atomic isotopes show insights on changes in prey and ecological relationships. We hope these papers give you an appreciation for how new techniques, which were unimaginable a few years ago, have now expanded our knowledge of bird biology and ecology.

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Cooperative automated radio telemetry: the Motus Wildlife Tracking System in Ontario

Stuart A. Mackenzie and Philip D. Taylor

Radio telemetry involves tracking animals using transmitters that emit pulses on very high radio frequencies. The technology allows researchers to track many different individual animals with high temporal and geographic precision. Radio-telemetry has played an important role in research and conservation on a wide variety of taxa for over 60 years (Adams 1965, Cochran *et al.* 1965). In recent decades, automation of receivers, miniaturization and digitization of tag signatures and coordination of monitoring efforts, have allowed researchers to simultaneously track larger numbers of individuals at broader scales than previously possible.

The Motus Wildlife Tracking System (Motus is Latin for 'movement') is a cooperative automated radio telemetry system that harnesses the collective power of many researchers and organizations into a globally coordinated effort that expands the scale, scope and impact of everyone's work. Motus is a not-for-profit program of Bird Studies Canada (BSC) in partnership with Acadia University and other collaborating researchers and organizations. It is funded through a combination of user fees and major support from various government agencies and private foundations. The core operations of Motus were initially supported by the Canada Foundation for Innovation, through a grant to Western University, Acadia University, BSC and the University of Guelph.

Figure 1. All Motus stations active for at least three months across all projects excluding Europe, 2014-2016. An up-to-date map of live stations is available at www.motus.org

Figure 2. Red Knot (*Calidris canutus*) outfitted with a radio transmitter (Lotek nano-tag) (see antenna extending from back) being released at Mingan, Quebec. *Photo: Yves Aubry*

Research in Ontario using Motus since 2014 has been comprehensive and diverse.

Researchers using Motus employ transmitters that weigh as little as 0.3 g. These transmitters emit a unique digital pulse every 5-40 seconds, which can be detected by automated receivers at distances of 15-20 km. Tags are fitted onto the backs of birds and bats, including small passerines such as warblers, or even large insects such as Monarchs (*Danaus plexippu*) and Green Darners (*Anax junius*). In July 2016, Motus comprised more than 300 receiving stations (Figure 1) throughout eastern North America, the Arctic and parts of Central and South America. The system has been used to track thousands of individuals of over 70 species of vertebrates. Unlike other lightweight tracking technologies like geolocators or global positioning system tags, location data are transmitted automatically to researchers and individual birds never need to be recaptured.

Research in Ontario using Motus since 2014 has been comprehensive and diverse. Perhaps the most ambitious project has been conducted by the James Bay Shorebird Monitoring Project led by Environment and Climate Change Canada (ECCC), Ontario Ministry of Natural Resources and Forestry, Trent University, the Moose Cree First Nation and BSC. This project aims to quantify habitat use and staging behaviour of migratory shorebirds on the western coast of James Bay (Friis *et al.* 2013, Friis and Peck 2014, Friis 2015). Since 2013, more than 400 individual shorebirds, primarily Semipalmated Sandpiper (*Calidris pusilla*), White-rumped Sandpiper (*C. fuscicollis*), Red Knot (*C. canuta*) and Dunlin (*C. alpina*), have been tagged in and around James Bay and tracked as they travel through the eastern seaboard and as far south as the Gulf of Mexico (Figure 2). These individuals are providing exciting new information about the importance of James Bay to migratory shorebirds as well as knowledge about their migratory pathways that aids in various conservation efforts.

Numerous studies on stopover and migration ecology of songbirds have been and are being conducted at Long Point Bird Observatory, Bruce Peninsula Bird Observatory and Thunder Cape Bird Observatory by Western University, University of Guelph, Trent University, Acadia University, BSC and ECCC. Specifically at Long Point, Black-throated Blue Warblers (*Setophaga caerulescens*), Magnolia Warblers (*S. magnolia*) and Yellow-rumped Warblers (*S. coronata*) have been tagged to study protandry (differential habits of males and females during migration; Morbey 2001) and stopover (Taylor *et al.* 2011, Seewagen *et al.* 2013). Canada Warblers (*Cardellina canadensis*) and Blackpoll Warblers (*S. striata*) have also been tagged to study stopover habitat use, and regional and continental migratory movements (Brown and Taylor 2015).

In the field of species at risk research and recovery, researchers from ECCC, Trent University and BSC have been studying breeding movements and post-breeding dispersal of Bank Swallows (*Riparia riparia*) at natural and anthropogenic nesting sites, providing an eye-opening understanding of a wide use of landscapes throughout the province. In 2016, aerial insectivore work continued on Barn (*Hirundo rustica*) and Cliff swallows (*Petrochelidon pyrrhonota*) as well as Common Nighthawks (*Chordeiles minor*) (Greg Mitchell [ECCC], Myles Falconer [BSC], Stuart Mackenzie [BSC], Liam McGuire [Texas Tech University] and Mark Brigham [University of Regina]).

Wildlife Preservation Canada in collaboration with the Toronto Zoo, Mountsberg Raptor Centre, African Lion Safari and Smithsonian Conservation Biology Institute have also used Motus to assess survivorship and track early migratory movements of captive-raised Loggerhead Shrikes (*Lanius ludovicianus*) released into the wild in southern Ontario (Hazel Wheeler and Jessica Steiner).

Finally, in the depths of winter, researchers from the University of Windsor have been making strides to understand the winter ecology and spring migration of Snow Buntings (*Plectophenax nivalis*). A small number of individuals were tagged near Long Point in early winter 2016, and their movements have been tracked throughout Ontario and up the St. Lawrence River (Emily McKinnon and Oliver Love).

Motus stations have also contributed to many other national and international projects where individuals tagged elsewhere, such as the United States, Nunavut, Yukon or Colombia, have been detected migrating through Ontario. One example of how these data have expanded our knowledge of birds in Ontario specifically is the discovery that the highest concentration of migratory flights for shorebirds originating at Delaware Bay (spring) and James Bay (fall) occurs through eastern Ontario (James Bay Shorebird Monitoring Project). Birders will also be interested to know that Red Knots have been detected migrating through every county in southern Ontario. We expect that they are not frequently observed by birders simply because many individuals choose to fly non-stop between the eastern seaboard and arctic staging areas and it is only during inclement or unusual weather that they are forced to land. Examples of the movement pathways from these and other projects around the hemisphere can be viewed at www.motus.org.

The cooperative application of this technology allows researchers to obtain significantly more data from their single studies and experiments, and likewise, allows researchers to contribute important data to other people's projects. As the network expands, we anticipate being able to supply low-cost receiving stations to members of the public, allowing birders and other citizen scientists to contribute to cooperative wildlife tracking at a global scale.

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Stress hormones: assessing population health at the physiological level

Rhiannon (Leshyk) Pankratz, Erica Nol and Gary Burness

Figure 1: Extracting a small, 100ul, blood sample from an adult male Ovenbird. Blood is extracted from the brachial vein using a small gauge needle and heparinized capillary tube. Blood samples are centrifuged to separate blood cells from plasma, which is analyzed for corticosterone.
Photo: Rhiannon Pankratz

With the emergence of the field of conservation physiology, there is increasing recognition that physiological metrics can provide critical information about the impact of environmental stressors on the flora and fauna of a region (Cooke *et al.* 2013). Of particular interest to us has been the measurement of the so-called "stress hormone", corticosterone, to infer the reaction of animals to environmental perturbations. Corticosterone is a glucocorticoid that circulates in the blood of birds and other taxa (cortisol in humans) and becomes elevated during periods of duress. Extended periods of exposure to a stressor can result in chronic elevation of glucocorticoids, and potential negative effects on health and survival (e.g., reduced body mass, reduction or cessation in reproduction) (Lattin *et al.* 2016). The measurement of corticosterone in a wild bird allows for the quantification of environmental or human-induced stressors on an individual's health and ultimately fitness (Busch and Hayward 2009).

In 2008, as a component of a larger project investigating the effects of group-selection silviculture on wildlife in Algonquin Provincial Park, we collaborated with Dawn Burke and Ken Elliott of the Ontario Ministry of Natural Resources and Forestry, to study the conservation physiology of Ovenbirds (*Seiurus aurocapilla*). Group-selection silviculture is a form of logging that targets small patches of trees (ca. 0.5 ha) for removal, with the end goal of promoting the growth of typically shade-intolerant, but relatively rare, tree species (e.g., Yellow Birch, *Betula alleghaniensis* and Black Cherry, *Prunus serotina*) in the Algonquin landscape. In our study, there were two treatments: 'typical' which involved the removal of small (0.03 ha) or large (0.07 ha) groups of trees next to at least one mature shade sensitive tree species and 'intensive' which involved the removal of medium-sized (0.05 ha) groups of trees spaced 50 m uniformly throughout a forest stand. Within an average 20 ha stand, 'typical' group selection resulted in 10-12 gaps and 'intensive' resulted in 80 gaps per forest stand. Our project was to complement a suite of studies looking at the potential effects of group-selection silviculture on various focal birds, including Yellow-bellied Sapsucker (*Sphyrapicus varius*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*), Black-throated Blue Warbler (*Setophaga caerulescens*), and the bird community as a whole. The other studies of the larger project used traditional ecological metrics of success (e.g., monitoring nest success, fledgling survival, population estimates); our project additionally incorporated the quantification of glucocorticoid hormones. Our goal was to measure corticosterone levels in the blood of Ovenbirds across the different group-selection logging treatments and at undisturbed sites, to determine if group-selection silviculture was affecting Ovenbirds on a physiological level, perhaps in the absence of other more commonly measured indices of health (e.g., body condition, reproductive success).

> Our study was the first to document the effects of group-selection silviculture on stress physiology of birds...

In our study, we measured baseline (immediately after capture) and stress-induced (30-minutes post-capture) corticosterone levels in blood samples extracted from adult male and nestling (baseline only) Ovenbirds (Figure 1). Baseline samples were extracted within three minutes of capture or disturbance of the nest site for nestlings. Blood was extracted within three minutes because it has been shown that there is insufficient time for corticosterone to increase as a result of the acute stress response and thus, this represents the best estimate of a baseline sample. Males were captured using mist nests and a territorial song lure; nestlings were sampled in their nests one to two days before fledging. These two measures of stress provide insight into the immediate response to stressors (baseline) and behavioural responses to stressors (stress-induced). We found that adults and nestlings responded differently to stress from different intensities of group-selection silviculture, with adult males showing elevated stress-induced levels in intensive sites (Figure 2) and nestlings showing elevated baseline levels in both intensive and typical sites (Figure 3) (Leshyk *et al.* 2012, 2013). We also measured body condition, nest success and ground insect abundance (Ovenbird food source) and found no difference across logging and control treatments (Leshyk 2011), highlighting the potential importance of measuring multiple indices of population health when assessing the effects of anthropogenic disturbance.

We attributed the hormonal responses of adult male Ovenbirds which showed elevated stress-induced levels to the changes in the perception of predator risk created by having to cross many relatively large openings in the canopy. We suspect that elevated baseline levels in nestlings were the result of chronic stressors in their environment, consistent with studies of other species (Wasser *et al.* 1997, Suorsa *et al.* 2003, Lucas *et al.* 2006). While we are uncertain of the specific mechanism responsible for the elevated baseline levels in nestling birds, we do not suspect reduced food abundance because of lack of a relationship between body condition and corticosterone levels (Leshyk *et al.* 2012). Taken together, our results suggest that the physiological response of Ovenbirds to group-selection silviculture is complex and additional research is needed to determine the specific mechanisms behind the observed responses.

Our study was the first to document the effects of group-selection silviculture on stress physiology of birds, and was one of only a handful of studies investigating glucocorticoid changes as a result of logging in general (Wasser *et al.* 1997, Suorsa *et al.* 2003, Lucas *et al.* 2006). Since the publication of our work, the field of conservation physiology, and in particular the application of stress hormones in evaluating wild populations has continued to advance, with a journal fully dedicated to this topic (Conservation Physiology) publishing its first articles in 2013. The development of non-invasive techniques to quantify stress in birds over longer time scales, including the use of feces (hours) or feathers (weeks

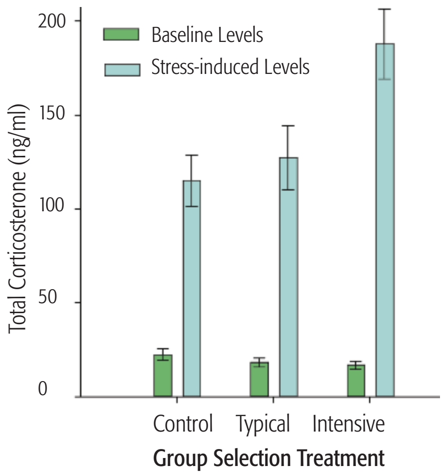

Figure 2: Baseline and stress-induced corticosterone levels in adult male Ovenbirds. Stress-induced levels were significantly higher in the intensive group selection treatment than either the typical group selection or control treatments. There was no difference in baseline corticosterone across the treatments. Means and standard error are presented. Redrawn from Leshyk *et al.* 2013.

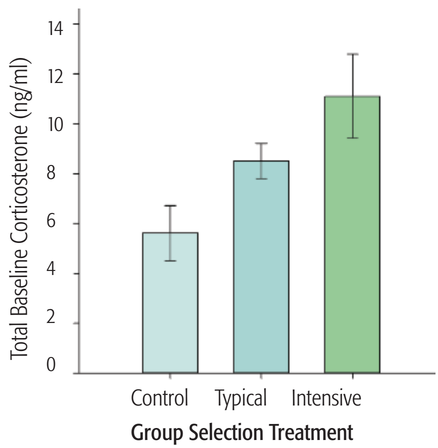

Figure 3: Baseline corticosterone levels for nestling Ovenbirds were significantly higher in sites cut with the intensive group-selection treatment than the undisturbed (control) treatment. Means and standard error are presented. Redrawn from Leshyk *et al.* 2012.

or months) may reduce the potential negative effects of capture, restraint and blood sampling (e.g., Hansen *et al.* 2016). At a regional level, a number of studies have quantified or experimentally manipulated corticosterone levels in Ontario bird populations (e.g., Hogle and Burness 2014, Ouyang *et al.* 2015, Madlinger and Love 2016). These studies contribute to the larger body of work exploring the physiology of free-living birds and the circumstances under which environmental variables may affect wild populations. Despite concerns that have been raised about the use of glucocorticoids to infer stress in wild animals (e.g., Dickens and Romero 2013), we argue that when combined with other metrics, measuring glucocorticoids can be an effective way to evaluate the health of wild bird populations, and can offer insight into the physiological and potential fitness effects of natural and anthropogenic stressors.

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Light-logging archival geolocators: opening the door to a new era of songbird migration science

Samantha Knight and D. Ryan Norris

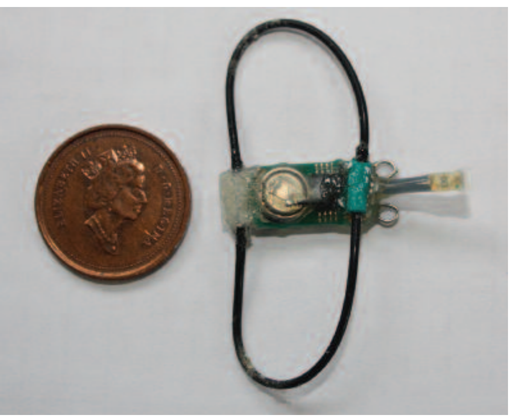

Figure 1a. (Above) Light-logging archival geolocator (0.8 g, M-series, British Antarctic Survey) with leg-loop backpack harness.

Figure 1b. (Opposite) Geolocator fitted onto the back of a Tree Swallow using the leg-loop backpack harness. *Photos: Dayna LeClair*

Science is driven by the generation of new ideas and hypotheses, but technological developments can also open new doors and, in some cases, play a significant role in advancing our understanding of the natural world. The development of the light-logging, archival 'geolocator', we argue, is one such technology that has tremendously advanced our knowledge of songbird migration and will also be important in helping us understand the causes of songbird declines.

Because of their small size (typically < 30 g), songbirds have always presented a challenge for tracking long-distance migrations. Dating back over 100 years, attaching rings or bands to individuals has been the primary method for tracking bird movements (Bairlein and Becker 2011). However, not only are recapture rates of marked birds often < 1% (USGS Bird Banding Laboratory 2016), but recovery of marked birds is restricted to a relatively small number of locations around the globe. Although the recent development of GPS-satellite tracking devices has provided the ability to remotely track year-round movements of a wide variety of animals with a high degree of precision (e.g., Bonfil *et al.* 2005, Alerstam *et al.* 2006, Mansfield *et al.* 2009), battery limitations have, thus far, prevented these devices from being light enough for most songbirds. The use of chemical markers, such as stable-isotopes, to estimate the geographic location of where tissue was grown in a previous period of the year has been revolutionary for linking the breeding and non-breeding sites of migratory birds (Chamberlain *et al.* 1997, Hobson and Wassenaar 1997, Hobson 1999). Stable isotope analysis requires only a small

amount of tissue (typically < 1mg) and, unlike band recovery, individuals only have to be captured once. However, stable isotopes have notable limitations, including providing relatively low spatial resolution and the inability to track continuous movements throughout the year.

By the beginning of the 21st century there was, therefore, a pressing need to find a solution to track the year-round movements of songbirds, and this was when geolocators were first introduced. Light-logging geolocators are based on a simple concept ingeniously engineered into a small archival device (Figure 1). To estimate daily locations, they record just two pieces of information: light levels (solar irradiance) taken at regular intervals (usually every 2 or 10 min) throughout the day, and time (Afanasyev 2004). Longitude is estimated by the time of solar noon or midnight (calculated as the midway point between sunrise and sunset) and latitude is estimated by day length (calculated as the length of time between sunrise and sunset; Afanasyev 2004). Geolocators are 'archival' because data are stored on board the device. Remote download via satellite would require too much power and, therefore, increase size and weight. This means that geolocators must be retrieved the following year to acquire the data and determine an individual's year-round migration. Depending on size, the devices can store approximately 8-12 months' worth of daily location data.

Vsevolod Afanasyev and James Fox, engineers with the British Antarctic Survey (BAS), originally developed geolocators as leg attachments for tracking seabirds (e.g., Weimerskirch and Wilson 2000). In 2006, after discussions with Bridget Stutchbury, a professor at York University, they began to modify geolocators for songbirds. To fit small songbirds, the geolocator needed to be fit as a 'backpack' with a leg-loop harness (Figure 1a; Rappole and Tipton 1991) instead of attached to the leg, as was done in heavier seabirds. A small stalk also had to be designed so back feathers would not cover the light-sensing device (Figure 1b, Figure 2). Using a 1.2 g version of this newly-designed geolocator, Stutchbury and colleagues published the first study on songbirds that tracked the remarkable year-round migrations of both Wood Thrushes (*Hylocichla mustelina*) and Purple Martins (*Progne subis*) from their breeding grounds in northern Pennsylvania to their tropical wintering grounds (Central and South America, respectively) and back (Stutchbury *et al.* 2009). They showed that geolocators could be used to identify migratory routes, the timing and rate of migration, key stopover sites during fall and spring migration, as well as overwintering sites at a level of spatial resolution never before seen.

The Stutchbury *et al.* (2009) proof-of-concept study opened the floodgates for new work on migratory songbirds in the following years, including a number of studies on species that breed in Ontario. For Gray Catbirds (*Dumetella carolinensis*; Ryder *et al.* 2011), Swainson's Thrushes (*Catharus ustulatus*; Delmore *et al.* 2012), Purple Martins (Fraser *et al.* 2012), Ovenbirds (*Seiurus aurocapilla*; Hallworth *et al.* 2015) and Barn Swallows (*Hirdundo rustica*; Hobson *et al.* 2015), geolocators have been used to reveal that breeding populations in western North America migrate to distinct, and often widely

Figure 2. A Blackpoll Warbler in Churchill, Manitoba, fitted with a 0.5 g light-logging geolocator (model ML6440, Lotek Wireless) in spring 2016. The 9 mm white light stalk can be seen on the bird's back.
Photo: Christian Artuso

separated, wintering areas compared to populations in the east. Using geolocators, it has also been discovered that several species, such as Swainson's Thrush (Delmore *et al.* 2012), Tree Swallow (*Tachycineta bicolor*; Bradley *et al.* 2014), and Barn Swallow (Hobson *et al.* 2015), cross the Gulf of Mexico during fall migration but migrate around the Gulf in the spring. This is likely due to wind patterns, where a tailwind assists the birds in a fall crossing, while less favourable wind conditions in the spring mean they must take a long detour (Bradley *et al.* 2014). Geolocators have also been used to demonstrate that male Savannah Sparrows (*Passerculus sandwichensis*) overwinter at higher latitudes in North America than females and that the further north a male overwinters the sooner he arrives on the breeding grounds to secure a territory (Woodworth *et al.* 2016). Many unusual and incredible migratory feats have also been uncovered using geolocators. Streby *et al.* (2015) used geolocators to show that Golden-winged Warblers (*Vermivora chrysoptera*) that had already reached their Tennessee breeding grounds travelled back south more than 1,500 km to avoid dozens of tornadoes that swept through the region only to return after the storms had passed. In another study, DeLuca *et al.* (2015) used geolocators to provide the first direct evidence that the

12 g Blackpoll Warbler (*Setophaga striata*; Figure 2) flies over the Atlantic Ocean from the Maritimes to the Greater Antilles during fall migration, a distance of over 1,500 km that takes up to three days to complete.

The use of geolocators in the last few years has uncovered many fascinating aspects of songbird migration but what is next? One exciting application is the use of these data to understand songbird population dynamics. With migratory animals, one of the greatest challenges is identifying which period in the annual cycle is driving population declines. Geolocators can be used to help address this problem because they provide unique data on migration routes, stopover sites and wintering areas. Using geolocators, we are now able to extract relevant climate or habitat information from all periods of the year. However, the challenge is even more complicated because individuals from a given breeding population may go to different non-breeding sites, potentially sharing sites with birds from other breeding populations. Migratory birds can, therefore, form complex networks in which breeding and non-breeding sites are linked through the mixing of individuals between seasons. Describing these migratory networks is of fundamental importance for understanding the causes of decline because events such has habitat loss that occur at one site may reverberate throughout the network (Sutherland and Dolman 1994, Taylor and Norris 2010). Geolocators will play a leading role in helping us describe these networks. For example, Stanley *et al.* (2015) used geolocators to describe the connections between multiple breeding and wintering populations of Wood Thrush and to then make recommendations about where conservation efforts would be most effectively focused for this species. Our current work using geolocators to describe the migratory network of Tree Swallows involves a collaboration of over 25 researchers across Canada and the U.S. We now have data from 137 geolocators deployed at 12 breeding sites ranging from Alaska to Nova Scotia, which will provide us with the most comprehensive description of a migratory network of any species to date.

The adoption of light-logging archival geolocators for songbirds has resulted in an incredible opportunity to track individual songbird movements throughout the annual cycle. However, like any method, there are drawbacks. Some, but not all, studies have shown that geolocators can result in reduced survival (Arlt *et al.* 2013, Gomez *et al.* 2014, Scandolara *et al.* 2014) and lower reproductive success (Arlt *et al.* 2013, Scandolara *et al.* 2014). Furthermore, because geolocators are archival, we can only obtain data from birds that have survived the entire annual cycle, which means that we gain no information from geolocators on the causes of mortality. New technologies, such as the recently established Motus automated radio telemetry array (see Mackenzie and Taylor article in this issue) and ICARUS (Wikelski *et al.* 2007), offer promise for tracking both movements and mortality, although their development is still in its infancy.

Regardless of what comes next, there is no doubt that light-logging geolocators have contributed enormously to our understanding of bird migration and will play a central role in helping us determine the causes of songbird declines.

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A Herring Gull on colony. *Photo: Craig Hebert*

How biochemical indicators can be used to detect changes in food webs of gulls

Craig Hebert

In the Laurentian Great Lakes, many factors act together to alter biological communities. These changes can affect the structure of the food web which regulates the flow of energy, nutrients, disease and contaminants through ecosystems. Changes in the amounts and pathways of transfer of these things are important regulators of wildlife populations. For example, changes in bird diets resulting from food web change can affect exposure to biomagnifying environmental contaminants (Hebert *et al.* 1997) and impact diet quality with resultant effects on bird reproductive success (Hebert *et al.* 2002). Food web change also appears to be playing a role in the increased mortality of Great Lakes waterbirds due to botulism type E (Hebert *et al.* 2014).

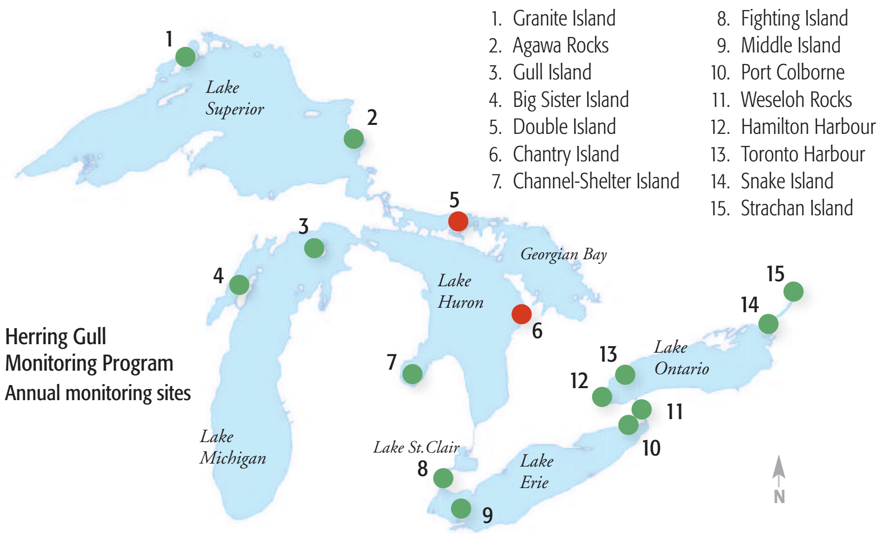


Figure 1. Location of Herring Gull colonies historically monitored as part of the Great Lakes Herring Gull Monitoring Program. Data shown in Figure 2 were generated from the analysis of egg samples collected from the two sites in red on Lake Huron (Site 5: Double Island, Site 6: Chantry Island).

To fully appreciate the importance of food web change to wildlife, it is essential to have tools that help detect it and determine its ecological significance. One way to do that is through regular monitoring of the diets of predators near the top of the food web. These species reflect change across lower trophic level food web components. Here, I focus on the use of a high trophic level colonial waterbird, the Herring Gull (*Larus argentatus*), as an indicator of changes in Great Lakes food webs. This species has been monitored annually across all of the Great Lakes since the 1970s as part of the Great Lakes Herring Gull Monitoring Program (GLHGMP) (Figure 1) (Mineau *et al.* 1984, Hebert *et al.* 1999a). Biochemical markers of diet were first added to the suite of measurements made as part of this program post-1990 (Hebert *et al.* 1997, 1999b, 2006) but it has been possible to generate data for earlier years using archived samples.

Eggs are collected annually and archived in a frozen state in the National Wildlife Specimen Bank (NWSB) at the National Wildlife Research Centre in Ottawa, Canada. Originally, these eggs were used to track levels of chemical contaminants in the environment and that continues to be an important aspect of the program. However, because portions of these egg samples have been archived in the NWSB since the beginning of the GLHGMP, they also provide a unique resource for evaluating temporal changes in Herring Gull diet. Changes in Great

Lakes food webs that change the availability of prey will be reflected in gull diets. In turn, the diet of gulls can be evaluated by measuring biochemical markers in eggs. These biochemical markers reflect the diet of female Herring Gulls during egg formation as females form their eggs from resources obtained near their breeding colonies. Hence, egg biochemical measurements reflect the availability of different food types in the vicinity of breeding sites and, by measuring these markers, we can gain insights into how and why Great Lakes food webs are changing. We routinely measure two types of dietary markers in eggs: 1) stable isotopes of nitrogen and carbon and 2) fatty acids.

Elements can exist in various stable (i.e., non-radioactive) forms. These are termed isotopes. Stable isotopes of an element have the same number of protons but differ in their number of neutrons, creating differences in the atomic mass of isotopes. Different isotopes of an element are chemically identical but their mass differences cause them to have different kinetic properties. These differences result in fractionation of isotopes during biochemical reactions that are useful in understanding the diets of higher trophic level organisms. For example, the ratio of the heavier ^{15}N isotope to the lighter ^{14}N isotope increases with trophic position (e.g., fish occupy higher trophic positions than most alternative foods that gulls may consume) so higher $^{15}N/^{14}N$ ratios in eggs may reflect a greater proportion of fish in the gull diet. Examining the ratio of the heavier ^{13}C carbon isotope to the lighter ^{12}C isotope provides further insights into gull food sources. For example, prey obtained from food webs based on aquatic primary producers, such as phytoplankton, will have lower $^{13}C/^{12}C$ ratios whereas food obtained from terrestrial sources will have relatively more of the ^{13}C isotope.

Fatty acid composition of eggs provides another way to evaluate changes in gull diets through time. Fatty acids are required for normal growth and development; however, some fatty acids either cannot be synthesized at all or cannot be synthesized with high efficiency in higher trophic level predators. Instead, these "essential" fatty acids are formed by primary producers and are passed up the food chain through consumption. During trophic transfers, prey fatty acid signatures are largely retained in higher trophic level species. In general, aquatic organisms such as fish contain greater amounts of the Omega-3 polyunsaturated fatty acids (PUFAs). In terrestrial organisms, Omega-6 PUFAs are relatively more abundant. Thus, the ratio of Omega-3 to Omega-6 PUFAs can be a useful indicator of the amount of aquatic versus terrestrial food in an organism's diet.

Examining temporal changes in egg nitrogen and carbon isotopes and in egg fatty acid patterns has provided us with the means to detect changes in gull diets over the past four decades and have allowed us to examine the reasons for those changes along with their biological significance. I illustrate these aspects using data from Lake Huron but similar information has been generated for all the sites shown on Figure 1. Biochemical data generated from eggs collected on Lake Huron revealed significant changes in the diets of Herring Gulls through time. Egg stable isotope values are expressed in delta notation (δ) which reflects the ratio of ^{15}N to ^{14}N in the egg relative to a standard. Declining $\delta^{15}N$ values reflected a decrease in gull trophic position, i.e., gulls are not feeding as high in the food web as they used to (Figure 2a) likely indicating a reduction in the amount of fish in the gull diet. Egg carbon isotope values ($\delta^{13}C$) also changed through time indicating an increased reliance on terrestrial foods in recent years (Figure 2b). Egg fatty acid signatures summarized as egg Omega-3/Omega-6 ratios also declined indicating an increase in the proportion of terrestrial food in the gull diet through time (Figure 2c). All of these biochemical markers provided corroborating evidence of significant shifts in gull diets through time with an increasing reliance on terrestrial food.

Fish management practices, changes in system productivity and exotic species introductions may be underlying the

Figure 2. Temporal trends in dietary biochemical markers measured in eggs collected from two Herring Gull colonies on Lake Huron:

a) stable nitrogen isotope ($\delta^{15}N$) trends

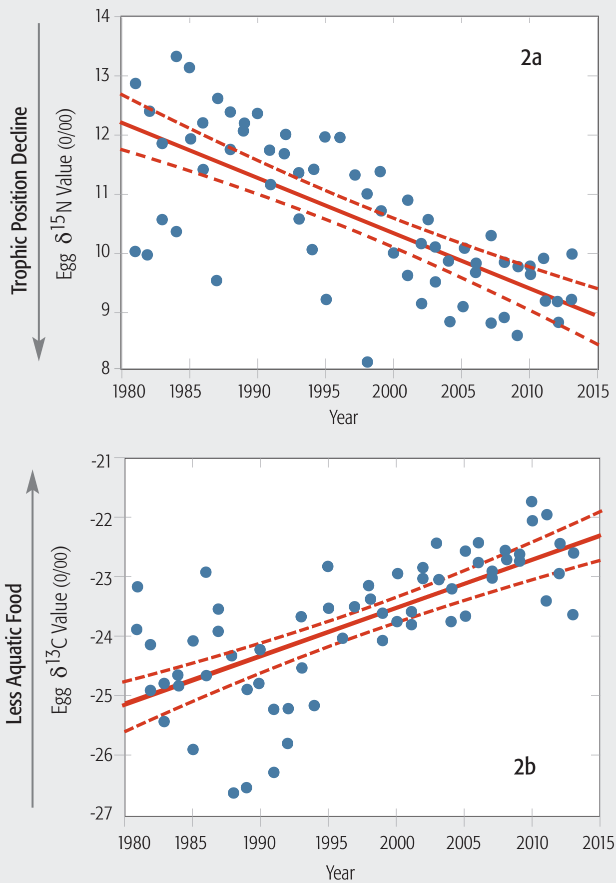
b) stable carbon isotope ($\delta^{13}C$) trends

c) Omega 3/Omega 6 fatty acid ratio trends

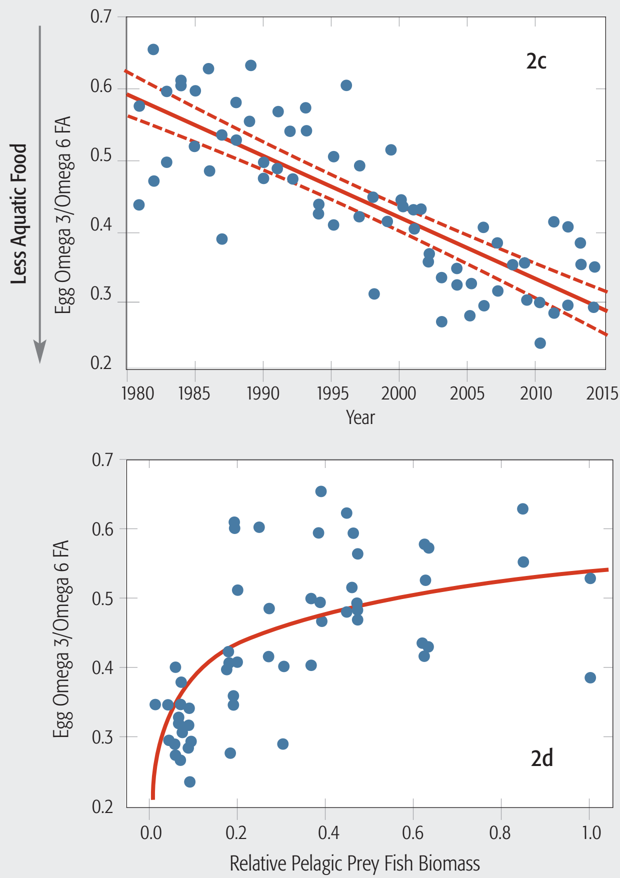
d) relationship between annual Omega 3/Omega 6 fatty acid ratios and estimates of prey fish abundance.

Each point represents the annual value generated for one colony. Annual estimates of prey fish relative abundance for Lake Huron provided by the United States Geological Survey. All correlations are significant at $p<0.05$.

------ 0.95 Conf. Int.



changes observed in gull diets from Lake Huron (Hebert *et al.* 2008, Paterson *et al.* 2014). For example, the introduction of exotic dreissenid mussels (zebra (*Dreissena polymorpha*) and quagga (*D. bugensis*) mussels) and round goby (*Neogobius melanostomus*) have greatly altered nutrient dynamics, the composition of lower trophic level communities and the spatial distribution of prey. Declines in the availability of prey fish in surface waters of the lake may be largely responsible for shifts in gull diet through time (Figure 2d). These dietary shifts may be limiting the availability of resources for reproduction in gulls possibly contributing to population declines. Similar factors are likely at work in other lakes (e.g., Lake Superior), where gull populations have decreased substantially. Further research is being conducted to examine this issue but biochemical markers will continue to play an important part in providing the means to assess further dietary change and connect it to larger ecosystem-scale processes.



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Ontario Bird Records Committee Report for 2015

Little Gull with Bonaparte's Gulls, Timiskaming , May 2015.
Photo: Michael J. Werner.

Ontario Bird Records Committee Report for 2015

Mike V.A. Burrell and Barbara N. Charlton

Introduction

This is the 34th annual report of the Ontario Bird Records Committee (OBRC) of the Ontario Field Ornithologists (OFO). The OBRC reviews rare bird reports in Ontario based on documentation that has been submitted by the birding community. Species and subspecies evaluations are based on the Review Lists for Ontario, which can be found on the OFO website (www.ofo.ca). Any new species, subspecies or first breeding records for Ontario are also reviewed. This report deals with the review of 172 records received by the OBRC in 2015 of which 143 (83%) were accepted. All reports reviewed by the 2015 Committee will be added to the permanent file kept at the Royal Ontario Museum (ROM).

The members of the 2015 Committee were Kenneth G.D. Burrell (chair), Mike V.A. Burrell (non-voting secretary), Barbara N. Charlton (non-voting assistant to the secretary), William J. Crins, Bruce M. Di Labio, Brandon R. Holden, Timothy B. Lucas, Ron Ridout and Ross W. Wood (Figure 1). Mark K. Peck acted as the ROM liaison for the OBRC.

Changes to the Checklist of Ontario Birds

Remarkably, four new species were added to the Ontario list, bringing the total to 494 species. These species were Pink-footed Goose (*Anser brachyrhynchus*), Little Egret (*Egretta garzetta*), Eurasian Dotterel (*Charadrius morinellus*) and Kelp Gull (*Larus dominicanus*). This is the most species added in a single year since the 1995 report when five species were added (Dobos 1996).

Changes to the Review Lists

Beginning with the 2014 report (Burrell and Charlton 2015), the OBRC split the province into three review zones. See Holden (2014) for more details on this change.

Prairie Warbler (*Setophaga discolor*) is added to the Lowlands Review List following acceptance of the first record for the region; this addition on top of previously omitted species brings the total number of species recorded in this review zone to 331.

No new species were added to the Central Review List, leaving the total number of species recorded in this review zone at 382.

Figure 1: Ontario Bird Records Committee for 2015. Left to right (standing): Brandon R. Holden, William J. Crins, Bruce M. Di Labio, Barbara N. Charlton, Ron Ridout. Left to right (sitting) Timothy B. Lucas, Kenneth G.D. Burrell, Ross W. Wood, Mike V.A. Burrell. *Photo: Mark K. Peck.*

Beginning in 2016, reports of Fish Crow (*Corvus ossifragus*) in the South Review Zone are no longer requested, based on more than twenty records occurring in the previous five years. Reports prior to 2016 are still requested for review. Also, beginning in 2016, reports of Black-headed Gull (*Chroicocephalus ridibundus*) and Cave Swallow (*Petrochelidon fulva*) in the South Review Zone are now requested for review, as both species have occurred fewer than twenty times in the previous five years. All four species new to Ontario, listed above, were recorded in the South Review Zone, bringing the total species recorded in this review zone to 484. No changes were made to the Subspecies Review List or the list of species known to have bred, leaving the total number of breeding species at 290.

Listing of Records

For accepted records and records for which the identification was accepted but the origin is questionable, the following information is provided where known: year and dates of occurrence, location, number of birds, the plumage and sex of each individual, names of contributors and OBRC file number. For accepted records, the total number of records for the province (including 2015 reports) is indicated in parentheses after the species name. All contributors who have provided reports are listed; if a contributor is also a finder of the bird(s), their name is underlined. Additional finders of the bird(s) are also listed where known, even if they did not provide documentation for review. Place names in italics refer to the county, regional municipality or district in Ontario.

Common and scientific names, as well as taxonomy, follow the seventh edition of the Check-list of North American Birds published by the American Ornithologists' Union (1998), along with its annual supplements published in *The Auk: Ornithological Advances,* up to the 56th supplement (Chesser *et al.* 2015) inclusive.

Plumage terminology follows that of Humphrey and Parkes (1959). For a detailed explanation of plumage and molt terminology, see Pittaway (2000).

All records that were not accepted due either to insufficient evidence or questionable origin have been listed separately. Contributors of all "not accepted" records are notified in writing by the Committee. Reasons for the decision are explained, using information provided by voting members on their voting slips. Any "not accepted" record can be reconsidered by the OBRC if new or additional documentation is provided.

All documentation provided to the OBRC is permanently archived at the ROM. Researchers and other interested parties are welcome to examine any of this material evidence, by appointment. Please contact Mark Peck in writing at Department of Natural History, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, M5S 2C6, or by email at markp@rom.on.ca or by telephone at 416-586-5523. Over the past several years, volunteers have been working on digitizing all of the documentation — if you would like to request digital copies or provide assistance with scanning please contact the secretary (obrc@ofo.ca).

Acknowledgements

The OBRC appreciates the efforts of the 164 observers who took the time to submit documentation of rare birds for consideration by the 2015 Committee. We also thank the following people who assisted the Committee in the acquisition of additional data and other material evidence that supplemented the information submitted directly by observers and Committee members, or by providing expert opinions on material evidence submitted to the Committee: David M. Bell, Peter S. Burke, Glenn Coady, Christian A. Friis, Alvaro P. Jaramillo, Lee Jones, Tony Leukering, Stuart A. Mackenzie, Steve Mlodinow, Willy Perez, Peter Pyle, Brian D. Ratcliff, Lynne Richardson, Jon P. Ruddy, Jeff H. Skevington and Kerrie Wilcox.

Figure 2: Pink-footed Goose with Snow Geese at Tayside, *Stormont, Dundas and Glengarry* on 31 October 2015. *Photo: Jacques M. Bouvier.*

Accepted Records

Pink-footed Goose *Anser brachyrhynchus* (1)

2015 – one, definitive basic, 30 October-26 December, Tayside, *Stormont, Dundas and Glengarry* (Jacques M. Bouvier, Christopher J. Escott, Jeremy L. Hatt, David I. Pryor, David E. Szmyr, J. Michael Tate, Bruce M. Di Labio; 2015-099) – photos on file.

This species has been expected in the province for at least the past decade, as a pattern has developed in the states and provinces in the Atlantic Flyway (Sherony 2008).

Greater White-fronted Goose *Anser albifrons* Lowlands only (62)

2012 – one, definitive basic, 11 September, Longridge Point, *Cochrane* (Mark S. Field, Jeremy L. Hatt, Greg Stuart; 2015-148) – photos on file.

Mute Swan *Cygnus olor* Central and Lowlands only (14)

2014 – two, second basic, 16-25 August, Northbluff Point, *Cochrane* (R. Douglas McRae, also found by Janine M. McManus; 2015-036) – photos on file.

"Bewick's" Tundra Swan ***Cygnus columbianus bewickii*** **(2)**

2015 – one, definitive basic, 14-15 March, north of Point Pelee National Park, *Essex* (Joshua D. Vandermeulen, found by Richard P. Carr; 2015-022) – photos on file.

Eurasian Wigeon ***Anas penelope*** **Central and Lowlands Only (73)**

2015 – one, definitive alternate male, 2-24 May, Moonbeam, *Cochrane* (Roxane D. Filion, Joshua D. Vandermeulen, also found by André F. Filion, Bibiane G. Filion; 2015-025) – photos on file.

Mottled Duck ***Anas fulvigula*** **(2)**

2014 – one, basic, 19-24 May, Hillman Marsh Conservation Area, *Essex* (Jeremy L. Hatt, Joshua D. Vandermeulen, Jarmo V. Jalava, also found by Alan Wormington, Jeremy M. Bensette, Rick Mayos; 2015-066) – photos on file.

This is only the second record of this species in the province, the first occurring 1 May-6 June 2008 also at Hillman Marsh (Richards 2009).

"Eurasian" Green-winged Teal ***Anas fulvigula*** **(7)**

2015 – one, definitive alternate male, 19-20 April, Lindenwood, *Grey* (Jerry R. Walsh, J. Patrick Walsh; 2015-003) – photos on file.

Common Eider ***Somateria mollissima*** **(24)**

2012 – one, basic female, 11 November, Lions Head, *Bruce* (Robert N. Taylor, also found by Anne-Marie Benedict; 2015-131) – photos on file.

Figure 3: Smew at Cornwall, *Stormont, Dundas and Glengarry* on 14 December 2015. *Photo: Jacques M. Bouvier.*

Smew ***Mergellus albellus*** **(5)**

2015 – one, basic female, 13-28 December, Cornwall (13-14 December) and Ault Island (19-28 December), *Stormont, Dundas and Glengarry* (Jacob K. Bruxer, Jacques M. Bouvier, J. Michael Tate, Bruce M. Di Labio; 2015-163) – photos on file.

The fact that another female-type Smew was reported on the St. Lawrence River at Lisbon Beach in St. Lawrence County, New York, on 16 February 2013 (about 35 kilometres west of the 2015 sightings) (eBird 2016) strongly suggests that this is the same bird, returning to the same general area to winter.

Western Grebe ***Aechmophorus occidentalis*** **(46)**

2015 – one, definitive alternate, 5-8 September, Etobicoke (Colonel Sam Smith Park), *Toronto* (James H. Watt, also found by Patricia Kluge; 2015-120).

A Western Grebe has appeared in the west end of Lake Ontario each spring since 2006 (with the exception of 2008 and 2014), strongly suggesting a returning bird each year.

Northern Fulmar ***Fulmarus glacialis*** **(16)**

2015 – one, definitive basic, light morph, 10 December, Nepean, *Ottawa* (Jon P. Ruddy, J. Michael Tate, Bruce M. Di Labio; 2015-155) – photos on file.
– one, definitive basic, light morph, 31 December, Kanata, *Ottawa* (Bruce M. Di Labio, found by Bethany Seaman; 2015-156) – photos on file.

It is interesting to speculate that the warm, late fall, followed by rapid cooling and freezing of James Bay in December played a role in forcing these birds (and other waterbirds) abruptly out of James Bay and over land in search of open water. The second bird was found injured on land and taken to the Wild Bird Care Clinic in Ottawa; it was subsequently transferred to a facility in Nova Scotia.

Northern Gannet ***Morus bassanus*** **(47)**

2015 – one, basic, 27 September, Netitishi Point, *Cochrane* (Joshua D. Vandermeulen, also found by Alan Wormington, Kory J. Renaud and Jeremy M. Bensette; 2015-085).

This is just the third record from the Lowlands, although it is the second since 2008; it is interesting to speculate that climate change and the opening of the Northwest Passage is spurring these birds to wander more widely into the Arctic Ocean before they eventually end up at the south end of James Bay.

Neotropic Cormorant ***Phalacrocorax brasilianus*** **(13)**

2015 – one, definitive alternate, 31 March-9 April (not seen 1 or 8 April), Stoney Creek (31 March and 2-3 April) and Hamilton (31 March and 2-7 and 9 April), *Hamilton* (Brandon R. Holden, Barbara N. Charlton, J. Brett Fried; 2015-015) – photos on file.
– one, definitive alternate, 13 May, Point Pelee National Park, *Essex* (Kenneth G.D. Burrell, Garth V. Riley; 2015-067) – photo on file.
– one, definitive alternate, 22 May, Mississauga, *Peel* and Etobicoke, *Toronto* (Andrew E. Keaveney; 2015-143).
– one, definitive alternate, 25 June-4 July, Toronto (Sunnyside Beach), *Toronto* (Mark S. Field, David E. Szmyr, found by Patrick Stepien-Scanlon; 2015-098) – photos on file.

With no overlap in dates, and similar plumage, the three Lake Ontario records could all pertain to the same individual. However, it is impossible to say for sure as this species has increased to the point where there are now the same number of records as for Great Cormorant.

Great Cormorant ***Phalacrocorax carbo*** **(13)**

2015 – one, definitive alternate, 4-15 May, Prince Edward Point (4 and 15 May), *Prince Edward* and Amherst Island (12 May), *Lennox and Addington* (Kurt Hennige, found by David Okines; 2015-027).

Figure 4: Little Egret at Carp, *Ottawa* on 2 June 2015. *Photo: Jacques M. Bouvier.*

Little Egret ***Egretta garzetta*** **1)**

2015 – one, definitive alternate, 2 June-13 July, Carp (2-3 June), Kanata (7-8 June), Manotick (17 and 20 June), Nepean (24 and 28 June-4 July, 7 and 10 July), Britannia (24-29 June, 13 July), *Ottawa* (Ben F. Di Labio, Mark Gawn, J. Michael Tate, Mike V.A. Burrell, David I. Pryor, David E. Szmyr, Bruce M. Di Labio, A. Geoffrey Carpentier, Jacques M. Bouvier; 2015-096) – videos, photos on file.

A first record for the province; this bird caused a lot of frustration for the Ontario birding community as it was hard to pin down and constantly changed its daily patterns. It was enjoyed by many, thanks to the remarkable work of the Ottawa birding community tracking and reporting its presence regularly.

Tricolored Heron ***Egretta tricolor*** **(40)**

2015 – one, definitive basic, 11-24 April (not seen 12-16 April), Leamington (11 April), Sturgeon Creek (11 April), and Holiday Beach Conservation Area (17-24), *Essex* (Evelyne Perreault, Kory J. Renaud, J. Michael Tate, found by Jeremy M. Bensette, Emma Buck; 2015-006) – photos on file.

– one, definitive basic, 27 April-1 May, Collingwood, *Simcoe* (Jennifer F. Keskikyla; 2015-070) – photo on file.

Yellow-crowned Night-Heron ***Nyctanassa violacea*** **(49)**

2015 – one, definitive basic, 23 May-6 June, Huntley, *Ottawa* (Bruce M. Di Labio, J. Michael Tate, David E. Szmyr, Joshua D. Vandermeulen, found by Mary Connolly; 2015-075) – photos on file.

– one, juvenal, 7 August, Hamilton (Van Wagner's Beach), *Hamilton* (Ann M. Porter; 2015-129) – photos on file.

2000 – one, definitive basic, 12 May, Rondeau Provincial Park, *Chatham-Kent* (Blake A. Mann; 2015-130).

Glossy Ibis ***Plegadis falcinellus*** **(73)**

2015 – one, definitive alternate, 28 April, Milton, *Halton* (David I. Pryor; 2015-011) – photos on file.

– one, definitive alternate, 30 April-5 May, Whitby, *Durham* (M.C. Coburn, Michael D. Williamson, A. Geoffrey Carpentier, found by Brandon M. McWalters; 2015-018) – photos on file.

– one, definitive alternate, 12-17 (not seen 13-16 May) May, Hillman Marsh Conservation Area, *Essex* (Tim R. Arthur, Tim Dawson, Lesley Dawson,

David E. Szmyr, Barbara N. Charlton, found by Jeremy M. Bensette; 2015-044) – photos on file.
- two, alternate, 14-15 May, Blenheim, *Chatham-Kent* (Reuven D. Martin; 2015-041) – photo on file.
- one, definitive alternate, 17-19 May, Brighton, *Northumberland* (James R.D. Barber, found by John Cree; 2015-042) – photo on file.
- ten, definitive alternate, 18-19 May, Little Current, *Manitoulin* (Don Brisbois, found by Rodney C. Thompson; 2015-045) – photos on file.

White-faced Ibis ***Plegadis chihi*** **(21)**

2015 – one, definitive alternate, 11 May, Point Pelee National Park, *Essex* and Blenheim, *Chatham-Kent* (Brandon R. Holden, Timothy B. Lucas, Kenneth G.D. Burrell; 2015-048) – photos on file.
- two, definitive alternate, 14-23 May, Port Royal, *Norfolk* (Ron Ridout, Leonard P. Manning, Joshua D. Vandermeulen, David E. Szmyr, found by Ted Gent and Paula Gent; 2015-047) – photos on file.
- one, definitive alternate, 1-3 June, Whitby (Cranberry Marsh), *Durham* (A. Geoffrey Carpentier, Charmaine Anderson, unknown finder; 2015-166) – photo on file.
- one, 2 June, Cumberland, *Ottawa* (J. Michael Tate, found by Gregory Zbitnew; 2015-128) – photos on file.
- one, basic, 3 November, Tiny Marsh, *Simcoe* (Barbara L. Crawford; 2015-093) – photos on file.

The Pelee/Blenheim bird was seen 9.5 hours apart, first flying over the tip of Point Pelee, then circling the Blenheim Sewage Lagoons, approximately 60km away. Plumage details allowed the Committee to be confident the same bird was involved in both sightings.

Figure 5: White-faced Ibises at Port Royal, *Norfolk* on 15 May 2015. *Photo: Ron Ridout.*

Ibis species *Plegadis* spp. (72)

2015 – one, alternate, 15-17 May, Tiny Marsh, *Simcoe* (Ken MacDonald, found by Judy Frey; 2015-046) – photo on file.
– one, alternate, 28 May, Melancthon, *Dufferin* (Dan J. MacNeal; 2015-043) – photos on file.
– one, alternate, 15 June, St. Clair National Wildlife Area, *Chatham-Kent* (Stephen R. Charbonneau; 2015-106) – photo on file.
– one, first basic, 6-8 October, Elmdale, *Essex* (Jeremy L. Hatt, found by J. Michael Tate; 2015-105) – photo on file.
– one, basic, 12-16 November, Oshawa Second Marsh, *Durham* (Tyler L. Hoar, Joshua D. Vandermeulen; 2015-165) – photos on file.

It was an incredible year for *Plegadis* ibises with sixteen reports between the two species. The previous high was 10 (4 Glossy, 2 White-faced, 4 unidentified) in 2011 (Cranford 2012).

Black Vulture *Coragyps atratus* Central and Lowlands only after 2011 (77)

2009 – one, basic, 12 October, St. Marys, *Perth* (Eric Jeffery, also found by Liz Jeffery; 2015-079).

Mississippi Kite *Ictinia mississippiensis* (55)

2015 – one, first basic, 15-16 May, Hillman Marsh Conservation Area, *Essex* (Kenneth G.D. Burrell, David I. Pryor, Joshua D. Vandermeulen, David E. Szmyr, also found by Adam P. Timpf; 2015-065) – photos on file.
– one, definitive basic male, 22 May, Brantford, *Brant* (William G. Lamond, Sarah Lamond; 2015-062) – photo on file.
– one, first basic, 23-24 May, Clarke's Corners, *Bruce* (Alfred Raab, Mark H. Cranford, Michael T. Butler; 2015-063) – photos on file.
– one, definitive basic, 23 May, London, *Middlesex* (Ian Platt, also found by Joan Taylor; 2015-150).

2014 – one, definitive basic, 18 May, Long Point Provincial Park, *Norfolk* (Jacob Schumann; 2015-097) – photo on file.

Figure 6: Mississippi Kite at Hillman Marsh, *Essex* on 16 May 2015.
Photo: Jacques M. Bouvier

Swainson's Hawk *Buteo swainsoni* 65)

2015 – one, juvenal, 13 September, Holiday Beach Conservation Area, *Essex* (Kenneth G.D. Burrell, Jeremy M. Bensette, also found by James G. Burrell, Mike V.A. Burrell; 2015-114) – photo on file.

Purple Gallinule ***Porphyrio matinicus*** **(18)**

2015 – one, first basic, 23 October, South Parry, *Parry Sound* (Robert S. H. Mansfield, Robert G. Wilson, also found by Joyce Mansfield; 2015-108) – photos on file.

The timing of this record fits perfectly with previous records in the province, fall accounting for two-thirds (12) of all records. Farnsworth *et al.* (2015) recently summarized the vagrancy patterns of this species and the Ontario pattern is consistent with elsewhere outside of its core range.

Black-necked Stilt ***Himantopus mexicanus*** **(18)**

2015 – two, alternate male and female, 9 May, Point Pelee National Park, *Essex* (Ashley P. Baines; 2015-125) – photos on file.

Wilson's Plover ***Charadrius wilsonia*** **(5)**

2015 – one, alternate female, 27-29 May, Toronto Islands, *Toronto* (Gavin C. Platt, Mike V.A. Burrell, David E. Szmyr, Joshua D. Vandermeulen, Charmaine Anderson, Dominik Halas, found by Glenn Coady; 2015-074) – photos on file.

Figure 7: Wilson's Plover at Toronto Islands, *Toronto* on 29 May 2015. *Photo: Dominik Halas.*

Figure 8: Eurasian Dotterel at Oliphant, *Bruce* on 3 October 2015. *Photo: Michael T. Butler.*

Figure 9: Little Gull with Bonaparte's Gulls at New Liskeard, *Timiskaming* on 14 May 2015. *Photo: Michael J. Werner.*

Eurasian Dotterel ***Charadrius morinellus*** **(1)**

2015 – one, juvenal, 3 October, Oliphant, *Bruce* (Michael T. Butler; 2015-132) – photos on file.

One of the most unexpected firsts for the province in some time; Howell *et al.* (2014) lists no eastern North American records and only a handful from the Pacific Coast away from Alaska. Even Iceland has only three records (Howell *et al.* 2014), highlighting the low probability of this species showing up in Ontario.

Purple Sandpiper ***Calidris maritima*** **Central only after 1985 (65)**

2012 – one, first basic, 29 April, Barr Island, *Thunder Bay* (Michael T. Butler, also found by Martha L. Allen, Christine Drake and Kyle Drake; 2015-157) – photos on file.

Dovekie ***Alle alle*** **(5)**

2015 – one, basic, 30 November, Bronte, *Halton* (Robert S. Secord; 2015-133) – photos on file.

Black-legged Kittiwake ***Rissa tridactyla*** **Central and Lowlands only (9)**

2014 – one, juvenal, 28 September, Netitishi Point, *Cochrane* (Joshua D Vandermeulen, also found by Kory J. Renaud; 2015-082).

Sabine's Gull ***Xema sabini*** **Central and Lowlands only (1)**

2015 – one, juvenal, 25 August, Longridge Point, *Cochrane* (Stuart A. Mackenzie, also found by Adam P. Timpf, Kyle Marsh; 2015-158).

Little Gull ***Hydrocoloeus minutus*** **Central only (1)**

2015 – one, definitive alternate, 13-24 May, New Liskeard, *Timiskaming* (Michael J. Werner; 2015-057) – photos on file.

Laughing Gull ***Leucophaeus atricilla*** **Central and Lowlands only (85)**

2015 – one, second basic, 9 August, Longridge Point, *Cochrane* (Christian A. Friis, Niamh M. McHugh, also found by Lindsay Barden; 2015-149) – photos, video on file.

California Gull ***Larus californicus*** **(66)**

2015 – one, second alternate, 4-12 May, Leamington (4 May) and Point Pelee National Park (12 May), *Essex* (Eric W. Holden, Brandon R. Holden; 2015-028) – photos on file.

Plumage details allowed the OBRC to be confident the same bird was involved in both sightings.

Figure 10: California Gull at Point Pelee National Park, *Essex* on 12 May 2015. *Photo: Brandon R. Holden.*

Figure 11: Kelp Gull at Mohawk Island, *Haldimand* on 12 July 2013. *Photo: Denby Sadler.*

Kelp Gull ***Larus dominicanus*** **(2)**

2013 – one, definitive alternate, 12 July, Mohawk Island, *Haldimand* (Dave Moore, Denby Sadler; 2015-140) – photos on file.

2012 – one, definitive prebasic molt, 7-9 September, Wheatley, *Chatham-Kent* (Alan Wormington; 2015-061) – photos on file.

It seems highly probable that these sightings pertain to a single bird "stuck" on Lake Erie. These records constitute the first and second accepted records of this southern hemisphere species for the province.

Arctic Tern ***Sterna paradisaea*** **South and Central only (22)**

2015 – five, definitive alternate, 26 May-1 June, Britannia, *Ottawa* (Mark Gawn, also found by Mark J. Patry; 2015-076) .

2013 – one, definitive alternate, 23 May, Wawa, *Algoma* (Joshua D. Vandermeulen; 2015-078).

The *Algoma* record represents the first record for the Central Review Zone.

Common Ground-Dove ***Columbina passerina*** **(4)**

2015 – one, first basic female, 8-9 November, Sioux Lookout, *Kenora* (Edith M. Burkholder, E. Merle Burkholder; 2015-100) – photos on file.

This is just the fourth record for the province, with two others occurring in the Central Zone (Wormington 1987, Crins 2003) and one from the South (Richards 2009). This year's record coincided with several extralimital reports in the midwestern United States (Minnesota, Wisconsin, Michigan, Illinois and Indiana) (eBird 2016).

Figure 12: Common Ground-Dove at Sioux Lookout, *Kenora* on 8 November 2015. *Photo: E. Merle Burkholder.*

White-winged Dove ***Zenaida asiatica*** **(47)**

2015 – one, definitive basic, 13 January, Beachburg, *Renfrew* (Bev M. Moses; 2015-001) – photos on file.

– one, basic, 22 May, Long Point Provincial Park, *Norfolk* (Stuart A. Mackenzie, also found by Laura Mackenzie; 2015-172).

– one, definitive basic male, 25 May-4 July, Rondeau Provincial Park, *Chatham-Kent* (Richard B. McArthur, Stephen R. Charbonneau, P. Allen Woodliffe; 2015-073) – photos on file.

– one, first basic, 18-30 October, Johnsons Landing, *Thunder Bay* (Aarre A. Ertolahti; 2015-167) – photo on file.

This species' pattern of vagrancy in the province in recent years continues, with 41 of the 47 records occurring since 2000.

Black-billed Cuckoo ***Coccyzus erythropthalmus*** **Lowlands only (1)**

2015 – one, definitive basic, 8-12 August, Longridge Point, *Cochrane* (Christian A. Friis, Barbara N. Charlton, Niamh M. McHugh, Veronique Drolet-Gratton, Lindsay J. Barden; 2015-134) – photos on file.

This is the first record of this species reviewed for the Lowlands Review Zone.

Barn Owl ***Tyto alba*** **(12)**

2015 – one, first basic male, 2 October, Windsor, *Essex* (Thomas J. Preney, found by Phil Roberts; 2015-080) – photos on file.

– one, 18 October, Mirage Lake, *Thunder Bay* (Elijah M. LaForrest, also found by Hugh D. LaForrest; 2015-081) – photo on file.

The *Thunder Bay* sighting is incredible in that it represents the farthest north record for the province, as it is approximately 115 kilometres north of Thunder Bay, *Thunder Bay* where the previous record from the Central Review Zone was found on 30 November 2005 (Crins 2006).

Chuck-will's-widow ***Antrostomus carolinensis*** **(34)**

2015 – one, basic female, 10 May, Oakville (Shell Park), *Halton* (David R. Don, Cheryl E. Edgecombe; 2015-087) – photos on file.

– one, definitive basic female, 15 May, Point Pelee National Park, *Essex* (Joshua R. Bouman, Kenneth G.D. Burrell, Jeremy L. Hatt, David E. Szmyr, Bruce M. Di Labio, unknown finder; 2015-035) – photos on file.

– one, definitive basic male, 17 May-4 July, South Bay, *Prince Edward* (David Okines, David I. Pryor, found by Peter R. Fuller; 2015-034) – photos, audio on file.

The *Prince Edward* bird marks the third consecutive year a singing male has been observed at this location (Holden 2014, Burrell and Charlton 2015), strongly suggesting it is the same bird returning each year. It was captured and banded in 2015 by Prince Edward Point Bird Observatory staff.

Figure 13: Black-billed Cuckoo at Longridge Point, *Cochrane* on 12 August 2015. *Photo: Barbara N. Charlton.*

Eastern Whip-poor-will ***Antrostomus vociferous*** **Lowlands only (1)**

2015 – one, alternate male, 30 July, Northbluff Point, *Cochrane* (Walter Wehtje; 2015-169).

Swift species ***Chaetura*** **sp. Lowlands only (1)**

2012 – one, basic, 4 September, Longridge Point, *Cochrane* (Mark S. Field, Jeremy L. Hatt; 2015-151).

At the time of observation, Chimney Swift was not a reviewable species in the old "North" review zone. The details provided by the observers were excellent, but the difficulty of separating out of range small swifts precluded the OBRC from accepting the specific identification for this record. There was no doubt, however, that a small, *Chaetura* swift was observed.

Say's Phoebe ***Sayornis saya*** **(18)**

2015 – one, basic, 26 April, Johnsons Landing, *Thunder Bay* (Aarre A. Ertolahti; 2015-012) – photos on file.
– one, basic, 17 September, Blenheim, *Chatham-Kent* (James T. Burk, Blake A. Mann, Jeremy L. Hatt, P. Allen Woodliffe, Barbara N. Charlton; 2015-109) – photos on file.

Vermilion Flycatcher ***Pyrocephalus rubinus*** **(6)**

2014/15 – one, first basic male, 18 December-1 January, West Becher, *Chatham-Kent* (Blake A. Mann, Jeremy L. Hatt, P. Allen Woodliffe, Barbara N. Charlton, found by Larry F. Cornelis; 2015-161) – photos on file.

A crowd favourite of 2015! This was the first record in Ontario since 2010 (Wormington and Cranford 2011), but the first to stay more than a day since 1994 (Pittaway 1995), resulting in many Ontario birders adding this sought-after species to their lists.

Tropical/Couch's Kingbird ***Tyrannus melancholicus/couchii*** **(2)**

2015 – one, 27 June, Upper Duck Island, *Ottawa* (David G. White; 2015-119) – photos on file.

Another great record from 2015; this is the second report of this species pair for the province, with the first at Hurkett, *Thunder Bay*, 27 September 1998 (Dobos 1999). Ontario's only confirmed record of either species was a Tropical Kingbird observed at Erieau, *Chatham-Kent* 26 October-30 November 2002 (Crins 2003).

Cassin's Kingbird ***Tyrannus vociferans*** **(4)**

2015 – one, basic female, 9 June, Long Point (Tip), *Norfolk* (Ron Ridout, found by Taylor M. Brown; 2015-086) – photos on file.

The photographs of this bird represent the first of a live individual in Ontario.

Western Kingbird ***Tyrannus verticalis*** **Lowlands only after 1997 (76)**

2015 – one, basic, 1 November, Netitishi Point, *Cochrane* (Joshua D. Vandermeulen, also found by Alan Wormington; 2015-127) – photos on file.

Gray Kingbird ***Tyrannus dominicensis*** **(8)**

2015 – one, first basic, 26-29 May, Elmdale, *Essex* (Jeremy L. Hatt, found by Jeremy M. Bensette; 2015-049) – photos on file.

Scissor-tailed Flycatcher ***Tyrannus forficatus*** **(75)**

2015 – one, alternate, 3 May, Atikokan, *Rainy River* (Bill and Nancy Fotheringham; 2015-171) – photo on file.
– one, first alternate female, 10 May, Dorion, *Thunder Bay* (Norma J. Maurice, also found by Marcel J. Maurice; 2015-059) – photo on file.
– one, definitive alternate male, 18 May, North Bay, *Nipissing* (Brent T. Turcotte, Dave Radcliffe; 2015-060) – photos on file.
– one, alternate, 22 June, Frog Creek, *Kenora* (Michael S. Dawber; 2015-111) – photo on file.

Figure 14: Vermilion Flycatcher at West Becher, *Chatham-Kent* on 27 December 2015.
Photo: P. Allen Woodliffe.

Figure 15: Cassin's Kingbird at the eastern tip of Long Point, *Norfolk* on 9 June 2015. *Photo: Ron Ridout.*

Figure 16: Gray Kingbird at Elmdale, *Essex* on 26 May 2015. *Photo: Jeremy L. Hatt.*

Black-billed Magpie ***Pica hudsonia*** **South and Lowlands only (6)**

2013-16 – one, definitive basic, fall 2013-22 April 2016 (at least), Echo Lake, *Algoma* (David I. Pryor, found by Alex and Carol Jurich; 2015-144) – photo on file.

The OBRC has always struggled in dealing with the provenance of reports of this species away from the species range in northwestern Ontario. As such, there are only six accepted records (with nine listed as origin uncertain). The Committee felt this bird should be considered wild as it showed up in the fall, after a bird was seen at Whitefish Point, Michigan, the preceding spring (eBird 2016). The location is also considerably closer to a breeding population than reports from southern Ontario.

Clark's Nutcracker ***Nucifraga columbiana*** **(5)**

2015 – one, basic, 25 September, Kenora, *Kenora* (Christopher J.S. Martin; 2015-088) – photos, video on file.

Another great record from 2015; video obtained of this individual represents the first such evidence recorded in the province.

Fish Crow ***Corvus ossifragus*** **Central and Lowlands only after 2015 (42)**

2015/16 – four, basic, 15 November-27 March, Fort Erie, *Niagara* (Nathan G. Miller, Garth V. Riley; 2015-152) – video on file.

2015 – two, basic, 25 January-1 March, Fort Erie, *Niagara* (David I. Pryor, David E. Szmyr, found by Andrew Don, Claude King; 2015-023) – photos, video on file.

- one, basic, 26 January, Waterloo, *Waterloo* (Kenneth G.D. Burrell; 2015-002).
- seven (one on 12 March, seven on 5-25 April, two on 17 May), basic, 12 March-17 May, St. Catharines, *Niagara* (Philip J. Downey, J. Brett Fried, Erika K. Hentsch, Leonard P. Manning, Richard D. Poort, Jacques M. Bouvier; 2015-007) – photos, video on file.
- one, basic, 12 April, Camelot Beach, *Niagara* (Phil M. Lameira; 2015-024).
- one, basic, 9 May, Rondeau Provincial Park, *Chatham-Kent* (Frank A. Pinilla, also found by Robert V. Pinilla; 2015-091).
- one, basic, 10 May, Point Pelee National Park, *Essex* (Jeremy M. Bensette, Jeremy L. Hatt; 2015-038) – audio on file.
- one, basic, 17 May, Stoney Creek, *Hamilton* (Brandon R. Holden, also found by Melissa Cameron; 2015-039) – photos on file.
- one, basic, 26 November, Oungah, *Chatham-Kent* (Patrick W. Deacon; 2015-147).

This species has shown no signs of altering its trajectory as a quickly expanding species into southwestern Ontario. Nine accepted records in 2015, make for 25 since 2012 when the "invasion" began. As such, the OBRC no longer requests documentation for this species when observed in the south. The Committee urges Ontario birders to continue documenting sightings with audio/video and to submit any nesting records to the OBRC.

Violet-green Swallow ***Tachycineta thalassina*** **(4)**

2014 – one, definitive alternate, 14 August, Port Burwell, *Elgin* (Aaron B. Allenson; 2015-170).

Blue-gray Gnatcatcher ***Polioptila caerulea*** **Central and Lowlands only (20)**

2014 – one, first basic, 30 September-2 October, Netitishi Point, *Cochrane* (Joshua D. Vandermeulen, also found by Kory J. Renaud, Jeremy M. Bensette; 2015-083) – photos on file.
- one, first basic, 2 October, Netitishi Point, *Cochrane* (Joshua D. Vandermeulen, also found by Kory J. Renaud; 2015-084) – photo on file.

Mountain Bluebird ***Sialia currucoides*** **(41)**

2015 – one, first basic female, 26 November-12 December, Whitby (Cranberry Marsh), *Durham* (Gray A.E. Carlin, Steven P.C. Pigeon, David E. Szmyr, David I. Pryor, A. Geoffrey Carpentier, Dominik Halas; 2015-154) – photos on file.
- one, first basic female, 28 November-28 December, Twin Elm (28-30 November) and Goodstown (11-28 December), *Ottawa* (J. Michael Tate, Mark Gawn, Jon P. Ruddy, Jacques M. Bouvier, Bruce M. Di Labio, found by Peter J. Blancher; 2015-153) – photos on file.

A single bird was believed to be involved in both sightings in *Ottawa* due to the close proximity of sightings, plumage features, and non-overlapping dates. Amazingly, the same observer found the bird at both locations!

Figure 17: Townsend's Solitaire at Netitishi Point, *Cochrane* on 31 October 2013. *Photo: Eleanor Kee Wellman.*

Figure 18: Sage Thrasher at Sauble Beach, *Bruce* on 23 June 2105. *Photo: Robert N. Taylor.*

Figure 19: Swainson's Warbler at Leslie Street Spit, *Toronto* on 18 May 2015. *Photo: David E. Szmyr.*

Figure 20: Prairie Warbler at Longridge Point, *Cochrane* on 27 August 2015. *Photo: Walter Wehtje.*

Townsend's Solitaire ***Myadestes townsendi*** **South and Lowlands only after 2000 (82)**

2015 – one, first basic, 30 September, Algonquin Provincial Park, *Nipissing* (Tom Chatterton, also found by Jennifer A. Chatterton; 2015-117) – photo on file.
– one, basic, 19 October, Etobicoke (Colonel Sam Smith Park), *Toronto* (David I. Pryor; 2015-116) – photo on file.
– one, first basic, 23 October, Long Point (Tip), *Norfolk* (J. Brett Fried, Erika K. Hentsch, found by Liam Curson; 2015-123) – photo on file.
– one, first basic, 1 November, Rondeau Provincial Park, *Chatham-Kent* (Garry T. Sadler; 2015-118) – photos on file.
– one, basic male, 22 December, Point Petre, *Prince Edward* (Barbara N. Charlton, also found by Tyler L. Hoar, Dan Riley, John Foster; 2015-164).

2013 – one, first basic, 31 October, Netitishi Point, *Cochrane* (Joshua D. Vandermeulen, also found by Alan Wormington; 2015-115) – photos on file.

The *Cochrane* bird represents the first record for the Lowlands.

Sage Thrasher ***Oreoscoptes montanus*** **(18)**

2015 – one, first basic, 23 June, Sauble Beach, *Bruce* (Robert N. Taylor, also found by Claude King, Linda Fraser Waldmann; 2015-121) – photos on file.

Swainson's Warbler ***Limnothlypis swainsonii*** **(11)**

2015 – one, basic, 18 May, Leslie Street Spit, *Toronto* (Paul N. Prior, Tyler L. Hoar, David I. Pryor, Richard D. Poort, Owen Strickland, David E. Szmyr; 2015-069) – photos on file.

Kirtland's Warbler ***Setophaga kirtlandii*** **(68)**

2015 – one, first alternate female, 10-14 May, Point Pelee National Park, *Essex* (Timothy B. Lucas, Bruce M. Di Labio, Jeremy L. Hatt, found by unknown finder; 2015-055) – photos on file.
– one, alternate female, 11-15 May, Rondeau Provincial Park, *Chatham-Kent* (Richard E. Lauzon, found by unknown finder; 2015-056) – photos on file.
– one, alternate male, 13 May, Inverhuron Provincial Park, *Bruce* (Douglas R. Martin, Merri-Lee Metzger, Bruce Edmunds; 2015-054) – photos on file.
– one, alternate male, 7-13 July, Starr Island, *Muskoka* (Thomas F. Jackman; 2015-095) – audio, photo on file.

The *Muskoka* record presumably pertains to the same individual male that maintained a territory at the same site during summer 2014 (Burrell and Charlton 2015).

"Audubon's" Yellow-rumped Warbler ***Setophaga coronata auduboni*** **(16)**

2015 – one, definitive alternate female, 26-28 April, Sarnia, *Lambton* (Joshua R. Bouman, Jeremy L. Hatt, found by Michael P.J. Bouman; 2015-013) – photo on file.

Prairie Warbler ***Setophaga discolor*** **Central and Lowlands only (5)**

2015 – one, first basic male, 27 August, Longridge Point, *Cochrane* (Walter Wehtje, also found by Abbygail Satura; 2015-107) – photos on file.

This is the first record for the Lowlands and only the fifth outside of southern Ontario. It is approximately 400 kilometres further north than the previous northernmost record in Ontario.

Field Sparrow ***Spizella pusilla*** **Central and Lowlands only (23)**

2015 – one, first basic, 11 October, Thunder Cape, *Thunder Bay* (Lena I. Ware, also found by Cody A. Rowe; 2015-089) – photo on file.

Lark Bunting ***Calamospiza melanocorys*** **(33)**

2015 – one, first alternate male, 23 May, Kirkwall, *Hamilton* (Howard S. Shapiro, Brian Gibson, David I. Pryor, Dominik Halas, Barbara N. Charlton; 2015-050) – photos on file.

2014 – one, first basic, 13 September, Long Point (Breakwater), *Norfolk* (Matt T. Timpf, also found by Nancy M. Raginski; 2015-112) – photos on file.

The *Norfolk* bird represents the first fall migrant for the province since an adult female was observed at Long Point Provincial Park, *Norfolk* on 7 September 1992 (Bain 1993).

Henslow's Sparrow ***Ammodramus henslowii*** **(45)**

2015 – one, alternate, 17-19 April, Point Pelee National Park, *Essex* (Blake A. Mann, found by Kory J. Renaud, Sarah Renaud; 2015-010) – photo on file.

– one, alternate, 21-24 April, Port Glasgow, *Elgin* (Chris C. Leys, found by Stanley Caveney; 2015-016) – photo on file.

– one, alternate, 4 May, Point Pelee National Park, *Essex* (Kenneth G.D. Burrell, Mike V.A. Burrell, also found by Barbara N. Charlton, Bruce M. Di Labio; 2015-029).

– one, alternate, 5 May, Point Pelee National Park, *Essex* (Bryan Teat, Dan Riley, found by Kenneth G.D. Burrell, Richard Pope; 2015-030) – photos on file.

– one, alternate, 11 May, Point Pelee National Park, *Essex* (Eric W. Holden; 2015-052) – photos on file.

– two, alternate males, 14-16 May, Harrow, *Essex* (Jeremy L. Hatt, Joshua D. Vandermeulen, David E. Szmyr, found by Dean J. Ware; 2015-051) – photos, audio on file.

– one, alternate, 20 May, Wheatley, *Chatham-Kent* (Joshua D. Vandermeulen; 2015-053).

1997 – one, alternate, 3 May, Rondeau Provincial Park, *Chatham-Kent* (Blake A. Mann, also found by P. Allen Woodliffe; 2015-094).

This year's seven records is the most for this species in the province since the OBRC began reviewing records.

Figure 21: Pink-sided Dark-eyed Junco at Southworth, *Kenora* on 30 December 2015.
Photo: Ellen M. Riggins.

"Pink-sided" Dark-eyed Junco ***Junco hyemalis mearnsi*** **(5)**

2015/16 – one, basic male, 21 November-26 March, Southworth, *Kenora* (Ellen M. Riggins; 2015-124) – photos on file.

Summer Tanager ***Piranga rubra*** **Central and Lowlands only (20)**

2015 – one, first alternate female, 9-10 May, Thunder Bay, *Thunder Bay* (Bill Greaves, found by Fritz Fischer; 2015-160) – photo on file.

Scarlet Tanager ***Piranga olivacea*** **Lowlands only (1)**

2015 – one, definitive alternate male, 13-21 June, Polar Bear Provincial Park (Burntpoint Creek research site), *Kenora* (Tim M. Haan; 2015-110) – photos on file.

At over 55 degrees north, this becomes the most northerly record for the province, and quite possibly one of the most northerly in the world. This bird was more than 600 km north of the most northerly breeding record detected on the second Ontario Breeding Bird Atlas (McLaren 2007).

Western Tanager ***Piranga ludoviciana*** **(46)**

2015 – one, first alternate male, 5 May, Dorion, *Thunder Bay* (Norma J. Maurice; 2015-031) – photos on file.
– one, definitive alternate male, 15 May, Manitouwadge, *Thunder Bay* (Tammie B. Hache; 2015-072) – photos on file.

Blue Grosbeak ***Passerina caerulea*** **(98)**

2014 – one, first alternate male, 11-16 May, Schreiber, *Thunder Bay* (Linda J. Collinson, Jason Nesbitt; 2015-126) – photos on file.

Painted Bunting ***Passerina ciris*** **(40)**

2015 – one, definitive alternate male, 11-13 May, Amherst Island, *Lennox and Addington* (Ann W. Adams, Kurt J. Hennige, Mark D. Read, also found by John Adams; 2015-058) – photos on file.

2003 – one, definitive alternate male, 12-13 May, Ashton, *Lanark* (James Akers, Patty Akers; 2015-071) – photo on file.

Yellow-headed Blackbird ***Xanthocephalus xanthocephalus*** **Lowlands only (1)**

2014 – one, first basic male, 25 August, Northbluff Point, *Cochrane* (R. Douglas McRae, also found by Janine McManus; 2015-008) – photos on file.

Brewer's Blackbird ***Euphagus cyanocephalus*** **Lowlands only (1)**

2014 – one, basic female, 30 June, Polar Bear Provincial Park (Burntpoint Creek research site), *Kenora* (R. Douglas McRae, also found by Lisa Pollock, Kim Bennett; 2015-009) – photos on file.

This is another exceptional record for the Lowlands.

Bullock's Oriole ***Icterus bullockii*** **(7)**

2015/16 – one, first basic female, 28 November-5 January, Pakenham, *Lanark* (Mark Gawn, J. Michael Tate, Jacques M. Bouvier, Bruce M. Di Labio, David E. Szmyr, Jeremy L. Hatt, found by Raymond P. Holland, Richard Waters; 2015-136) – photos on file.

This bird caused considerable debate and excitement among Ontario birders. Consensus among the Committee and outside experts was that the bird's plumage was consistent with Bullock's Oriole. However, mtDNA results indicated it contained some Baltimore Oriole maternal genes. The specific identification was clarified once nuclear DNA analysis showed that it was indeed a match for Bullock's Oriole. The bird survived in the wild until 5 January, at which point it was reported to be very lethargic and was captured and taken to the Wild Bird Care Centre in Ottawa; there it was successfully rehabilitated and at the time of writing was scheduled to be transported west and released.

Gray-crowned Rosy-Finch ***Leucosticte tephrocotis*** **(24)**

2015 – one, *tephrocotis*, basic male, 14 December, Atikokan, *Rainy River* (Michael S. Dawber, David H. Elder; 2015-139) – photo on file.

"Hornemann's" Hoary Redpoll ***Acanthis hornemanni hornemanni*** **(11)**

2015 – one, basic male, 3 February-18 March, South Porcupine, *Cochrane* (Roxane Filion; 2015-019) – photos on file.

Eurasian Tree Sparrow ***Passer montanus*** **(11)**

2015/16– one, basic, 24 November-15 February, Stokes Bay, *Bruce* (Michael T. Butler, found by Elizabeth and Jeremy Thorn; 2015-138) – photo on file.

2015 – one, basic, 20-21 April, Dryden, *Kenora* (Owen B. Vaughan, also found by Angelica M. Vaughan; 2015-004) – photos on file.

– one, definitive basic, 8 May, Point Pelee National Park, *Essex* (Brandon R. Holden, Joshua D. Vandermeulen, David E. Szmyr, Jacques M. Bouvier; 2015-037) – photos on file.

It was another exceptional year for this species in the province; adding the three records in 2015 to the four in 2014 (Burrell and Charlton 2015) makes for 64% of the total records in the past two years alone.

Not Accepted Records: Identification Accepted, Origin Questionable

Birds in this category are considered by the OBRC to be correctly identified but their origin is questionable. Over time, some instances involve birds that have a high certainty of previous captive origin, whereas some records placed in this category have caused considerable debate among past voting members. If new evidence suggesting wild origin becomes available, such reports may be reconsidered by the OBRC.

2015 – Graylag Goose (*Anser anser*), one, 29 March, Minesing, *Simcoe* (Justin F.B. Peter, Charlotte J. England, also found by Nigel J. Shaw; 2015-005) – photos on file.

– Barnacle Goose (*Branta leucopsis*), two, basic, 3-4 May, Mohrs Corner, *Ottawa* (Gary Milks, Arnie Simpson, Jamie Spence, Lacey Dolan, found by Richard Waters, Raymond P. Holland; 2015-026) – photos on file.

While the vagrancy of Barnacle Geese is now well documented in northeastern North America (Sherony 2008), the OBRC continues to struggle with the wild status of this species in the province due to its abundance in private collections/farms. This record ticked many boxes in favour of being considered wild (e.g., timing, location) but unfortunately the OBRC did not receive any additional details describing the circumstances of the observations or the behaviour of the birds in question. Should this information be forthcoming the Committee could reconsider this record.

– Gambell's Quail (*Callipepla gambelii*), one, definitive basic male, 18 July, Grass Lake, *Waterloo* (Gavin T. McKinnon, also found by Donald T. McKinnon; 2015-092) – audio, photos on file.

2006 – European Goldfinch (*Carduelis carduelis*), one, basic, 8-9 May, Donald, *Haliburton* (Thom Lambert, Edward B. Poropat; 2015-141) – sketch on file.

Not Accepted Records: Insufficient Evidence

The documentation received for the following reports generally was found not to be detailed enough to eliminate similar species unequivocally or simply lacking enough detail to properly describe the individual. In many cases, OBRC members felt that the species being described was likely correctly identified by the observer but the report received for voting was simply too limited for acceptance. These circumstances sometimes arise from unavoidable situations such as poor viewing conditions or brevity of observation.

2015 – Mute Swan, three, 31 March, Dobie, *Rainy River* (2015-021) – photos on file.
- Mississippi Kite, one, 13 May, Point Pelee National Park, *Essex* (2015-162).
- Mississippi Kite, one, 26 May, Dundas, *Hamilton* (2015-064).
- Cooper's Hawk (*Accipiter cooperii*), one, 21 August, Northbluff Point, *Cochrane* (2015-145).
- Cooper's Hawk, one, 27 August, Northbluff Point, *Cochrane* (2015-146).
- Swainson's Hawk, one, 25 April, Grimsby, *Niagara* (2015-014).
- Swainson's Hawk, one, 19 October, Wingle, *Renfrew* (2015-159).
- Swainson's Hawk, one, 11 November, Toronto, *Toronto* (2015-122).
- California Gull, one, 29 November, Niagara Falls, *Niagara* (2015-137) – photos on file.
- Arctic Tern, one, 4 October, Barrie, *Simcoe* (2015-077).
- Selasphorus Hummingbird (*Selasphorus* sp.), one, 12 April 2015, Niagara-on-the-Lake, *Niagara* (2015-020).
- Selasphorus Hummingbird, one, 24 May, Algonquin Provincial Park (Canoe Lake), *Nipissing* (2015-068).
- Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*), one, 16-19 September, Cobourg, *Northumberland* (2015-113).
- Fork-tailed Flycatcher (*Tyrannus savana*), one, 28 May, Ottawa (Innis Point), *Ottawa* (2015-040).
- Fish Crow, one, 25 April, Oakville, *Halton* (2015-017).
- "Audubon's" Yellow-rumped Warbler, one, 1 October, Point Pelee National Park, *Essex* (2015-168).
- Grasshopper Sparrow (*Ammodramus savannarum*), one, 11 October, Thunder Cape, *Thunder Bay* (2015-090).
- "Pink-sided" Dark-eyed Junco, one, 7 October, Oustic, *Wellington* (2015-104) – photos on file.
- Black-headed Grosbeak (*Pheucticus melanocephalus*), one, 6 May, Sandford, *Durham* (2015-032).
- Blue Grosbeak, one, 18 May, Point Pelee National Park, *Essex* (2015-033) – photos on file.
- Bullock's Oriole, one, 25 November-5 December, Brighton, *Northumberland* (2015-135) – photos on file.

2014 – Fish Crow, one, 20 May, St. Catharines, *Niagara* (2015-103).
2013 – Fish Crow, one, 6 May, Port Weller, *Niagara* (2015-101).
2012 – Fish Crow, four, 9 February, Port Weller, *Niagara* (2015-102).
– "Hornemann's" Hoary Redpoll, one, 26 January-9 February, Macdiarmid, *Thunder Bay* (2015-142) – photos on file.

Corrections/Updates to Previous OBRC Reports

2014 report (*Ontario Birds* 33:50-81)

Under Eurasian Collared-Dove change "Jeremy M. Bensette, Kory J. Renaud, Leonard P. Manning, Chris T. Heffernan, Kyle E. Holloway, Karl R. Overman, David I. Pryor, Kenneth G.D. Burrell, also found by Michelle L. Valliant; 2014-083" to "Jeremy M. Bensette, Jeremy L. Hatt, Kory J. Renaud, Leonard P. Manning, Chris T. Heffernan, Kyle E. Holloway, Karl R. Overman, David I. Pryor, Kenneth G.D. Burrell, also found by Michelle L. Valliant; 2014-083" and update the last date to 28 August 2015.

Under Rufous Hummingbird change "*Durham*, Grey" to "Durham, *Grey*"

Under Scissor-tailed Flycatcher change "unknown finder" to "John Haselmayer" and change "T. Mark Oliver, also found by Wanda M. Oliver" to "T. Mark Olivier, also found by Wanda M. Olivier"

Under Blue Grosbeak change "Mike V.A. Burrell, Brandon R. Holden also found by Eric W. Holden, Kenneth G.D. Burrell, James G. Burrell, G. Carol Gregory" to "Mike V.A. Burrell, Brandon R. Holden also found by Eric W. Holden, Kenneth G.D. Burrell, James G. Burrell, G. Carol Gregory"

Under Painted Bunting (origin questionable) change "Heather E. Burrow, Leonard P. Manning, Mike D. Williamson, James Watt, Sue Barth, Luc S. Fazio, Michael J. Hatton, Mike A. Veltri, Frank G. Horvath, Sandra L. Horvath, found by Heather E. Burrow" to "Heather E. Burrow, Leonard P. Manning, Mike D. Williamson, James Watt, Sue Barth, Luc S. Fazio, Michael J. Hatton, Mike A. Veltri, Frank G. Horvath, Sandra L. Horvath"

Under European Goldfinch (origin questionable) change "Bobbie Hebert, found by Paul Hebert, Bobbie Hebert" to "Bobbie Hebert, also found by Paul Hebert"

2001 report (*Ontario Birds* 20:54-74)

Under Sprague's Pipit, change "Donald A. Sutherland, William J. Crins, also found by Martyn E. Obbard, Michael J. Oldham, Pamela O" to "Donald A. Sutherland, William J. Crins, also found by Martyn E. Obbard"

1983 report (*Ontario Birds* 2:53-65)

Under Northern Wheatear, change the last date of the 1978 record to 16 October.

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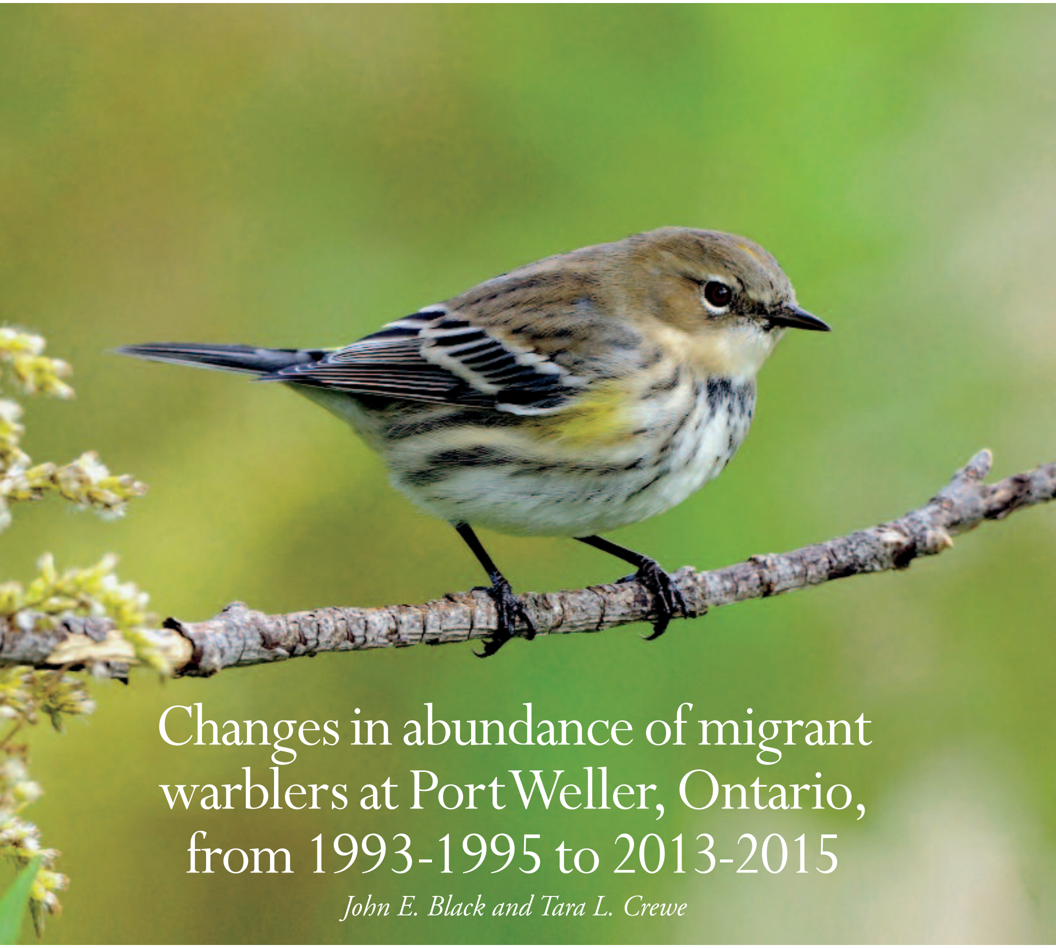


Changes in abundance of migrant warblers at Port Weller, Ontario, from 1993-1995 to 2013-2015

John E. Black and Tara L. Crewe

Yellow-rumped Warbler. *Photo: Homer Caliwag*

Introduction

Testing how bird populations have changed over time is a primary goal of many long-term monitoring programs, including the Breeding Bird Surveys (BBS)(Environment Canada 2014), Christmas Bird Counts (Link *et al.* 2008), Canadian Migration Monitoring Programs (Crewe *et al.* 2008), Niagara Peninsula Hawkwatch (Hawk Migration Association of North America) and Breeding Bird Atlases (Cadman *et al.* 2007). This testing is typically accomplished by counting the number of birds detected during breeding, on the wintering grounds, or passing a particular geographic location during migration. Counts collected in the same way over time can then be used to assess if and how the count population has changed.

Construction of the fourth Welland Canal began in 1913 and was completed in 1932. As part of the construction, two piers stretching 1.3 km into Lake Ontario were built to provide a harbour at the proposed northern end of the canal, where a natural harbour did not exist. The small community that grew up around the piers was named Port Weller after John Weller, an engineer on the first Welland Canal. Known as the Port Weller West (PWW) and Port Weller East (PWE) piers, they have long been known as a migrant stopover site and thus a good spot to observe birds during migration.

From 1993 to 1997, a study was conducted to estimate the abundance and diversity of bird species using the Port Weller piers during spring migration. This was an attractive study for local birders because it allowed them access to PWW, which is not open to the public. Each morning during the month of May, observers recorded the number of birds (primarily passerine migrants) seen and/or heard on PWW and PWE. Results from that original study were summarized in Black and Roy (2010). More than 13,000 individuals of 97 species were observed. The species with the most individuals observed were Yellow-rumped Warbler (*Setophaga coronata*), Yellow Warbler (*Setophaga petechia*) and American Goldfinch (*Spinus tristis*), each with over 1,000 sightings over the five-year period.In order to explore whether the number of individual migrants at Port Weller has changed over time, we repeated the 1993-1997 count methods in 2013-2015 at PWW. While sampling every 20 years cannot provide information on the cause or pattern of change in the count population over time, it can be used to gauge whether mean counts or species assemblage has changed between time periods, as is done with breeding bird data collected by breeding bird atlases over a larger number of sites (Bird Studies Canada *et al.* 2006).

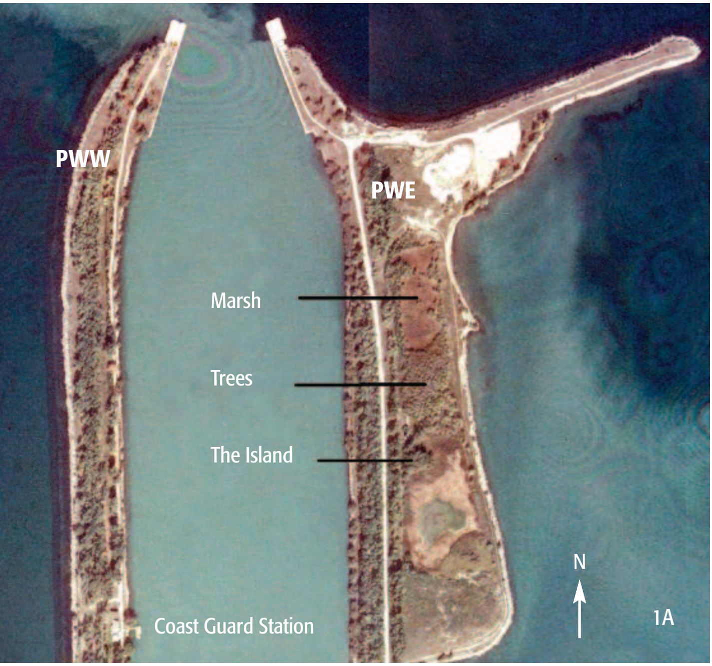
In this article, we discuss only Wood Warblers (hereafter "warblers"). We compare the 1993-1995 and 2013-2015 counts collected at PWW to examine whether there is evidence of a change in the number of individuals by and across warbler species detected using the pier over the past 20 years, and whether the direction of change corresponds with trends in these species detected over similar time periods using alternative bird surveys. We also compare the 1993-1997 counts at PWW with counts collected during the same time period at nearby PWE for evidence of habitat effects on stopover probability, and with counts collected at Long Point, to determine whether annual fluctuations in counts corresponded among sites.

Methods

Count Site Descriptions

Port Weller West Pier

The count area at PWW extends 750 m northward from a Canadian Coast Guard Station to the end of the pier; the station is located at about the midway point of the pier (Figures 1A and 1B). The east side of the PWW count area contains two passageways: a dirt and



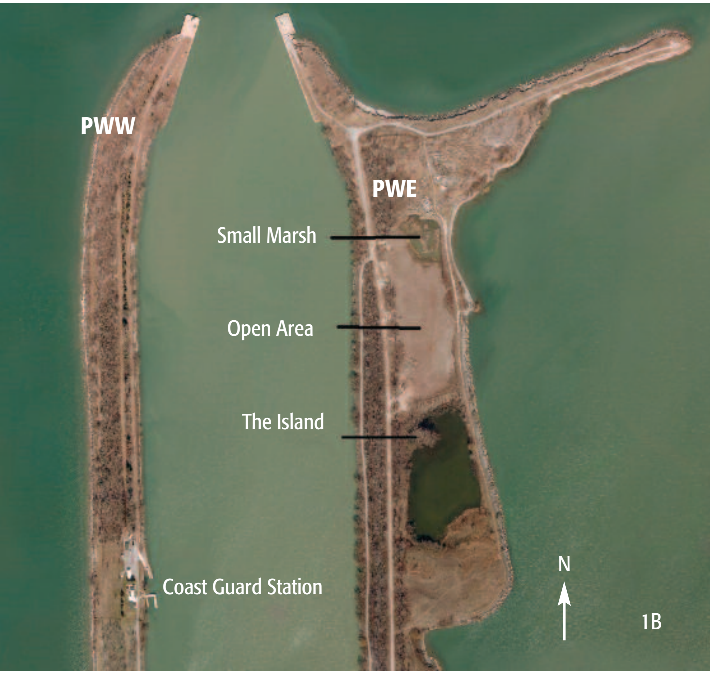


Figure 1A. The Piers, September 1995.

Figure 1B. The Piers, April 2010.
Photos courtesy of Colleen Beard, Brock University Map, Data and GIS Library.

gravel roadway 7 m from the canal (Figures 2A and 2B) and a 12 m wide grassy mowed strip to the west of the road, which converges with the roadway as one nears the tip (Figures 3A, 3B, 4A and 4B). Willow trees along the east side of the road (i.e., adjacent to the canal) were present in 1993-1997 and remained more-or-less unchanged for the 2013-2015 count. In 1993-1997, the mowed strip held poles and wires from a power line that was no longer in use. The wires and poles were removed prior to 2013. West of the mowed strip, an uneven canopy of aging 40-foot poplar trees, punctuated by cedar and spruce trees, was established as a result of plantings in 1932. Since 1997 a number of these poplars have died and there has been an appearance of shorter trees and shrubs. Additional comments on the habitat on the west pier are included in Black and Roy (2010).

Figure 2A. 6 May 1993. Looking north at the road at start of the count area.

Figure 2B. 10 May 2013. Looking north at the road at start of the count area.
Photos: John Black

Above: **Figure 3A. 6 May 1993. PWW view looking northwest on grassy strip 50 m north of start of the count area.**

Right: **Figure 3B. 10 May 2013. PWW view looking north on grassy strip 50 m north of start of the count area.**
Photos: John Black

Port Weller East Pier

From 1993-1997, a small wooded island (hereafter "Island") existed between a north pond and south pond to the east of the road on PWE (Figure 1A). At PWE (1993-1997), the count area was a road beside a 36 m wide hedgerow to the west of the Island, and a 15 m wide path off the road east of the hedgerow beside the Island. Unfortunately, as a result of work on the canal, the habitat at the Island on PWE changed dramatically since the 1993-1997 study (Figure 1B). Counts were thus not performed there from 2013 to 2015. Additional comments on the habitat and how the habitat changed over the years on PWE are included in Black and Roy (2010).

Far Left: **Figure 4A. 7 May 1993. PWW view looking south along dirt road 75 m south of the north end of the pier.**

Left: **Figure 4B. 27 May 2013. PWW view looking south along dirt road 75 m south of the north end of the pier.**
Photos: John Black

Migrating Bird Counts

Birds observed using PWW were counted daily during the month of May (1993-1997, 2013-2015). The count coordinator (J. E. Black) identified a compiler for each day, who then selected one or two people to accompany him or her on the count. Thus, one to three participants, but preferably two to three, conducted counts together each day. It was relatively easy to find people to count on weekends but harder to find counters for weekdays when many birders were working. Because there was a range of skills in the counters, efforts were made to ensure that at least one counter each day was familiar with the local birds and able to recognize most, if not all, of the songs of migrants on the pier, and that at least one counter was able to hear the high frequency calls of species like the Blackpoll Warbler (*Setophaga striata*). The narrow pier and low bird densities at the count sites made it possible to find, identify and count all birds present during the count period, including those whose songs were unfamiliar to the counters.

At PWW, observers counted all birds detected (i.e., seen or heard) on the mowed strip and the dirt road while walking northward from the Coast Guard Station to an automated weather station at the end of the pier. Surveys began as close to 08:00 as possible, with start times ranging between 07:00-08:30. Surveys lasted one to one-and-a-half hours depending on the number of birds present, but as close to one hour as possible. All birds detected were recorded on a predesigned checklist, which contained species deemed appropriate for the 1993 study (Black and Roy 2010). In the 2013-2015 study, the compiler entered the counts in a predesigned Excel data entry file each day, and emailed the file, along with comments on any unusual encounters, to the coordinator and the other participants in the study. At PWE, counts of all birds seen or heard in the hedgerow and Island were collected between 09:30 and 10:00. See Black and Roy (2010) for more details on count methods.

Change in Count Size Over Time

Port Weller West Pier

We tested whether the number of warblers (by and across all species) detected on PWW changed between time periods by fitting hierarchical linear regression models (Kéry and Royle 2016). Note that we included only warbler species where at least five individuals were observed in one

Bird Count Observers

During the 1993-1997 surveys at PWW and PWE, over 25 persons contributed some time to counting. Eight of these counters were involved on a regular basis from 1993 to 1995. The average age of these eight observers was 57, with a range from 35 to 80. During the 2013-2015 surveys at PWW, over 15 persons contributed some time to counting. Twelve counters were involved on a regular basis, including four individuals that participated in 1993-1997. The average age of these twelve counters was 58, with a range of 31 to 83.

of the time periods or at one of the locations. We calculated 99% migration "windows" (Francis and Hussell 1998) independently for each species to remove excess zero-observation counts at the beginning and end of migrations by excluding data that fell outside the inner 99% of non-zero observation days over time. Regression models (negative binomial distribution) were fit in a Bayesian framework (Rue *et al.* 2009). Raw daily counts were the response variable, and year group (1993-1995 or 2013-2015) and second-order polynomial effects for day of the year were fixed and continuous predictor variables, respectively. First- and second-order effects for day of the year were calculated using a Legendre transformation, which results in independent and orthogonal polynomial effects. The regressions also included a hierarchical (random) term for year to account for random variation in annual counts, which assumed independent and identically distributed errors. A difference in counts between year groups was strongly supported when 95% credible intervals excluded zero. Bayesian posterior probabilities (Kéry and Royle 2016) were used as additional support for or against a change in count size between year groups; e.g., a posterior probability of 0.50 would suggest little support for a change in count size between year groups; a probability > 0.95 would suggest strong support for an increase in count size between year groups; and a probability < 0.05 would suggest strong support for a decline in count size between year groups, even if 95% credible intervals included zero.

Correspondence Among Sites

Comparison of trends

We compared the direction of change in counts detected at PWW for each species with the direction of change detected using other Ontario surveys.

1. Long Point Bird Observatory (LPBO) on Lake Erie, which has collected counts of birds during spring migration since 1961. We include trends (% change/year) estimated for the time period of 1993-2012 (Canadian Migration Monitoring Network 2015).
2. Breeding Bird Survey trends for the province of Ontario, estimated for two time periods, 1970-2012 and 2002-2012 (Environment Canada 2014).

Note that the time period, method of analysis and method of determining statistical significance differed among survey types, so they are not directly comparable. Regardless, if all surveys are monitoring the same population, and counts from each survey reflect change in the underlying monitored population, then the direction of change should correspond.

Comparison of annual counts

We compared count size trends between PWW and other Ontario survey sites by first fitting a separate linear regression model (INLA; Martino and Rue 2008) to data for each species at each site to estimate annual indices of count population size, following the methods used to estimate annual indices of count size for the Canadian Migration Monitoring Network and LPBO (Crewe *et al.* 2008).

The regression model was similar to the model described above, but with year as a categorical predictor. The regression coefficient estimates for the year terms (on the log scale) were used as annual indices of abundance, and were compared for correspondence among survey sites using Pearson correlation. Using this method, annual indices for PWW (1993-1997) were compared with annual indices from PWE (1993-1997) and LPBO (1993-1997); and annual indices from PWE (1993-1997) were also compared with annual indices from LPBO (1993-1997) to determine whether the pattern of fluctuation in counts was similar between sites. Methods used to derive annual indices at LPBO are described elsewhere (Canadian Migration Monitoring Network 2015); annual indices for Long Point were accessed online through NatureCounts (www.naturecounts.ca).

Results

Counts were conducted on all dates in May at PWW in each year. At PWE, counts were not conducted during one day in 1994 (26 May) due to inclement weather, and counts were not conducted 3 May and 25 May-31 May in 1997.

A total of 31 warbler species was observed on PWW during 1993-1995 and 2013-2015. Copies of interim reports for all species counted for the years 2013-2015 are available on the Brock University web site (http://www.brocku.ca/tren/niagarabirds). All comparisons and analyses were restricted to 22 warbler species that met the minimum requirement of five individuals detected in at least one time period (Table 1). Note that seven of the 22 species with the largest numbers over both studies accounted for 86% of the total individuals. Nine species seen in smaller numbers and thus not indexed for comparisons were: Golden-winged Warbler (*Vermivora chrysoptera*), Prothonotary Warbler (*Protonotaria citrea*), Hooded Warbler (*Setophaga citrina*), Yellow-breasted Chat (*Icteria virens*), Pine Warbler (*Setophaga pinus*), Blue-winged Warbler (*Vermivora cyanoptera*), Prairie Warbler (*Setophaga discolor*), Orange-crowned Warbler (*Oreothlypis celata*) and Cerulean Warbler (*Setophaga cerulea*).

We included Yellow Warbler and Yellow-rumped Warbler counts in the regression examining change in total warbler abundance over time. Total warbler counts for each year and period are presented in Table 1 with and without Yellow Warbler and Yellow-rumped Warbler. We did this because counts of these two species were extremely large, and any change in total warbler counts would largely reflect any change in these species. Yellow Warblers breed in Niagara and in the vicinity of PWW, and our counts were thus likely to include both resident and migrant individuals. Changes in Yellow Warbler counts over time might therefore reflect changes in the local breeding population as opposed to changes in the overall migrating population. Further, Yellow-rumped Warblers typically migrate through Niagara in mid-April, before our survey began, and, while sampling the entire migration may not be necessary to estimate an unbiased trend using migration counts (Crewe *et al.* 2016), we felt that our survey did not adequately sample their entire migration

Table 1. Total number of individuals of each warbler species detected at Port Weller West Pier during May, 1993-1995 and 2013-2015. Total warbler counts are shown with and without Yellow Warbler (YEWA) and Yellow-rumped Warbler (YRWA).

Species	Scientific Name	1993	1994	1995	2013	2014	2015	1993-1995	2013-2015
Ovenbird	*Seiurus aurocapilla*	4	5	7	4	1	2	16	7
Northern Waterthrush	*Parkesia noveboracensis*	2	5	2	7	12	6	9	25
Black-and-white Warbler	*Mniotilta varia*	9	3	30	10	17	14	42	41
Tennessee Warbler	*Oreothlypis peregrina*	3	2	2	9	6	5	7	20
Nashville Warbler	*Oreothlypis ruficapilla*	3	6	15	6	46	5	24	57
Mourning Warbler	*Geothlypis philadelphia*	2	0	0	3	1	2	2	6
Common Yellowthroat	*Geothlypis trichas*	40	24	33	47	59	60	97	166
American Redstart	*Setophaga ruticilla*	72	37	59	40	49	65	168	154
Cape May Warbler	*Setophaga tigrina*	32	31	9	2	7	9	72	18
Northern Parula	*Setophaga americana*	1	11	3	6	16	20	15	42
Magnolia Warbler	*Setophaga magnolia*	62	29	33	40	77	92	124	209
Bay-breasted Warbler	*Setophaga castanea*	42	13	10	3	14	17	65	34
Blackburnian Warbler	*Setophaga fusca*	6	1	11	3	13	20	18	36
Chestnut-sided Warbler	*Setophaga pensylvanica*	38	12	33	24	29	28	83	81
Blackpoll Warbler	*Setophaga striata*	22	9	7	64	17	100	38	181
Black-throated Blue Warbler	*Setophaga caerulescens*	18	26	47	11	22	27	91	60
Palm Warbler	*Setophaga palmarum*	43	44	24	60	98	84	111	242
Black-throated Green Warbler	*Setophaga virens*	8	9	13	13	8	10	30	31
Canada Warbler	*Cardellina canadensis*	5	1	3	6	1	7	9	14
Wilson's Warbler	*Cardellina pusilla*	13	3	7	12	17	11	23	40
Total (excl. YEWA, YRWA)		425	271	348	370	510	584	1044	1464
Yellow-rumped Warbler	*Setophaga coronata*	295	276	226	139	271	372	797	782
Yellow Warbler	*Setophaga petechia*	268	208	208	373	761	950	684	2084
Total (incl. YEWA, YRWA)		988	755	782	882	1542	1906	2525	4330
Total Number of Species		22	21	21	22	22	22	22	22

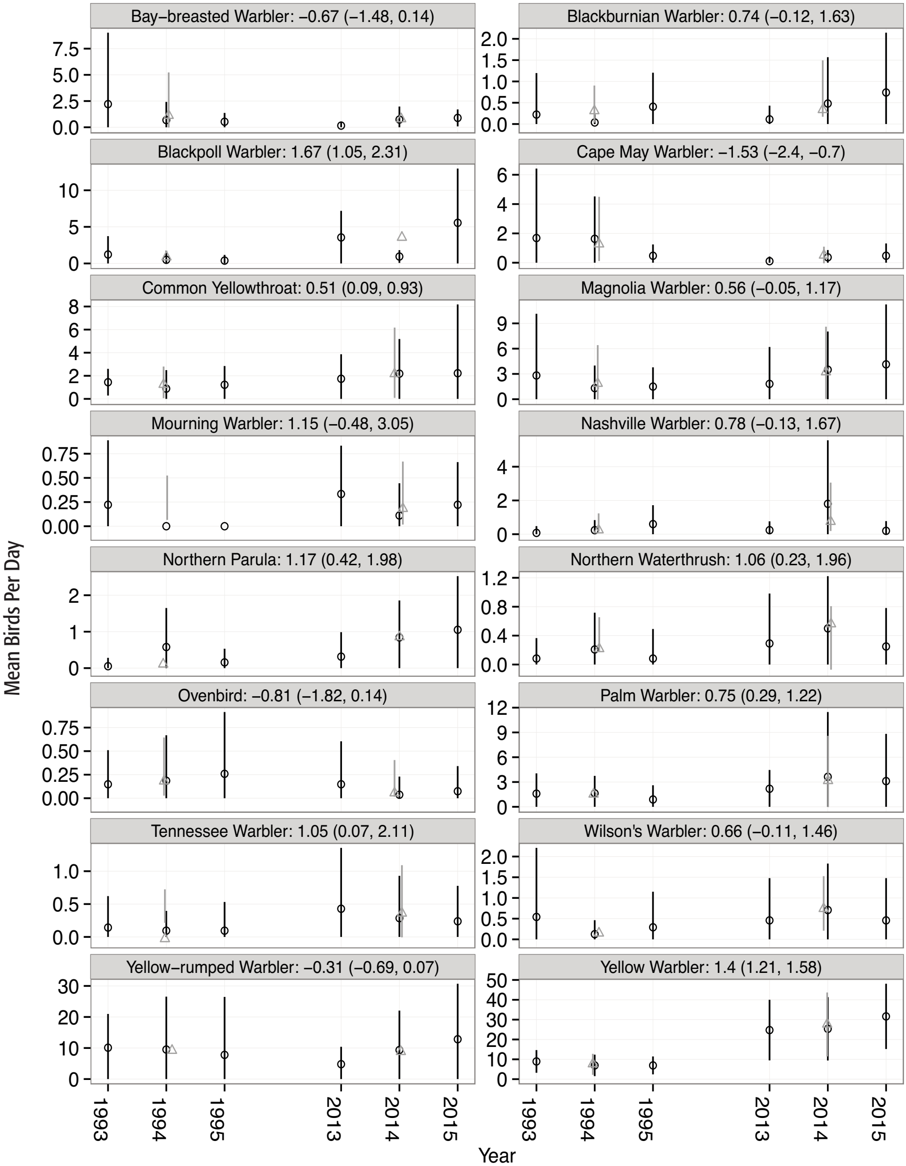


Figure 5. Mean count (standard deviation) by year (black circles) and across years in a year group (grey triangles) for species at Port Weller West Pier where the posterior probability supported a 95% probability that counts increased or declined over the 20-year period between 1993-1995 and 2013-2014. Effect size and 95% credible intervals are shown for each species.

Common Yellowthroat. *Photo: Tom Thomas*

for the purposes of this study. Most other warblers detected during this study typically migrate through Niagara during May when counts were collected (Black and Roy 2010).

Change in Count Size over Time - Port Weller West Pier

The total number of warblers counted was larger in 2013-2015 (4,330; Table 1) than in 1993-1995 (2,525) and this increase in counts between time periods was supported by the regression analysis (positive mean with credible intervals that excluded zero; Table 2). Even if we remove the large numbers of Yellow Warblers (our most common summer resident) and the very abundant Yellow-rumped Warblers, an increase in counts of warblers was observed from 1,044 in 1993-1995 to 1,464 in 2013-2015 (Table 1).

Our analysis also supported an increase in counts between time periods for seven of 22 species (Blackpoll Warbler, Common Yellowthroat, Northern Parula, Tennessee Warbler, Northern Waterthrush, Palm Warbler, and Yellow Warbler; Figure 5) and a decline in counts for Cape May Warbler (negative means with credible intervals that excluded zero; Table 2). If we consider species with a posterior probability ≥ 0.95 (increase in counts) or ≤ 0.05 (decline in counts), our results further supported an increase in count between time periods for Magnolia Warbler, Nashville Warbler, Blackburnian Warbler and Wilson's Warbler, and a decline in count for Bay-breasted, Ovenbird and Yellow-rumped Warblers. In the case of the Yellow-rumped Warbler, the apparent decline was likely the result of a decline in extreme counts between time periods, as opposed to a decline in the median or mean count over time.

Table 2. Total count at Port Weller West Pier in each year group (1993-1995 and 2013-2015), mean, standard deviation (SD), lower 95% credible interval (LCI), upper 95% credible interval (UCI) and posterior probability (Post. Prob.) for a regression that tested whether mean count increased (positive mean) or declined (negative mean) between year groups for each species and across all warbler species. Strong support for a change in count size between time periods is suggested by credible intervals that do not include 0 (shown in bold), but also by a posterior probability ≤ 0.05 for a decline in counts or ≥ 0.95 for an increase in counts, even when credible intervals did include 0 (shown in italics).

Species	Total Counts 1993-995	2013-2015	Mean	SD	LCI	UCI	Post. Prob.
Ovenbird	*16*	*7*	*-0.81*	*0.5*	*-1.82*	*0.14*	*0.05*
Northern Waterthrush	**9**	**25**	**1.06**	**0.44**	**0.23**	**1.96**	**0.99**
Black-and-white Warbler	42	41	0.01	0.43	-0.84	0.86	0.52
Tennessee Warbler	**7**	**20**	**1.05**	**0.52**	**0.07**	**2.11**	**0.98**
Nashville Warbler	*24*	*57*	*0.78*	*0.45*	*-0.13*	*1.67*	*0.96*
Mourning Warbler	2	6	1.15	0.90	-0.48	3.05	0.91
Common Yellowthroat	**97**	**166**	**0.51**	**0.21**	**0.09**	**0.93**	**0.99**
American Redstart	168	154	-0.17	0.21	-0.58	0.24	0.21
Cape May Warbler	**72**	**18**	**-1.53**	**0.43**	**-2.4**	**-0.7**	**0.00**
Northern Parula	**15**	**42**	**1.17**	**0.4**	**0.42**	**1.98**	**1.00**
Magnolia Warbler	*124*	*209*	*0.56*	*0.31*	*-0.05*	*1.17*	*0.96*
Bay-breasted Warbler	*65*	*34*	*-0.67*	*0.41*	*-1.48*	*0.14*	*0.05*
Blackburnian Warbler	*18*	*36*	*0.74*	*0.44*	*-0.12*	*1.63*	*0.95*
Chestnut-sided Warbler	83	81	-0.02	0.3	-0.6	0.57	0.48
Blackpoll Warbler	**38**	**181**	**1.67**	**0.32**	**1.05**	**2.31**	**1.00**
Black-throated Blue Warbler	91	60	-0.29	0.26	-0.79	0.21	0.12
Palm Warbler	**111**	**242**	**0.75**	**0.24**	**0.29**	**1.22**	**1.00**
Black-throated Green Warbler	30	31	-0.03	0.4	-0.82	0.76	0.48
Canada Warbler	9	14	0.43	0.5	-0.55	1.43	0.80
Wilson's Warbler	*23*	*40*	*0.66*	*0.4*	*-0.11*	*1.46*	*0.95*
TOTAL (excl. YEWA, YRWA)	*1044*	*1464*					
Yellow-rumped Warbler	*797*	*782*	*-0.31*	*0.19*	*-0.69*	*0.07*	*0.05*
Yellow Warbler	**684**	**2084**	**1.4**	**0.09**	**1.21**	**1.58**	**1.00**
TOTAL (incl. YEWA, YRWA)	**2525**	**4330**	**0.59**	**0.19**	**0.19**	**0.99**	**0.99**

Correspondence among Sites

Comparison of trends

Direction of detected change in mean counts over time at PWW corresponded with the direction of population trend detected for LPBO for 14 of 22 species, and with the direction of trend detected for BBS for 11 of 22 species (across both BBS surveys), and with LPBO and both BBS time periods (i.e., across all surveys) for 7 of 22 species (Table 3).

Bay-breasted Warbler. *Photo: Claude King*

Table 3. Comparison of the direction of change in counts (+ suggests an increase in counts and - suggests decline in counts) of each warbler species detected at Port Weller West (PWW) Pier during 1993-1995 and 2013-2015, compared with the direction of change detected for LPBO and BBS.

* suggests strong support for the change: for PWW, 95% credible intervals excluded 0; for BBS, strong support was suggested by the "overall reliability high" rating; and for LPBO, we considered a trend to have strong support when $p \leq 0.05$. Species where direction of change corresponded among all surveys are shown in bold. For example, the Northern Waterthrush showed an increase in columns 1, 2 and 4 and a decrease in column 3; there was strong support for the increase in column 1.

Species	PWW 1993/95-2013/15 (%)	LPBO 1993-2012 (%)	BBS 1970-2012 (%/yr)	BBS 2002-2012 (%/yr)
Ovenbird	-	+*	-*	-*
Northern Waterthrush	+*	+	-	+
Black-and-white Warbler	-	-	-	+
Tennessee Warbler	+*	-	-	-
Nashville Warbler	+	-	+	+
Mourning Warbler	+	+	-*	-
Common Yellowthroat	+*	+	+	+
American Redstart	-	+	-*	-
Cape May Warbler	-*	-	-	-
Northern Parula	+*	+*	+	+
Magnolia Warbler	+	-	+	+
Bay-breasted Warbler	-	-*	-	-
Blackburnian Warbler	+	-	+*	-
Chestnut-sided Warbler	-	+	-	-
Blackpoll Warbler	+*	+*		
Black-throated Blue Warbler	-	+	+*	+
Palm Warbler	+*	+	+	+
Black-throated Green Warbler	+	+	+	-
Canada Warbler	+	+	-	-
Wilson's Warbler	+	+	+	+
Yellow-rumped Warbler	-	-	+	+

Table 4. Pearson correlation coefficient (Corr) of annual indices among sites, estimated for Port Weller West (PWW), East (PWE) Piers and Long Point Bird Observatory (LPBO) during 1993-1997 (n = 5). (Note that significant positive correlations p ≤ 0.05 are in bold.)

Species	PWW-PWE		PWW-LPBO		PWE-LPBO	
	Corr	*p*	*Corr*	*p*	*Corr*	*p*
Ovenbird	0.73	0.17	0.39	0.52	0.28	0.65
Northern Waterthrush	-0.22	0.72	0.64	0.25	0.60	0.28
Black-and-white Warbler	0.80	0.11	-0.37	0.55	-0.46	0.43
Tennessee Warbler	**0.88**	**0.05**	0.72	0.17	0.61	0.27
Nashville Warbler	0.66	0.23	0.41	0.49	**0.96**	**0.01**
Mourning Warbler	0.19	0.76	0.04	0.95	0.26	0.68
Common Yellowthroat	0.32	0.60	0.45	0.44	**0.89**	**0.04**
American Redstart	**0.98**	**<0.01**	-0.34	0.57	-0.43	0.47
Cape May Warbler	**0.97**	**0.01**	0.71	0.18	0.55	0.33
Northern Parula	-0.45	0.45	0.24	0.70	0.29	0.63
Magnolia Warbler	0.74	0.15	0.58	0.30	0.21	0.73
Bay-breasted Warbler	0.6	0.28	**0.88**	**0.05**	0.70	0.19
Blackburnian Warbler	**0.91**	**0.03**	0.70	0.19	0.72	0.17
Chestnut-sided Warbler	**0.97**	**0.01**	0.43	0.46	0.24	0.69
Blackpoll Warbler	**0.99**	**<0.01**	-0.15	0.81	-0.12	0.84
Black-throated Blue Warbler	0.03	0.97	0.76	0.14	0.21	0.73
Palm Warbler	0.68	0.20	0.17	0.78	0.42	0.48
Black-throated Green Warbler	0.46	0.43	0.38	0.52	0.75	0.15
Canada Warbler	**0.99**	**<0.01**	0.56	0.32	0.60	0.28
Wilson's Warbler	0.43	0.47	0.43	0.47	**0.99**	**<0.01**
Yellow-rumped Warbler	0.85	0.07	0.18	0.63	0.00	0.99
Yellow Warbler	-0.65	0.23	0.42	0.48	-0.44	0.45

Comparison of counts among sites

Significant (p ≤ 0.05) positive correlations of annual indices between PWW and PWE suggest that similar patterns of annual variation in migration counts were observed for 7 of 22 species (Tennessee Warbler, American Redstart, Cape May Warbler, Blackburnian Warbler, Chestnut-sided Warbler, Blackpoll Warbler and Canada Warbler); Yellow-rumped Warbler was near-significant at p = 0.07 (Table 4). Similar comparisons between PWW and LPBO (1993-1997) suggest comparable patterns of annual variation for one species (Bay-breasted Warbler, Table 4) and comparisons between

PWE and LPBO (1993-1997) suggest comparable annual fluctuations for only three species (Nashville Warbler, Common Yellowthroat, Wilson's Warbler) (Table 4). However, note that only 5 years of data were used in these comparisons, and that Long Point annual indices were estimated using a regression that included data collected from 1961-2013, and may not be directly comparable (i.e., differences between LPBO and PWW/PWE may be due to differences in detection, analysis or in the population being monitored).

Discussion

Overall, our results suggest that counts of several warbler species and warblers as a group have increased between 1993-1995 and 2013-2015 at PWW. Many factors can influence the number of birds detected by a particular count protocol, including variation in observer skill (Link and Sauer 2002), weather (Francis and Hussell 1998), habitat (Harrison *et al.* 2000), climate (Berthiaume *et al.* 2009, Calvert *et al.* 2009) and population distribution (Paprocki *et al.* 2014). In particular, a systematic change in any factor that influences detection, including climate change, habitat succession, or a change in migratory route or stopover behaviour can bias trends in migration counts if the underlying temporal change in detection is not accounted for (see review in Crewe *et al.* 2015a). Because detection probability was not explicitly estimated at PWW through the use of double-observer sampling or other methods (e.g., Berthiaume *et al.* 2009), we cannot confirm whether any observed change in count size reflects real change in the size of the monitored population or, alternatively, a change in the probability that birds were detected at PWW.

Using daily counts of migrating animals to estimate population change, as we did here, relies on the assumption that new birds were detected each day, and that factors affecting the probability of detecting available birds, such as stopover duration or observer skill, did not change systematically over time. At PWW, mean observer age and skill were approximately the same in both time periods, and should not have contributed substantially to any systematic variation in detection over time. Habitat has also remained relatively stable between 1993 and 2013 (Black and Roy 2010). However, we did not collect data on vegetation at or surrounding the sites monitored, thus we cannot ascertain that detection probability did not change over time as a result of habitat succession. This pier has opened up a little with the death of many poplars and the succession and additional appearance of shorter trees and shrubs, which may have influenced the probability that some warbler species used the pier during stopover, and therefore the probability of detecting those species. The habitat is perhaps now more suitable for Yellow Warblers, which were found in much larger numbers not only during migration but also during the breeding period between 2013-2015 and 1993-1995. (See http://www.brocku.ca/tren/niagarabirds.) The increase in counts of other warbler species over time might also be attributed to an increase in detection if the observed changes in habitat resulted in a higher

Northern Parula.
Photo: Tom Thomas

probability that birds stopped at the site, and/or a higher probability that individuals that did stop remained at the site for longer periods of time. If birds were more likely to stop during the latter time period, or more likely to stay for longer time periods before departing again on migration, this could bias estimates of long-term change by increasing the odds that an individual would be counted on one or more observation days (Crewe *et al.* 2015a).

Even if we were to assume that changes in habitat and observer effort did not contribute to differences in warbler numbers between 1993-1995 and 2013-2015, it is still not obvious that we can, from the results above, conclude that more birds migrated through Port Weller in 2013-2015 than in 1993-1995. This might be true if all other factors contributing to the probability that birds will land at the piers, such as weather, migration route, and breeding or wintering distribution, have also not changed over time. The large variation in daily (large standard deviation around annual means, Figure 5) and annual counts (Table 1, Figure 5) observed for some species, for example, might suggest that counts were influenced by factors in addition to temporal changes in the underlying population size. Perhaps weather conditions were such that Blackpoll Warblers were more likely to land at PWW in 2013-2015 than in 1993-1995. Moreover, weather conditions farther south might also influence how many individuals stop at PWW in spring, and on a larger spatial scale, change in habitat structure in the landscape surrounding the Port Weller Piers might influence the probability that birds stopover and are counted during migration.

Regardless, correspondence of fluctuations in annual indices at PWW with PWE for some species suggests that at least for those species, counts are not simply a reflection of site-specific changes in detection probability. A correspondence in the direction of count trends for seven warbler species detected at PWW with LPBO and Ontario BBS (Table 3) also suggests, at least qualitatively, that the small study on the west pier does reflect the overall direction of population change detected for those warbler species across Ontario. The lack of correspondence in direction of trend among surveys for most other species does, however, suggest that counts do likely reflect some site-specific biases (Harrison *et al.*

2000), or differences among surveys in the breeding origin of the migrants detected. Without knowledge of the breeding origin of individuals detected by migration counts, we cannot safely assume that all surveys are monitoring the same population, particularly as distance between sites increases (this might have contributed to the greater correspondence between PWW and PWE annual indices as compared with PWW or PWE with LPBO annual indices). Correspondence of trends in annual migration counts collected at LPBO with Breeding Bird Survey trends have been reported in the past (Francis and Hussell 1998, Crewe *et al.* 2008) and do support the use of seasonal migration counts, such as those collected at PWW, for long-term population monitoring when collected annually over the long term.

Concluding Remarks

In general, we conclude that the type of method used here (sampling three years every 20 years), as opposed to sampling annually over a 20-year time period, can be useful for estimating whether the size of the count population has changed over time, while reducing long term effort required to collect data. Sampling more years (e.g., five years every 20 years) might improve correspondence of annual indices and long-term trends with alternative sites and surveys. The correspondence in direction of trend for some species detected at PWW with direction of trend observed for those species using other bird count datasets suggests that a systematic study of one small area (PWW) can be used to learn not only about birds using a single locality during migratory stopover (e.g., Niagara), but potentially also the direction of population change at a larger spatial scale. For those species with annual indices and trends that did not correspond among sites or surveys, additional data on detection probability would be required to determine if observed changes reflect changes in local factors, such as habitat succession. Daily counts at more sites that sample the same breeding population over the same period of time, as is done with Breeding Bird Atlases (see also Crewe *et al.* 2015b), would also allow us to determine with greater confidence whether site-specific annual fluctuations are evidence of broader-scale population fluctuations. Note that by not counting annually, we did lose information on the trajectory of change over time, and on the long-term variation in annual counts. As a result, it is not possible to determine whether the observed change is outside the normal range of annual variation in population counts. Our study has nevertheless answered the simple question raised in the introduction: "did the number of warblers detected using the west pier during migration change between 1993-1995 and 2013-2015?" We see that the number of warblers detected using the west pier during migration increased! It will be most interesting to see if the conclusions reached here persist when the final two years, 2016 and 2017, of data are included.

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Colour morphs, downy and juvenile plumages of Trumpeter and Mute Swans

Harry G. Lumsden

Both Trumpeter Swans (*Cygnus buccinator*) (hereafter Trumpeters) and Mute Swans (*Cygnus olor*) (hereafter Mutes) have two colour morphs, a normal and a leucistic morph. These are most obvious in the cygnets, but are discernible in adults with careful observation.

Munro *et al.* (1968) studied the genetic control of normal grey (also called Royal) and leucistic (also called Polish) colour morphs of Mutes in Rhode Island and concluded that a single sex-linked gene controlled their frequency with grey being dominant. They found that 10% (N=29) of the male, 26% (N=51) of the female cygnets and overall 16% were leucistic. Reese (1975) found that 19% (N=25) of the Mute hatchlings in Chesapeake Bay, Maryland, were leucistic. Bacon (1980) hypothesized that leucistic Mute females may be more productive than the normal colour morph. Because of their white plumage, leucistic swans appear to be a year older than they actually are, and may obtain a mate at two years of age and breed at three years of age; by doing so leucistic females have an advantage over normal females which seldom breed at three years of age. His hypothesis predicts that leucistic genes should be more common in low density and expanding populations. This is consistent with the situation in Ontario where Mute populations have been expanding (Petrie and Francis 2003). In a sample of adult Mutes banded in the spring of 1983 and 1984 on the northwest shore of Lake Ontario, there were 11 leucistic females (69%) and only five (31%) that were grey. Of the males, 10 (37%) were leucistic and 17 (63%) were grey.

Leucistic Trumpeters are rare compared to leucistic Mutes. In the Rocky Mountain population, the only records of leucistics come from Yellowstone National Park where Condon (1941 in Banko 1960) found nine leucistics among 58 cygnets (13%) from 1937-1940. McEneaney (2005) described in detail the plumages and the colour of bill, legs and

Figure 1. Five normal grey Trumpeter Swan cygnets in primary natal down, about four days old. *Photo: Harry Lumsden.*

feet of subadult and adult leucistic Trumpeters in Yellowstone National Park. Banko (1960) found none at Red Rock Lake National Wildlife Refuge in Montana and leucistics do not seem to have been recorded in the Pacific population in Alaska.

In Ontario, among the Rocky Mountain population adult stock bought from aviculturists for restoration, none were leucistic but three of these released pairs produced leucistic cygnets. These presumably trace their origin to Yellowstone National Park. The normal female #839 with her normal mate #812 hatched seven (39%) leucistics among 18 cygnets produced from 2006-2009 at Aurora (44° 00' N 079° 28' W), indicating the presence of the recessive gene. The male #812 was killed when he landed in front of a car on a busy highway in 2010 and subsequently #839 mated with a new normal mate H24, and together they hatched 25 cygnets from 2010-2015, but none were leucistic. This indicates it was #812 that carried the recessive gene. At Bluffers Park (43° 42' N, 079° 14' W), the normal female A70 with a normal mate #197 hatched 37 cygnets from 2004-2010 of which four (11%) were leucistic cygnets. Another normal pair near Portland (44° 42' N 076° 12' W) is also reported to have hatched leucistics.

Downy and Juvenile Plumages

The Common Loon (*Gavia immer*) replaces stage A down with stage B down (Palmer 1962), and the Eagle Owl (*Bubo bubo*) and presumably the Great Horned Owl (*Bubo virginianus*) are other examples of birds which replace the first down (neoptile) with a second down (mesoptile) (Cramp 1985). Unlike these species, there is no moult of primary down to

Figure 2. One normal (grey) and three leucistic Trumpeter Swan cygnets (white) in primary down about 10 days old.

Figure 3. Five normal (grey) Trumpeter Swan cygnets in secondary down on 9 August 2013, 30 days old.
Photos: Harry Lumsden

make way for secondary down in Trumpeters and Mutes. The primary down of swan cygnets at hatch develops from feather follicles within the egg during embryonic life (Vetkevich 1966). The cygnets grow very fast and as their skin area expands, down that develops from secondary follicles fills the empty space between the primary follicles. The primary down feathers of normal Trumpeters are very pale grey over most of the body but whiter on the under parts and the bill is dull pink shading to grey laterally and proximally, the nail is a dark grey and the feet and legs are flesh-coloured (Figure 1). Leucistic cygnets have pure white primary down (Figure 2) and secondary down with the colour of the bill and feet similar to their normal siblings (Vetkevich 1966). In normal morph cygnets, these new follicles produce a darker more cryptic secondary down which differs in colour from that of the primary down (Figure 3). Banko (1960) described this secondary down as mouse-grey in colour.

The primary down of normal Mute cygnets is pale greyish-brown with white underparts (Witherby *et al.* 1939). As in Trumpeters, the secondary down is darker than the primary down. Leucistic Mute cygnets hatch with pale cinnamon down also grading to white on the breast and head (Figure 4) and again, like Trumpeters, secondary down is white and remains white for life.

The parents of both Trumpeters and Mutes are remarkably sensitive to the colour of their newly hatched cygnets. Although the difference at hatch between normal and leucistic cygnets is slight (e.g., in Trumpeters, Figure 2.) there are records of parents of both species attacking and killing their own leucistic cygnets. Scott (1972) lists five accounts in Europe of Mutes killing their own cygnets. In Ontario, a Trumpeter parent is suspected of killing one leucistic cygnet in 2008. The cygnet was found dead on the nesting raft the day after it hatched, much bloodied around the head (H. Lumsden, pers. obs.). At Bluffer's Park in 2004, the Trumpeter male #197 killed two of his leucistic cygnets (R. Griffiths, pers. comm.). In the early stages of Trumpeter Swan restoration, Trumpeter eggs were placed in Mute nests as part of a cross fostering technique. Attacks by Mutes on the "wrong" coloured cygnets were effectively prevented by tinting the tips of the down with a black dye at hatch (Lumsden and Drever (2002). At about 30 days of age, the secondary coat of down on these cygnets was spotted with darker clusters of filaments from the dyed primary down.

The parents of both Trumpeters and Mutes are remarkably sensitive to the colour of their newly hatched cygnets.

Figure 4. Two normal cygnets (left) and one leucistic (far right) Mute cygnet, newly hatched and still on the nest. *Photo: Harry Lumsden*

Figure 5. Leucistic Trumpeter Swan cygnet #395 in juvenile plumage on 22 January 1998, 7 months old.
Photo: Harry Lumsden

The juvenile contour feathers in the plumage of normal Trumpeter cygnets is about the same colour grey as that of the secondary down. These feathers, growing from both primary and secondary follicles, push the down off as they grow (Vetkevich 1966). The feet of normal juveniles change to yellowish grey and darken with age finally becoming black at maturity.

At seven months, a typical leucistic male Trumpeter cygnet, #395 (Figure 5), had fully developed his white juvenile plumage. His bill was mostly pink flecked with black with bare lores, off-white in colour. His feet were bright orange-yellow which he will retain for life. By 25 months, the bill of another leucistic male, C04, had changed to black with small yellow spots on the lores, near the gape and at the nostril (Figure 6).

At 31 months, another leucistic male, #091, showed only one tiny yellow spot on the lores (Figure 7). Trumpeters very rarely have a yellow mark on the lores which is not associated with leucism (Figure 8). Such birds may be mistaken for Tundra Swans (*Cygnus columbianus*) but the length of their bills (longer in Trumpeters) (Johnsgard 1974), the terminal feathering on the forehead (square or slightly rounded in Tundras, slightly pointed in Trumpeters) and quality of the yellow patch establishes their identity as Trumpeters. The quality of the yellow patch in Tundras is clear yellow and its location is close to the apex of the bill process, whereas in Trumpeters, the yellow is comprised of clustered speckles and streaks of yellow on a black background and is sometimes located well below the apex of the bill process close to the middle of the lores.

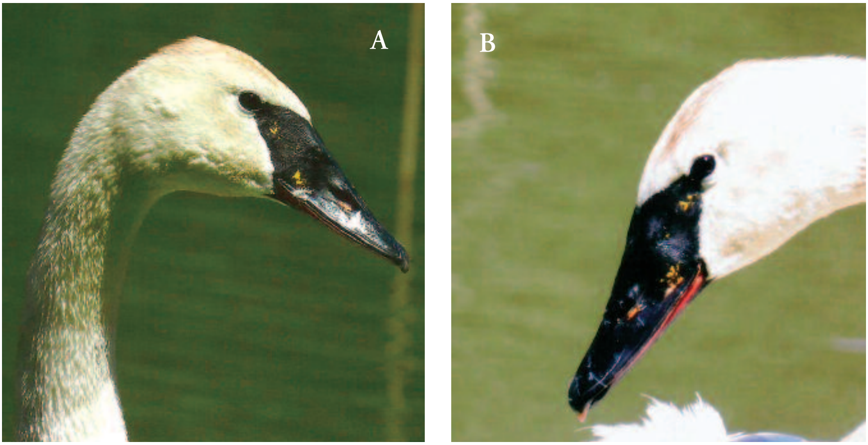

Figure 6. At 25 months, leucistic male C04 had yellow spots on the lores near the gape and at the nostrils. These markings were asymmetrical. A: right facing, B: left facing.

Figure 7. Left: At 30 months, leucistic male #091 showed only one tiny yellow spot at the lores.

Figure 8. Below: Female #116 with a yellow mark on the lores. She was not a leucistic bird.

Photos: Harry Lumsden

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In Memoriam
Dr. David J. T. Hussell

Jon D. McCracken

Born in 1934 in Winchester, England, Dr. David J. T. Hussell passed away on 10 April 2015 in Simcoe, Ontario, at the age of 80. He is survived by his wife (Dr. Erica Dunn), two sons (Jeremy and Peter) and two grandsons. David's life and accomplishments were celebrated by the many people who attended a memorial service held near Long Point, Ontario, on 30 May 2015.

I first met David in 1975, when I was a wide-eyed, first-year biology student about to embark on what turned out to be a life-changing spring and summer volunteering for Long Point Bird Observatory (LPBO).

Way before that, as a teen growing up in England, David developed an early interest in birds, making frequent birding trips on his bicycle to visit various bird observatories. Like his dad before him, however, he went on to choose a career in civil engineering, earning a professional degree at the University of London. Soon after, he migrated to Canada and found a job with the Ontario Department of Highways in 1957. He continued there for several years before rediscovering his childhood passion for birds.

David Hussell in Iceland, 1972. *Photo: Erica Dunn*

In 1964, he enrolled as a Ph.D. student at the University of Michigan, which is where he also met his future wife (and fellow ornithologist) "Ricky" Dunn. His thesis examined the breeding biology of Lapland Longspurs (*Calcarius lapponicus*) and Snow Buntings (*Plectrophenax nivalis*) in the High Arctic — a place and environment that resonated with him for the rest of his life.

After receiving his doctorate, he went on to complete post-doctoral research at the University of Pennsylvania (working on European Starlings) and the American Museum of Natural History. The latter is where he first got interested in studying the reproductive ecology of Tree Swallows. It turned out that this was an area of research that fascinated David for about 40 years — at another place that clearly resonated with him — Long Point, Ontario.

David was the last of what I call the original "band of banders" — which was a spirited team of amateur ornithologists from the Ontario Bird Banding Association who, in the fall of 1959, ventured 30 km out into the middle of Lake Erie, to the tip of Long Point. Their mission was to investigate the site's potential as a future banding station. A wise visionary from the outset, David recognized that not only was the Long Point site fantastic for birds, but he soon had it in his mind that a systematic, daily protocol of migration monitoring could one day become a useful tool for tracking bird population changes over time. Shortly thereafter, in 1960, the LPBO operation "hatched".

LPBO is the oldest research station of its type in the Western Hemisphere, and it's impossible to overlook David's extraordinary contributions to that organization. He was not only one of the Observatory's founders, he served as the Chair of the Board for several years, and as the first Executive Director from 1974-1982, not to mention the tens of thousands of hours he volunteered in the field.

David continued to be involved in LPBO research activities during his subsequent employment as a Research Scientist for the Ontario Ministry of Natural Resources, and again later throughout his retirement. For more than five decades, he maintained a close, personal involvement in the Observatory's programs, especially migration monitoring and Tree Swallow research.

Stepping out a little farther afield, David is widely regarded as the founding father of migration monitoring in North America. Not only was he instrumental in pioneering LPBO and its programs, he also played major roles in developing new bird observatories in Ontario at Thunder Cape, Innis Point and Prince Edward Point, as well as helping conceive and champion the development of the Canadian Migration Monitoring Network. Along the way, he created the first analytical approaches to calculating population trend estimates of migrating birds, and developed guidance documents that we still use today for establishing migration monitoring stations.

He was also heavily involved in the process of transforming LPBO into Bird Studies Canada, and building it as an international centre of excellence. Most

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recently, he played a leadership role in developing the 'Raptor Population Index' for hawk monitoring stations across the continent. Indeed, when you think about trickle-down effects and impacts, it can be said that David played some sort of role in the development of many migration monitoring stations in North America.

In addition to his steady love for Long Point, David continued to enjoy spending parts of his summers working in the High Arctic, where he most recently was making significant contributions to the study of Northern Wheatear (*Oenanthe oenanthe*) migration and breeding ecology.

Importantly, David was one of the first people to recognize, promote and celebrate the exceptional contributions that volunteers can make as "citizen scientists" to the study of birds, whether it was at migration monitoring stations or through other types of surveys that he helped create: Ontario's first breeding bird atlas project, the Canadian Lakes Loon Survey, Project FeederWatch, the Ontario Heronry Inventory, and surveys of beached birds on the Great Lakes.

Just as importantly, he figured that volunteers could be motivated in other ways too, including fund-raising, and he proved it by creating the Baillie Birdathon in 1976. Since then, Birdathon participants have raised over $5 million for more than 600 worthy bird conservation and research projects across the country.

During his career, David Hussell published about 75 scientific papers. In the process, he served as a trainer and mentor for dozens of young biologists. In the mid 1970s, together with his wife, Ricky, he created the Young Ornithologists' Workshop (YOW) at Long Point, which I think is one of his most important legacies. Most of the teens who've graduated from the YOW program over the years have gone on to get degrees in biology and are themselves now making strong contributions to science and conservation.

David also enriched and influenced the lives of lots of 'grown-up' professional colleagues. Over the years, they awarded him many official accolades, including lifetime-achievement recognitions from the Society of Canadian Ornithologists (Speirs Award), the Hawk Migration Association of North America (Broun Award), the Ontario Field Ornithologists (Distinguished Ornithologist Award), the Ontario Bird Banding Association (Janette Dean Award) and the Linnaean Society of New York (Eisenmann Medal). He was also made a fellow of the American Ornithologists' Union in 1991.

For those who knew him, David was subdued, humble and prone to understatement. He was also totally committed to rigorous and methodical thinking, had powerful observational skills, paid enormous attention to detail and had just the right touch of soft-spoken genius to inspire others. His earlier training as an engineer was foundational to his later scientific mindset to design, probe, question, and tinker — not only with things, but also with ideas — both big and small.

Like all talented trail-blazers, you might think that David's path is a tough act to follow... but once you've taken up the road map, you'll find that the sign posts he thoughtfully laid down serve as clear stepping-stones to the future. He left a lot of sign posts. I know, because I am one of them.

List of Selected Publications

Hussell, D.J.T. 1972. Factors affecting clutch size in arctic passerines. Ecological Monographs 42:317-362.

Hussell, D.J.T. 1981. The use of migration counts for monitoring bird population levels. Studies in Avian Biology 6:92-102.

Hussell, D.J.T. 1985. On the adaptive basis for hatching asynchrony: brood reduction, nest failure and asynchronous hatching in Snow Buntings. Ornis Scandinavica 16:205-212.

Hussell, D.J.T. 1988. Supply and demand in tree swallow broods: a model of parent offspring food provisioning interactions in birds. American Naturalist 131:175-202.

Hussell, D.J.T. 2003. Climate change, spring temperatures, and timing of breeding of Tree Swallows (*Tachycineta bicolor*) in southern Ontario. Auk 120:607-618.

Hussell, D.J.T. and **C.J. Ralph**. 2005. Recommended methods for monitoring change in landbird populations by counting and capturing migrants. North American Bird Bander 30:6-20.

Hussell, D.J.T. and **T.E. Quinney.** 1987. Food abundance and clutch size of Tree Swallows *Tachycineta bicolor*. Ibis 129:243-258.

Farmer, C.J., D.J.T. Hussell and **D. Mizrahi**. 2007. Detecting population trends in migratory birds of prey. Auk 124:1047-1062.

Bairlein, F., D.R. Norris, R. Nagel, M. Bulte, C.C. Voigt, J.W. Fox, D.J.T. Hussell and **H. Schmaljohann**. 2012. Cross-hemisphere migration of a 25 g songbird. Biology Letters 8:505-507.

Hobson, K.A., S.L. Van Wilgenburg, E.H. Dunn, D.J.T. Hussell, P.D. Taylor and **D.M. Collister**. 2015. Predicting origins of passerines migrating through Canadian migration monitoring stations using stable-hydrogen isotope analyses of feathers: a new tool for bird conservation. Avian Conservation and Ecology 10(1):3. http://dx.doi.org/10.5751/ACE-00719-100103.

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