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**ATLAS OF COLONIAL WATERBIRDS NESTING
ON THE CANADIAN GREAT LAKES, 1989-1991
PART 5. HERONS AND EGRETS IN 1991**

**Hans Blokpoel
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NOTE

The Atlas consists of five parts as follows:

- Part 1. Cormorants, gulls and island-nesting terns on Lake Superior in 1989.
(Blokpoel and Tessier 1993).
- Part 2. Cormorants, gulls and island-nesting terns on Lake Huron in 1989.
(Blokpoel and Tessier 1997).
- Part 3. Cormorants, gulls and island-nesting terns on the lower Great Lakes system in 1990.
(Blokpoel and Tessier 1996).
- Part 4. Marsh-nesting terns on Lake Huron and the lower Great Lakes system in 1991.
(Austen, Blokpoel and Tessier 1996).
- Part 5. Herons and egrets in 1991.
(This report).

ABSTRACT

During the 1991 breeding season an inventory was made of Great Blue Herons (*Ardea herodias*), Great Egrets (*Ardea alba*) and Black-crowned Night-Herons (*Nycticorax nycticorax*) nesting in the Canadian portions of Lake Huron (except for the waters surrounding Manitoulin Island) and the lower Great Lakes, including Lake St. Clair and the upper St. Lawrence River. Canadian Lake Superior was not surveyed in 1991, so 1989 data are used as substitutes in this report.

The field work was a cooperative effort by various organizations and individuals, under overall coordination by the Canadian Wildlife Service. Islands and shoreline marshes were visited and nest numbers were counted or estimated on the ground or from the water.

Great Blue Herons were the most widespread of the three species studied. They had 29 colonies with 207 nests in Lake Superior, 9 colonies with 378 nests in Lake Huron, and 6 colonies with 513 nests in the lower Great Lakes area. Where previous data are available, comparisons with the results reported here indicate population growth in Lake Huron and the lower Great Lakes area, but possibly a decline in the remote area of Pukaskwa National Park on Lake Superior.

Erie

Great Egrets were the least numerous with four colonies holding in total 156 nests. Two colonies were in the western basin of Lake ~~Huron~~ and the other two were in southern Lake Huron. This species has recently expanded its breeding range and numbers in Ontario.

Black-crowned Night-Heron colonies were present in the southern parts of Lake Huron (6 colonies with 257 nests) and in the lower Great Lakes area (17 colonies with 1,671 nests). There is a lack of adequate data to determine any lakes-wide population change, but the limited data for Lake Huron suggest a decline during 1978-91.

RESUME

Pendant la période de nidification de 1989, on a inventorié le Grand Héron (*Ardea herodias*), la Grande Aigrette (*Ardea alba*) et le Bihoreau à couronne noire (*Nycticorax nycticorax*), lesquels nichent dans la partie canadienne du lac Huron (à l'exception des eaux entourant l'île Manitoulin) et les grands lacs inférieurs, incluant le lac St. Clair et la partie supérieure de la rivière St. Laurent. Puisque la partie canadienne du lac Supérieur n'a pas été inventoriée en 1991, on a utilisé les données du relevé de 1989 pour cet endroit.

Le travail sur le terrain a été un effort de plusieurs organismes et individus, sous la coordination générale du Service canadien de la faune. Les îles et les marécages le long des rives ont été visités. On a compté manuellement ou estimé sur le terrain ou d'un bateau, le nombre de nids.

Des trois espèces, c'est le Grand Héron qui était le plus répandu. Il y avait un total de 29 colonies avec 207 nids sur le lac Supérieur, 9 colonies avec 378 nids sur le lac Huron et 6 colonies avec 513 nids dans les grands lacs inférieurs. La comparaison de données antérieures disponibles avec les résultats de ce rapport, indique une augmentation de la population au lac Huron et dans les grands lacs inférieurs, mais un déclin probable dans les endroits plus éloignés du parc national Pukaskwa au lac Supérieur.

C'est la Grande Aigrette qui est la moins nombreuse avec quatre colonies et un total de 156 nids. Il y avait deux colonies dans le bassin ouest du lac ^{Erié}~~Huron~~ et les deux autres se trouvent dans la partie sud du lac Huron. Dernièrement, cette espèce a augmenté son nombre et répandu son aire de reproduction en Ontario.

Il y avait des colonies de Bihoreau à couronne noire dans les parties sud du lac Huron (6 colonies avec 257 nids) et dans les grands lacs inférieurs (17 colonies avec 1671 nids). Il y a un manque de données adéquates afin de déterminer aucun changement du niveau de la population dans les grands lacs, mais les données disponibles semblent indiquer une baisse de 1978 à 1991.

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1. INTRODUCTION

Birds that breed in a colony and that breed or feed in association with water are referred to as colonial waterbirds (Maehr and Rodgers 1985). Colonial waterbirds are of special concern to the Canadian Wildlife Service (CWS) because during the nesting season they are concentrated on their colony sites and are then highly vulnerable to predation and disturbance. In addition, as top predators in the food web, they may bio-accumulate contaminants that are present in their environment, and, therefore, they can be used to monitor contaminant levels and their bio-effects. In the Great Lakes, contaminant levels in Herring Gulls eggs have been monitored routinely since the early 1970s (Mineau *et al.* 1984; Bishop *et al.* 1992; Ryckman *et al.* 1997). Furthermore, when gulls nest at large colonies in urban or industrial sites they may cause various problems to people (Blokpoel and Tessier 1986). An additional concern is that nesting gulls may encroach on the nesting habitat of other species (Courtney and Blokpoel 1983; Blokpoel and Tessier 1986).

Large-scale inventories of colonial waterbirds nesting on the Great Lakes did not begin until 1976. In 1976, and again in 1977, the U.S. portions of the Great Lakes were surveyed under contract for the U.S. Fish and Wildlife Service (USFWS) (Scharf *et al.* 1978). The Canadian portions of the Great Lakes were surveyed and censused in a more gradual fashion: Lake Ontario and the upper St. Lawrence River in 1976 (Blokpoel 1977), Lake Erie and adjacent waterbodies in 1977 (Blokpoel and McKeating 1978), Lake Superior in 1978 (Blokpoel *et al.* 1980) and Lake Huron, including Georgian Bay and the North Channel, in 1980 (Weseloh *et al.* 1986). During 1981-1988 certain areas were re-inventoried during one or more years (e.g. Blokpoel and Harfenist 1986, Weseloh *et al.* 1988).

A lakes-wide inventory of all colonial waterbird species on both sides of the Canada/US border was carried out during 1989-1991. The inventory was done in consultation between CWS and USFWS. In Canada the fieldwork was coordinated by CWS (Ontario Region) and was largely carried out by contractors with substantial assistance from the Ontario Ministry of Natural Resources (OMNR) and Parks Canada. Because of the large amount of work and cost involved in making an inventory of all the Great Lakes it was decided to attempt a 3-year effort with fieldwork as follows:

- 1989 - all "primary" species in the upper Great Lakes;
- 1990 - all "primary" species in the lower Great Lakes; and
- 1991 - all "secondary" species in all Lakes.

For the purpose of the inventory, "primary" species are those species that nest primarily (or originally) on sparsely vegetated islands and off-shore structures, i.e. Double-crested Cormorant (*Phalacrocorax auritus*), Ring-billed Gull (*Larus delawarensis*), Herring Gull (*L. argentatus*), Great Black-backed Gull (*L. marinus*), Caspian Tern (*S. caspia*) and Common Tern (*Sterna hirundo*). "Secondary" species are those species that nest primarily in marshes and on densely vegetated islands, i.e. Great Blue Heron (*Ardea herodias*), Great Egret (*Ardea alba*), Black-crowned Night-Heron (*Nycticorax nycticorax*), Forster's Tern (*Sterna forsteri*) and Black Tern (*Chlidonias niger*).

During the inventories of the "primary" species in 1989 and 1990, any colony of a "secondary" species, which was encountered, was noted, and an effort was made to count or estimate the number of the nests. In 1991, when the "secondary" species were surveyed, it was not feasible to repeat the surveys of Lake Superior (except for the coast of Pukaskwa National Park) and of the waters surrounding

Manitoulin Island in northern Lake Huron.

The data collected during the 1989-1991 inventory of the Canadian Great Lakes are published as CWS Technical Reports and the five Technical Reports listed on the page preceeding the Abstract constitute the "Atlas of Colonial Waterbirds nesting on the Canadian Great Lakes, 1989-1991"

This report is the fifth and final of the "Atlas of Colonial Waterbirds Nesting on the Canadian Great Lakes, 1989-1991" and it has the following purposes:

- (1) to present the results of the 1991 inventories of herons and egrets using the format used by the USFWS for several other atlases of colonial waterbirds, and
- (2) to compare the 1991 results with historical data, where available, and discuss any changes.

Our intended readership consists of managers, planners, developers, park naturalists, and various other "users" of the Great Lakes and their natural resources, as well as biologists and interested lay people. We recommend that readers use the Methods section in order to access the information quickly.

2. STUDY AREA

Our study area covers the Canadian portions of the Great Lakes system and the upper St. Lawrence River (Fig. 1). The inventory was essentially restricted to colonies on natural islands and in coastal marshes. However, in the lower Great Lakes, there are relatively few islands and herons have begun to nest on man-made peninsulas (such as Tommy Thompson Park along the Toronto waterfront) and on other land-fill sites (such as the Eastport Development Area in Hamilton Harbour). These and similar sites are included in this report.

We originally intended to survey the lakes for herons and egrets in 1991, the third year of the survey. However, because of financial and logistical restraints, it was not feasible to resurvey Lake Superior (except for Pukaskwa National Park) and the waters surrounding Manitoulin Island in 1991. The western portion of Georgian Bay was not visited either in 1991. This area has very few islands and during the 1980 survey only one Great Blue Heron colony was found there (Weseloh *et al.* 1986). Coverage of the Great Lakes for herons and egrets during 1989-1991 was as follows:

Lake Superior

1989--All islands were surveyed, heron colonies were noted and nests numbers counted or estimated.

1990--No survey.

1991--No survey, except for the islands and coastal marshes of Pukaskwa National Park.

Lake Huron

For the purpose of this report, Lake Huron consists of the North Channel, Georgian Bay and Lake Huron proper (i.e. the rest of Lake Huron).

1989--All islands were surveyed, heron colonies were noted and nests numbers counted or estimated.

1990--No survey.

1991--Survey of marshes and islands of eastern Georgian Bay, northern North Channel and southern Lake Huron proper.

Lower Great Lakes Area

For the purpose of this report, the Lower Great Lakes Area consists of Lake St. Clair, the Detroit River, Lake Erie, the Niagara River, Lake Ontario, and the St. Lawrence River downstream to Cornwall, Ontario.

1989--No survey

1990--All islands were surveyed, and heronries were noted but not always censused.

1991--Survey of marshes and islands

3. METHODS

3.1 Definitions - For the purpose of this report, a colony consists of one or more breeding pairs of a species that usually nests in groups. Thus we consider a single Herring Gull nest as a colony in this report. We refer to the place where a colony is located as the colony site.

3.2 Nest counts - Islands were reached by boat, examined from the boat and, if nesting was evident or likely, field workers would go ashore and count all nests by searching the entire island. We refer

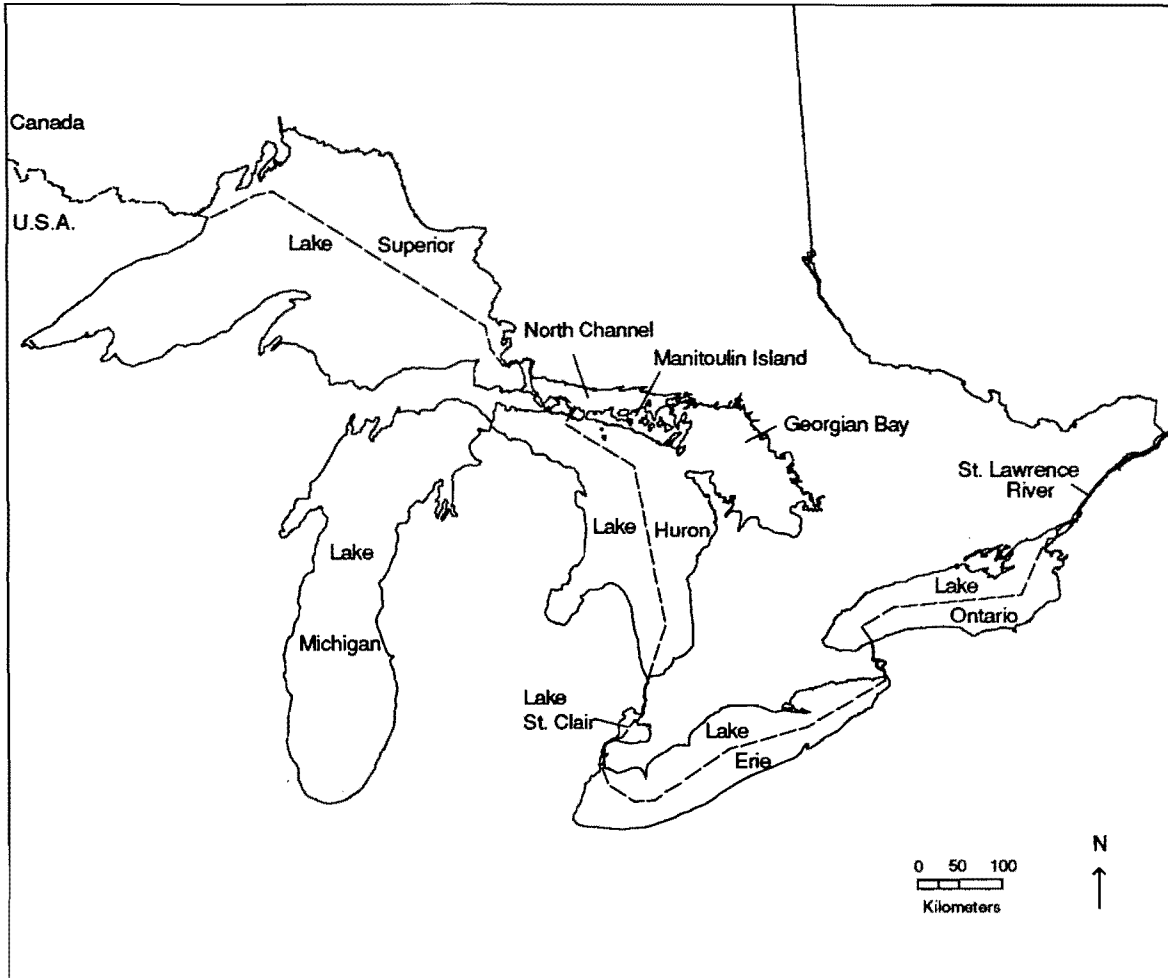


Fig. 1. Map of the Great Lakes.

to this method as Ground Count. Field workers counted **active nests**, i.e. nests that had eggs and/or chicks or, when that could not be observed, that were clearly attended as evident from whitewash around and below the nest.

At some islands birds were obviously nesting but local conditions did not permit landing. In those cases the number of nests would be estimated from the boat. We refer to these counts as Boat Estimates. In a few cases estimates were made from the mainland shore, and such estimates are referred to as Ground Estimates.

To facilitate the nest counts at some colonies, nesting trees were temporarily marked with colored flagging tape. For colony sites that could not be visited estimates from a boat or from shore were made. The coastal marshes of the Lower Great Lakes Area and southern Lake Huron were inventoried in 1991 by volunteers and/or LPBO staff members, as described in detail in Part 4 of the Atlas.

The procedures followed in the 1989 inventory of Lake Superior are given in the Atlas Part 1. The presence of heron/egret colonies was noted and nests numbers counted or estimated, usually from the boat because of the density of the vegetation.

3.3 Survey dates and survey participants - The time for the fieldwork is short: colonies should be visited late in incubation (to ensure that most birds are on eggs) but before or very early into hatching (to prevent chick mortality). This means that most field work should be carried out in a time-span of about 2-3 weeks. Because a large area had to be covered, the fieldwork had to be carried out by many teams of field workers with each team assigned a portion of the area.

The names of the participants in the 1991 survey of the islands and peninsulas of the lower Great Lakes, eastern Georgian Bay, northern North Channel and southern Lake Huron proper are given in Appendix 1, together with the dates of field work. The names of participants of the 1991 survey of the coastal marshes of the lower Great Lakes and southern Lake Huron proper are given in Part 4. The names of the survey participants, the areas surveyed by them, and the survey dates during the 1989 inventory of Lake Superior are given in Part 1.

3.4 Instructions for field work - Before the start of the 1989 fieldwork in the upper Great Lakes, one of us (GDT) visited the cooperating OMNR offices to discuss the project with OMNR staff and contractors, to provide written and oral instructions, and to issue navigation charts, field notebooks, data sheets, logbooks, hand counters, hard hats and earplugs, as described in Parts 1 and 2 of the Atlas.

Similarly, before the 1991 survey of the Lower Great Lakes Area, the Long Point Bird Observatory (LPBO) provided the many volunteers with detailed instructions, maps, and recording forms, as detailed in Part 4 of the Atlas.

3.5 Preparation of colony lists and colony maps - As mentioned in the Introduction, we present the bird data in a format that is similar to the one used by the USFWS for waterbird inventories in USA (e.g., Erwin 1979, Speich and Wahl 1989). The key elements of the format of USFWS atlases are: listing all colony sites by 1:250,000 map sheet, giving each colony site a unique identification number, plotting all colony sites on a 1:250,000 map (to provide overviews of colony distribution),

and plotting colony sites on 1:24,000 USGS maps (to provide detailed colony locations).

The Canadian Great Lakes are covered by 1:250,000 Topographical Maps as follows: Lake Superior is covered by Maps 52A, 42D, 42C, 41N, and 41K (see App.2); Lake Huron is covered by Maps 41K, 41J, 41I, 41G, 41H, 41A, 31D, 40O, and 40P (see App. 3); and the Lower Great Lakes Area (including Lake St. Clair and the upper St. Lawrence River) is covered by Maps 40J, 40G, 40I, 30L, 30M, 30N, 31C, 31B, and 31G (see App. 4).

The unique identification numbers for the individual colony sites consist of a prefix (which is the number of the 1:250,000 topographical map that covers the area where the colony site is located) and a 3-digit number. For example, the north island of the Cloud Islands is covered by the 1:250,000 Map 52A (see App.2) and its identification number is 52A001 (see App. 6).

We list the 1989 data for Lake Superior, the 1989 and 1991 data for Lake Huron, and the 1990 and 1991 data for the lower Great Lakes area, in the Appendices 6,7, and 8, respectively. The colony sites are listed in these Appendices by 1:250,000 Topographic Maps.

In Appendices 6-8 we also present the results of the lakes-wide survey carried out during 1976-1980. Further details on the organization of Appendices 6-8 are provided in App. 5.

4. RESULTS and DISCUSSION

The survey findings are presented by species and we follow the AOU checklist for the taxonomic order and scientific names of species (AOU 1983, 1995).

4.1 Great Blue Heron

Lake Superior -- Lake Superior (except for the Pukaskwa National Park coast) was not covered in 1991, so we present in Table 1 the findings of the 1989 survey (although the 1989 survey dealt primarily with gulls and cormorants, colonies of herons were also noted and counted). In 1989 a total of 29 colonies was found with a total of 207 nests. Colony sizes were relatively small, ranging from 1 to 27 nests ($\bar{x}=7.1$, $s.d.=6.4$ nests). The 1989 colony sites were well dispersed all along the coast line (Fig. 2).

The previous inventory of Canadian Lake Superior took place in 1978 (Blokpoel *et al.* 1980). Because most of the coastline was surveyed by air in 1980, a comparison of the total nest numbers in 1980 and 1989 is likely to be biased. However, the coast of Pukaskwa National Park was surveyed by boat by PNP staff in 1980, and resurveyed, also by boat, in 1989 and again in 1991. The findings of these 3 surveys for the PNP coast show that nest numbers during 1980-1991, while fluctuating widely, declined substantially (Table 2).

Lake Huron -- In total 9 colonies were reported in 1991. They held a total of 378 nests, with colony sizes ranging from 3 to 124 nests ($\bar{x}=42$, $s.d.=42.8$ nests). These 9 colonies most likely represented the bulk of the herons nesting on the lake. The 2 largest colonies (Nottawasaga Island and Chantry Island) held 229 nests or 61% of the known total. The majority of the 9 colonies were in the North Channel, but the 2 largest colonies were in the southerly portion of the lake (Fig. 3).

Table 1. Colonies of Great Blue Herons on Canadian Lake Superior in 1989.

Colony site id. no.	Name or description of colony site ^a	Nests in 1989
52A001	N I. of the Cloud Islands ^b	1
52A002	SW I. of the Cloud Islands ^b	1
52A003	SE I. of the Cloud Islands ^b	1
52A035	Buck Island	17
52A044	E I. of the Sand Islands	5
52A046	Clark Island	1
52A048	Gravel Island	1
52A053	Delaney Island	12
52A069	Hawk Island	8
42D004	Nest Island	8
42D020	Island W of Cobinosh Island	1
42D031	S tip of largest I. of Les Petits Ecrits	1
42D057	S shore of Lawson Island	8
42D072	S Island of the Sullivan Islands	1
42D111	Island E of 42D110	13
42D116	I. S of mouth of White Gravel R.	2
42D124	Westmost I. in Simons Harbour	13
42D138	W I. of the Islands W of Otter Head	5
41N004	Crane Island	12
41N010	Island E of Le Petit Mort Rocks	3
41N015	Island E of Floating Heart Bay	4
41N052	Entrance Island	8
41N057	Island N of Chalfant Island	9
41N065	NW tip of Devil's Warehouse Island	10
41N072	Island S of South Lizard Island	21
41N084	Ossifrage Island	5
41K014	middle I. of 3 Is. S of Batchawana I.	27
41K015	north I. of 3 Is. S of Batchawana I.	5
41K016	I. 0.5 km W of south I. of 3 Is. S of Batchawana I.	4
Total		207

^a-- See Atlas Part 1 (Blokpoel and Tessier 1993) for location details.

^b--A total of 3 nests for the Cloud Islands was reported. For this report we assume one nest per island.

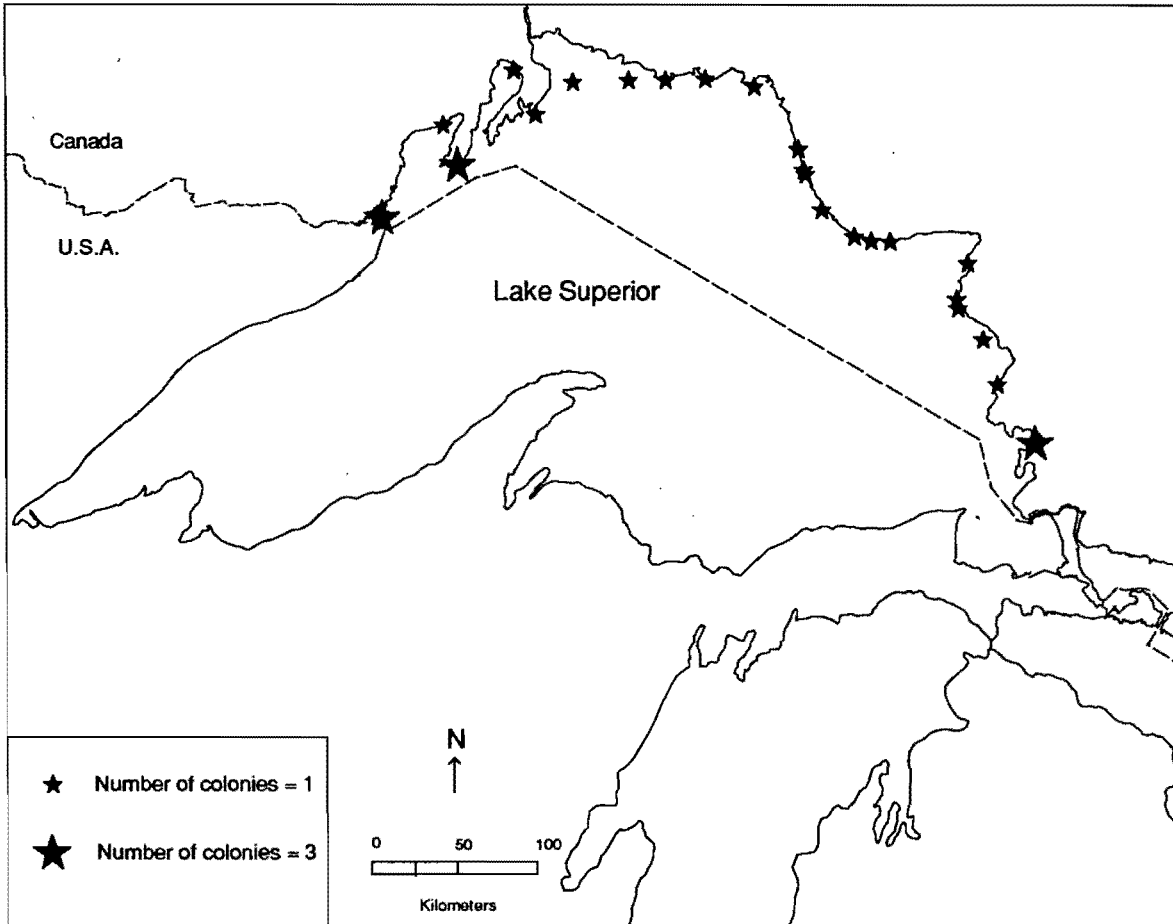


Fig. 2. Distribution of Great Blue Heron colonies in the Canadian part of Lake Superior in 1989.

Table 2. Colonies of Great Blue Herons along the coast of Pukaskwa National Park, Lake Superior, in 1991, 1989 and 1980.

Colony site identification number	Colony site name or description ^a	Number of nests		
		1991	1989	1980
42D103	I. W of 42D102	1	0	1
42D111	I. E of 42D110	28	13	32
42D116	I. S of mouth of White Gravel R.	0	2	2
42D124	W-most I. in Simons Hrbr.	13	13	24
42D138	W I. of the is. W of Otter Head	7	5	32
Total		49	33	91

^a-- See Atlas Part 1 (Blokpoel and Tessier 1993) for location details.

Table 3. Colonies of Great Blue Herons in Canadian Lake Huron that were censused both in 1980 and 1991.

Colony site identification number	Colony site name or description	Number of nests in 1980	Number of nests in 1991 ^a
41J044	Maggs Island	11	0
41J049	Bigsby Island	5	0
41J055	Middle Grant Island	30	19
41J065	Richelieu Island	28	17
41J141	Pirate Island	2	6
41J042	Cedar Island	42	6
41H003	Loon Island	77	34
41A013	Ghegheto Island	8	64
41A053	Nottawasaga Island	53	105
41A056	Chantry Island	24	124
Total		280	375

^a--In 1991 one more colony with 3 nests (41K022, App.7) was reported, but that colony is not used for the 1980-1991 comparison because 1980 data are lacking.

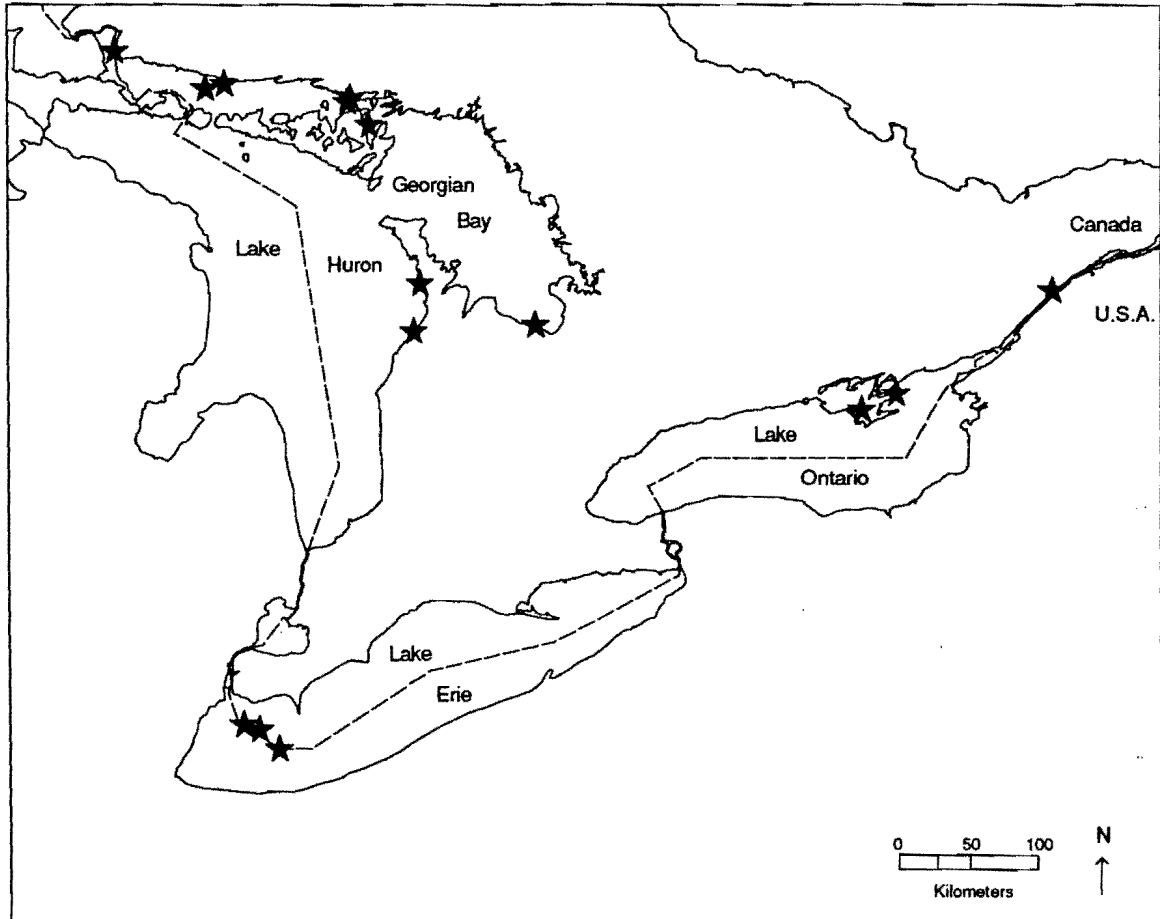


Fig. 3. Distribution of Great Blue Heron colonies in the Canadian parts of Lake Huron and the Lower Great Lakes Area in 1991.

The 1980 survey of Canadian Lake Huron included the waters surrounding Manitoulin Island and was, therefore, more extensive than the one in 1991 (see App.7). To compare the 1991 data with those for 1980, we consider only those 10 colony sites that were active in 1980 and that were visited in 1991. Of these 10 colonies (with a total of 280 nests) present in 1980, 8 were still active in 1991 (with a total of 375 nests) and 2 had been abandoned (Table 3). Of the 8 colonies still active in 1991, 4 had declined and 4 had increased in size, but overall the increases were much larger than the declines. Although these numbers suggest that the Great Blue Heron population is increasing on these sites, any counting errors at the 2 largest colonies in 1980 and/or 1991 could create serious bias in the data. Although the 1991 data are incomplete for Lake Huron as a whole, the available information strongly suggests an increase in the breeding population on the lake.

Lower Great Lakes Area -- A total of 6 colonies with a total of 513 nests was reported in 1991 (Table 4). Colony size ranged from 3 to 248 nests (\bar{x} =85.5, s.d.=84.2 nests). The 6 colony sites are plotted in Fig. 3. The colony on East Sister Island with 248 nests was by far the largest of all the colonies in the Canadian Great Lakes.

The previous survey of Canadian Lake Erie was in 1977, with some additional information being available for 1978 (App. 5). At the 3 main islands in the Canadian portion of Lake Erie's western basin (i.e. Middle, East Sister and Middle Sister) there were some 76 nests in 1977-78, and those numbers had increased almost 5-fold to 368 by 1991. There are no data for comparison in the rest of the lower Great Lakes.

Additional Comments -- The Great Blue Heron is a common species with a large breeding range in Ontario, from the lower Great Lakes north to well into the Boreal Forest. Colonies are especially common "... along the southern edge of the Canadian Shield, where productive wetlands and isolated wooded areas are particularly abundant" (Dunn, 1987). Ontario heronries were censused in 1978-1981 (Dunn *et al.* 1985) and again in 1990-91 (Graham *et al.* 1996). During the period 1976-1991, a 55% increase in the number of heron pairs was observed within the 2 census areas (one in southern and one in eastern Ontario). This increase in Ontario is in line with trends observed

Table 4. Colonies of Great Blue Herons in the Canadian lower Great Lakes area in 1991.

Colony site identification number	Colony site name or description	Number of nests in 1991
40G001	Middle Sister Island	30
40G003	East Sister Island	248
40G006	Middle Island	90
30N006	Beaver Meadow, East Lake	17
31C017	Cressy Marsh	3
31C027	2 km N of Johnstown	125
Total		513

across North America (Graham *et al.* 1996). The results for the lower Great Lakes and Lake Huron are in general agreement with the findings of the Ontario heronry inventories, in that nest numbers increased between 1977-80 and 1989-91. The substantial decline in nest numbers during 1978-1991 for the 5 colonies along the coast of Pukaskwa National Park on Lake Superior may be due to the small sample size or it could be a real decline, possibly related to the harsh conditions in that area.

Average colony size decreased with increasing latitude from 85.5 nests in the lower Great Lakes, to 42 nests in Lake Huron, to 7.1 nests in Lake Superior. A similar trend was noted during 1981-1985, when the field work for the Atlas of the Breeding Birds of Ontario was carried out (Dunn 1987).

4.2 Great Egret

Lake Superior -- There was no nesting by Great Egrets in 1989. During the 1978 survey of Canadian Lake Superior, Great Egrets were not reported either and we are not aware of reports that the species has ever bred on the Canadian portion of Lake Superior.

Lake Huron -- There were 2 colonies in Canadian Lake Huron: one on Nottawasaga Island in southern Georgian Bay with 7 nests, and the other on Chantry Island in Lake Huron proper with 6 nests (Table 5, Fig. 4). The Nottawasaga and Chantry colonies became established after 1980 because the survey of Lake Huron in that year did not report Great Egrets. At Nottawasaga Island nesting occurred during 1981-85 (Peck 1987) and at Chantry Island nesting was first confirmed in 1990 (Austen *et al.* 1994).

Lower Great Lakes Area -- There were 2 colonies in the western basin of Canadian Lake Erie: one colony on East Sister Island with 141 nests and the other on Middle Island with 2 nests (Table 5, Fig. 4). After the species had nearly been driven to extinction in the early 1900s, the first indication of possible nesting in Ontario was a sight record for East Sister Island in 1953 (Austen *et al.*). Although Great Egrets probably nested there by 1957, confirmed nesting was first established in 1975 (Austen *et al.* 1994).

Table 5. Colonies of Great Egrets in the Canadian Great Lakes in 1991.

Colony site identification number	Colony site name or description	Number of nests in 1991
41A053	Nottawasaga Island	7
41A056	Chantry Island	6
40G003	East Sister Island	141
30G006	Middle Island	2
Total		156

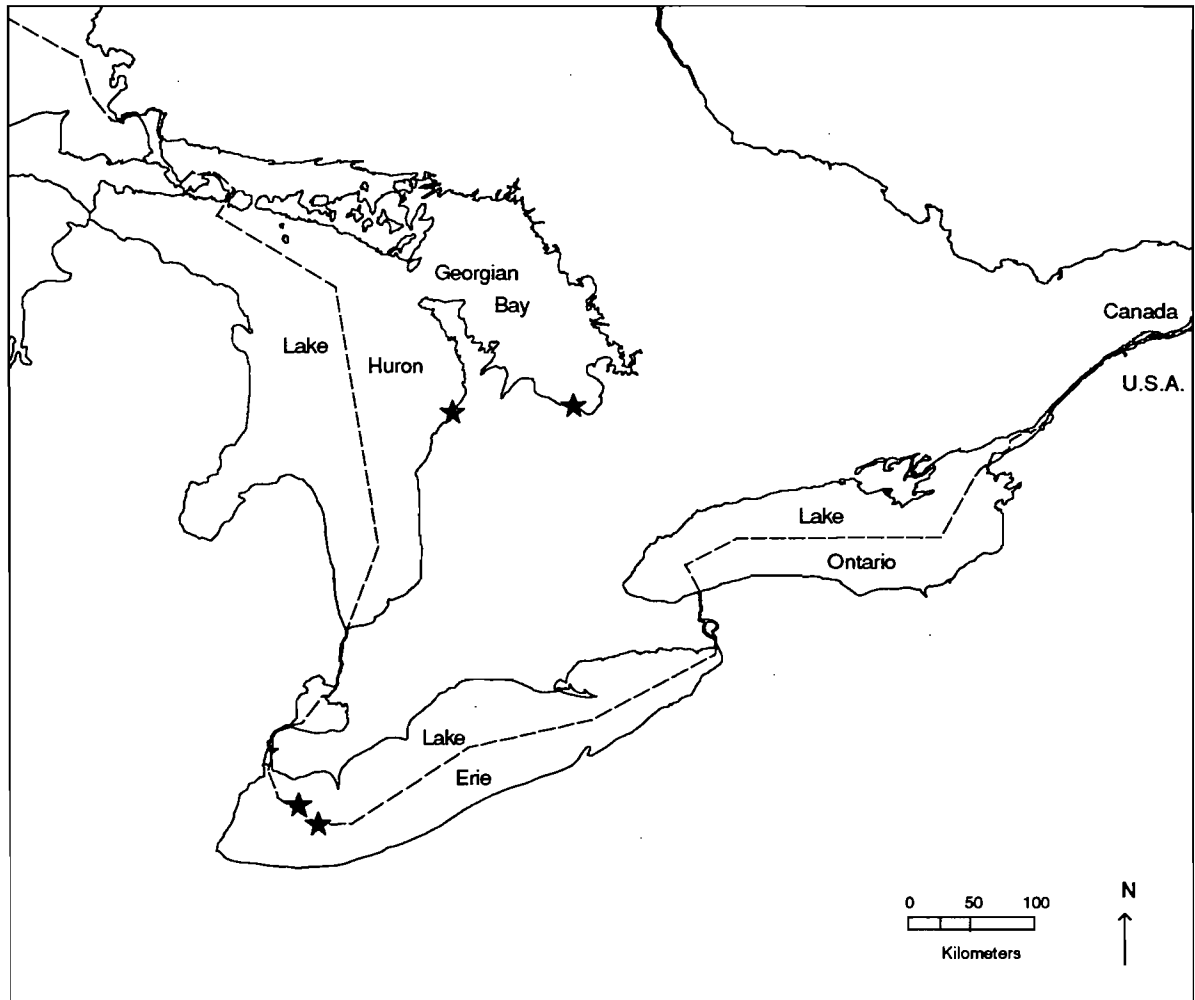


Fig. 4. Distribution of Great Egret colonies in the Canadian parts of Lake Huron and the Lower Great Lakes Area in 1991.

During the previous survey of Canadian Lake Erie in 1978, Great Egrets were found nesting at East Sister Island (10 nests, App. 8), as well as at Middle Sister Island (3 nests, App. 8). During 1981-85, breeding occurred on both islands (Peck 1987), but by 1991 the smaller colony on Middle Sister Island colony had ceased to exist, whereas the larger one on East Sister Island had grown enormously to 141 nests by 1991.

Additional comments -- In addition to the above nesting sites, the Ontario Breeding Bird Atlas reported confirmed breeding during 1981-85 at two sites in the Walpole Island marshes of Lake St. Clair and one nest at Luther Lake (some 70 km south of Nottawasaga Island, Peck 1987). During the 1991 survey of the accessible portions of the Walpole Marshes, no nesting by Great Egrets could be confirmed, but 5 Great Egret nests were found in a Great Blue Heron colony in the Public Bush, Walpole Island (outside the study area) and the presence of 75 adults observed feeding in the local marshes suggests that more egrets may have nested in the Walpole Island area (Austen and Cadman 1991).

The nesting distribution and abundance appear to be increasing in Ontario in recent years (Austen *et al.* 1994). Since 1994, Great Egrets have also established a colony in Quebec, where they have nested annually on Dickerson Island, in the St. Lawrence River, near the junction of the Quebec, Ontario and New York State borders. This site is the northernmost nesting locality of Great Egrets in eastern North America (David 1996).

The Great Egret has been proposed as "rare" in Ontario (Austen *et al.* 1994), but it is not considered a species at risk (OMNR 1997).

4.3 Black-crowned Night-Heron

Lake Superior -- There were no reports of nesting by this species in Lake Superior in 1989 and 1991. During the earlier survey of Canadian Lake Superior in 1980, no nests of night-herons were found either. This is in agreement with the Breeding Birds Atlas of Ontario (Goodwin 1987), which reports nesting as far north as Manitoulin Island in northern Lake Huron, but not on Lake Superior.

Lake Huron -- There were 6 colonies with a total of 257 nests reported in 1991. Colony sizes ranged from 3 to 107 nests ($\bar{x}=42.8$, $s.d.=43.2$ nests, $N=6$, Table 6). The 6 colonies reported in 1991 were dispersed over the more southerly portions of the lake (Fig. 5). Taking into account that the waters surrounding Manitoulin Island were not surveyed in 1991, the nesting distribution shown in Fig. 5 is in very good agreement with the findings of the Breeding Bird Atlas of Ontario (Goodwin 1987).

In Table 6 we also present the nest numbers reported in 1989 and 1980. The totals for those 6 colony sites for which data are available in 1991, 1989, and 1980 varied substantially, with an overall decline in nest numbers from 325 in 1980 to 243 in 1991. (As Table 6 shows, there were 3 more night-heron colonies with a total of 4 nests found on Lake Huron in 1980. At 2 of these 3 colony sites no night-herons were reported in 1989 and no data are available for the third colony site).

Lower Great Lakes Area -- There were 17 colonies present in this area in 1991 with a total of 1,671 nests. Colony sizes ranged from 2 to 667 nests ($\bar{x}=98.3$, $s.d.=155$, Table 7). The colonies were widely distributed over the entire area (Fig. 5).

The available data for 1976/77 are also presented in Table 7. The 1976/77 and 1991 data are not comparable because the 1976 inventory did not include herons/egrets and some sites could not be reached in either 1976/77 or 1991. Nevertheless, a few obvious changes are worthy of comments.

We do not know why the large colony on Pelee Island ceased to exist by 1991. On the other hand, we do know that the large colonies at Tommy Thompson Park along the Toronto Waterfront are the result of colonization from nearby Muggs Island when large-scale control operations resulted in the eradication of a local Ring-billed Gull colony (Blokpoel and Tessier 1992 and unpubl. data). The lack of readily available gull eggs and chicks as food for the night-herons and their chicks at Muggs Island, coupled with the availability of good nesting trees and large numbers of gull eggs and chicks at Tommy Thompson Park, may have caused, or contributed to, the shift from Muggs Island to Tommy Thompson Park.

During the last several years the nesting population of Double-crested Cormorants in the Canadian Great Lakes has increased enormously (Weseloh *et al.* 1995), especially in the lower Great Lakes where treed natural islands are relatively scarce. This has led to severe competition between night-herons and cormorants for nest sites in trees. In all known cases, the larger cormorants have

Table 6. Colonies of Black-crowned Night-Herons on Canadian Lake Huron in 1991, 1989 and 1980.

Colony site identification number	Name or description of colony site	Number of nests in 1991	Number of nests in 1989	Number of nests in 1980
41A022	Warren Island	19	30	56
41A024	Island N of Argyle Island	14	2	0
41A043	1st island SE of Gray Island	3	6	0
41A053	Nottawasaga Island	107	107	172
41A056	Chantry Island	100	56	97
41A062	Island 0.3 km S of Birch I.	14	---	---
41G033	Three is. W of Walker Point	---	0	1
41H040	Papoose Island	0	3	0
41H137	James Island	---	0	2
41H140	Snake Island	---	---	1
Total^a		243	204	325

^aTotals for the 6 colonies with information available in each of the 3 years.

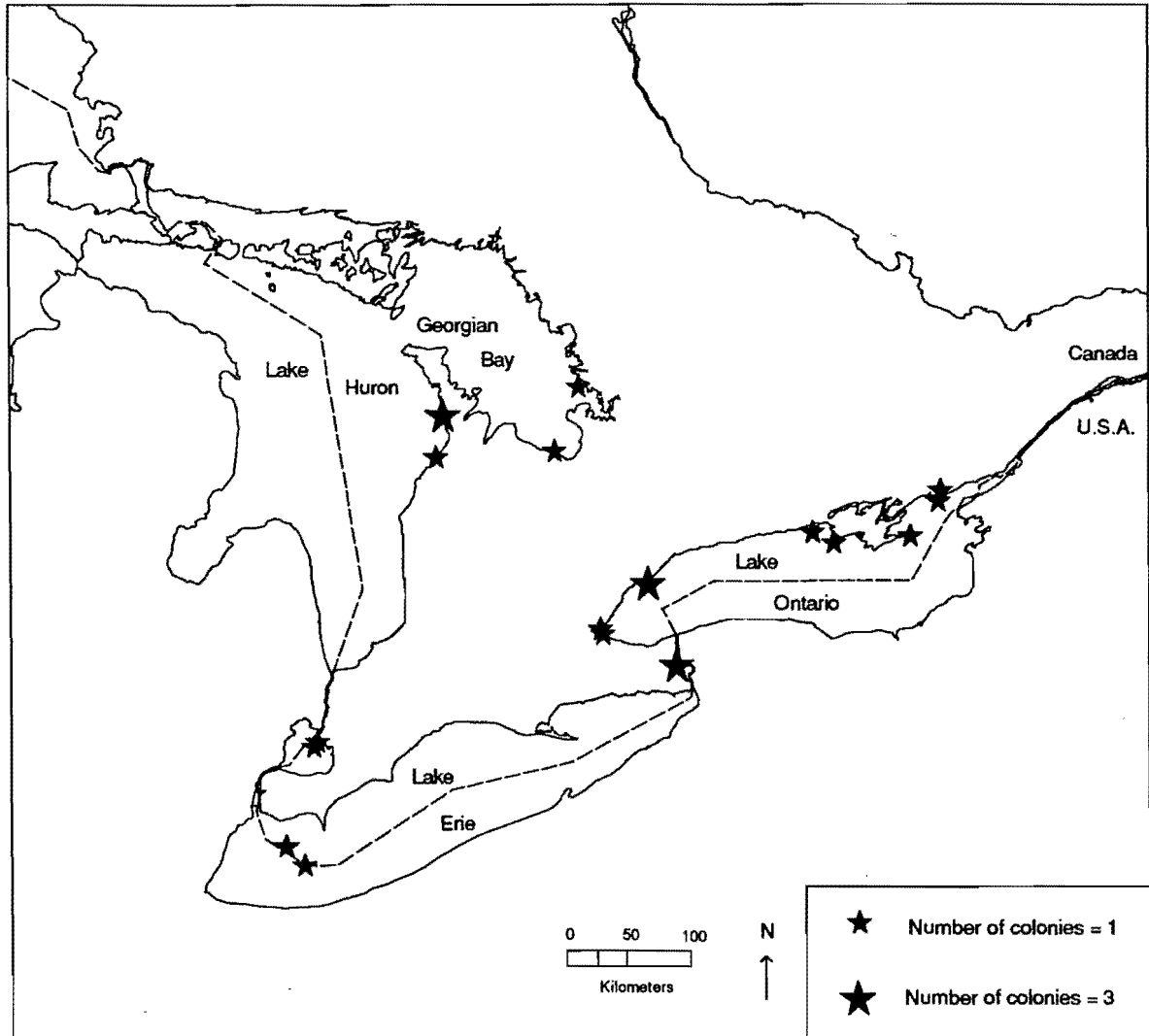


Fig. 5. Distribution of Black-crowned Night-Heron colonies in the Canadian parts of Lake Huron and the Lower Great Lakes Area in 1991. For two colonies in Lake Ontario 1990 data are used (see Table 7).

Table 7. Colonies of Black-crowned Night-Herons in the Canadian lower Great Lakes area in 1991/1990 and/or 1977/76.

Colony site identificaton number	Name or description of colony site	Number of nests in 1991 ^a	Number of nests in 1976/77 ^a
40J006	Squirrel Island	10	---
40J008	Bassett Island	88	---
40G003	East Sister Island	106	350+
40G006	Middle Island	45	---
40G007	N end of Pelee Island	0 ^b	870
30M002	Unnamed I. #1 (closest to shore)	200	65T ^c
30M003	Unnamed I. #2 (2nd closest to shore)	13	---
30M026	Unnamed I. #3 (farthest from shore)	213	---
30M008	Eastport	60	5T ^d
30M010	Farr Island, Hamilton Harb.	14	---
30M012	Muggs Island	0 ^b	56
30M013	Peninsula A, T.Thompson Park	14	0
30M014	Peninsula B, T.Thompson Park	111	0
30M015	Peninsula C, T.Thompson Park	667	0
30N001	High Bluff Island	37	79 ^e
30N002	Gull Island	0	27 ^d
30N003	Scotch Bonnet Island	27 ^b	0
30N004	False Duck Islands	48 ^b	---
31C001	Pigeon Island	0	65 ^f
31C004	Snake Island	16	0
31C024	Little Cataraqui River Marsh	2	---

^a-Data sources are given in Appendix 5

^b-Data are for 1990

^c-T= total for bracketed colonies

^d-Data are for 1975

^e-Data are for 1978

^f-Data are for 1976

outcompeted the night-herons. Cormorants are large, heavy, web-footed birds that are fairly ungainly when moving about in trees. They like to nest in the top layer of the canopy, which allows for easier take-offs and landings. Night-herons, on the other hand, have long toes and are relatively adept at moving along branches and getting in and out of foliage. They prefer to nest in more concealed areas in the interior of canopies. Because of these different nest site preferences, cormorants are normally nesting above night-herons in trees that they share. This way the night-herons are exposed to a rain of copious, acidic defecations from the cormorants, which kills the foliage and may irritate the night-herons. In any case, sooner or later the night-herons give up their nest sites and move elsewhere. This has been the case at Pigeon Island and Gull Island (Table 7), has happened during 1991-97 at the Eastport colony (Pekarik *et al.* 1997) and is happening at Peninsulas A and B of Tommy Thompson Park (Jarvie *et al.* in press).

Additional comments -- During 1981-85, the years of field work for the Ontario Breeding Bird Atlas, most of the confirmed nesting was reported for the shorelines of the Great Lakes, with colonies as far north as Manitoulin Island. Many additional, but unconfirmed, breeding records were reported for inland locations in southwestern and southeastern Ontario (Goodwin 1987). Those findings are in good general agreement with the results reported here.

The night-herons that established colonies in Hamilton Harbour and Tommy Thompson Park have shown remarkable adaptation by nesting in highly disturbed, but apparently otherwise suitable, habitats in noisy, semi-urban areas. Although the available data do not allow a proper evaluation of population trends, it is clear that, at least in the Great Lakes, night-herons will continue to suffer from nest site competition with cormorants.

The Black-crowned Night-Heron is not on the Canadian Endangered Species List (WWF 1993), nor is it considered a species-at-risk in Ontario (OMNR 1997). It has recently been recommended for the status of "rare" in Ontario, because it has a small population, nests in relatively few locations, and is at the edge of its North American breeding range (Austen *et al.* 1994).

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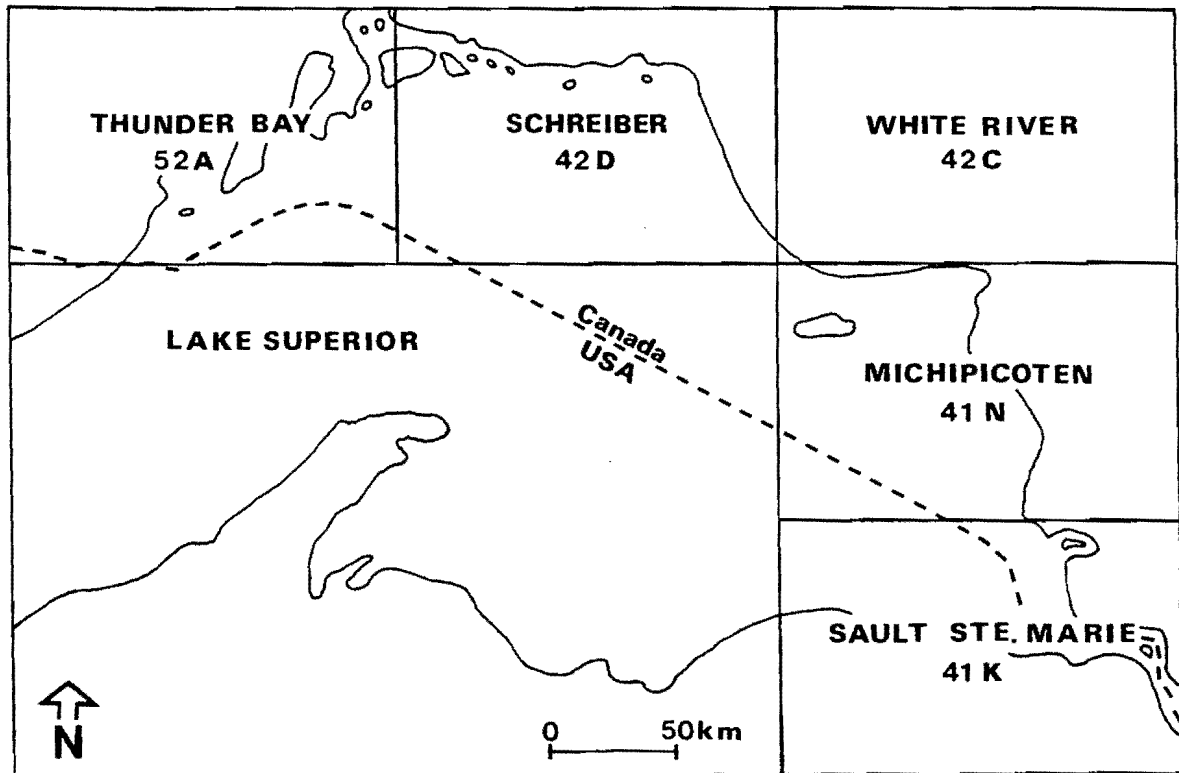
7. APPENDICES

Appendix 1. Names of participants of the 1991 survey

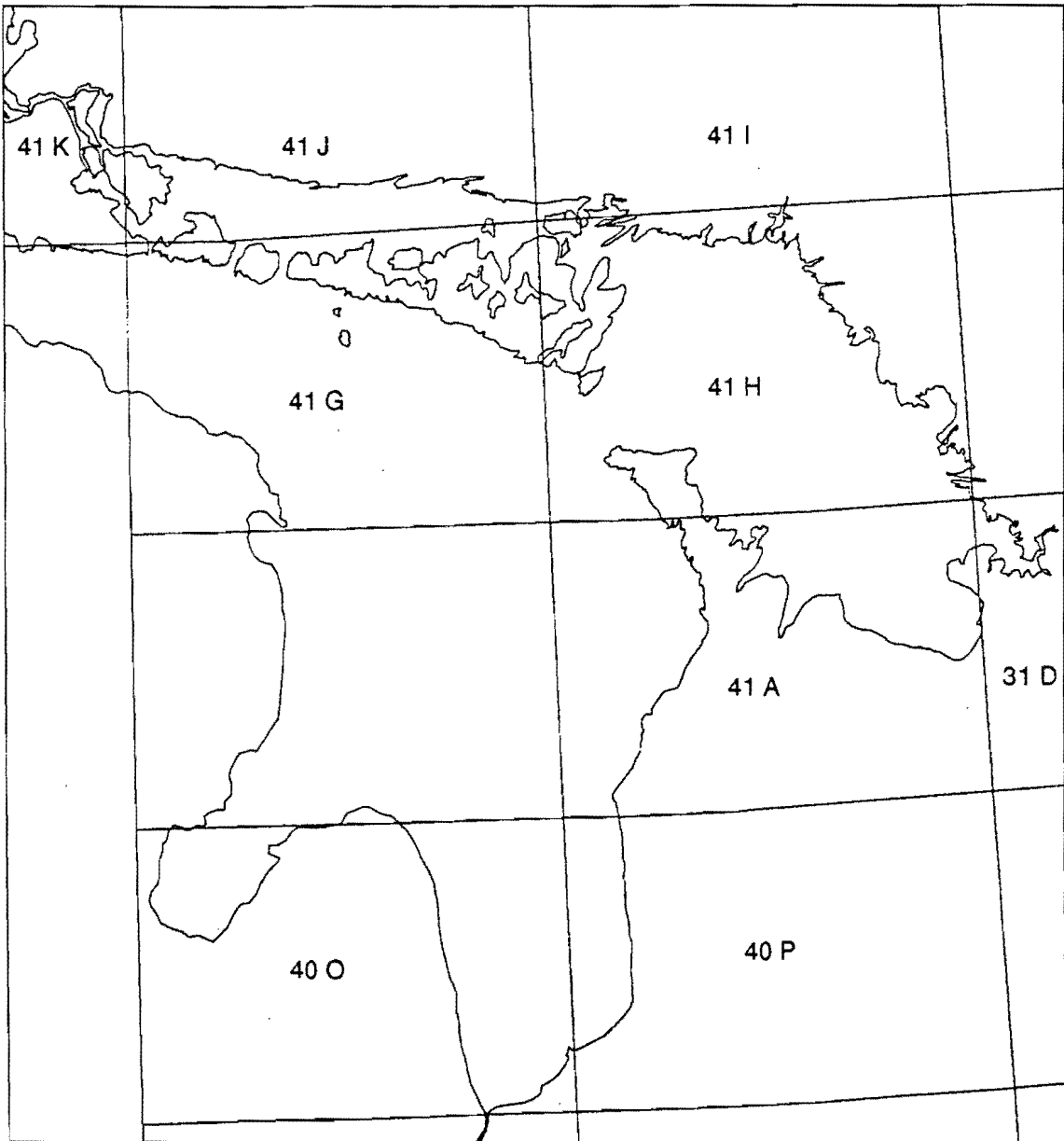
Area surveyed	Name of survey participant	Affiliation ^a	Dates of field work in 1991
Pukaskwa National Park shoreline	G. Fenton A. Moreland	PNP	28-29 May
marshes and near-shore islands of eastern and southern Georgian Bay	H. Blokpoel G.D. Tessier D. Wesley J. Sullivan	CWS	2-9 June
marshes and islands of the northern portion of the North Channel	M. Hortiguela S. Turner	CWS contractor	4-14 June
islands west of Bruce Peninsula	H. Blokpoel J. Sullivan	CWS	27-29 May
islands in eastern Lake Erie and the Niagara River	D.V. Weseloh	CWS	26 April- 18 June
marshes of Lake St. Clair, the lower Great Lakes and the upper St. Lawrence River	M. Austen M. Cadman LPBO volunteers ^b	LPBO	27 May-15 July
islands in Lake Ontario and the upper St. Lawrence River	G.D. Tessier W. Lee	CWS	30 May-1 June
Tommy Thompson Park	S. Jarvie	MTRCA	30 May

^a--PNP--Pukaskwa National Park, CWS--Canadian Wildlife Service, MTRCA--Metropolitan Toronto and Region Conservation Authority

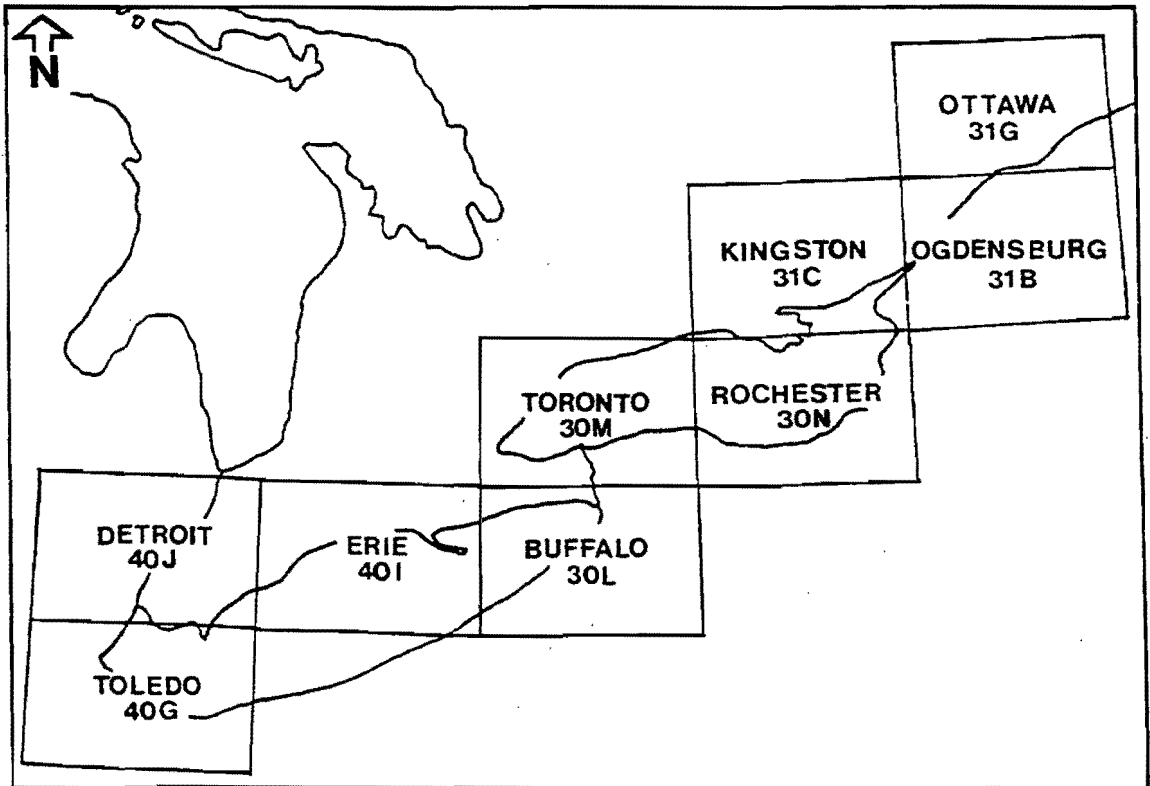
^b--Names are given in the Acknowledgments of Part 4 of the Atlas (Austen *et al.* 1996)

Appendix 2. Coverage of Canadian Lake Superior by 1:250,000 Topographical Maps.

Appendix 3. Coverage of Canadian Lake Huron by 1:250,000 Topographical Maps.



Appendix 4. Coverage of the Canadian Lower Great Lakes Area by 1:250,000 Topographical Maps.



Appendix 5. Explanation of the listing of the colony sites in Appendices 6-8.

The results of the 1991 survey are presented in Appendices 6-8 by 1:250,000 Topographical Maps. Coverage of the Canadian Great Lakes by the 1:250,000 Maps is shown in Appendices 2-4.

Appendices 6-8 run across opposite pages. On the left hand page we present information on the colony sites and on the right hand page we report the inventory results for the corresponding colony sites. To help the reader, the colony site identification numbers are given in the leftmost column of both the left hand and right hand page. At several of the colony sites cormorants, gulls and/or terns were also nesting. Because these species were dealt with in earlier Atlas Reports, the colony sites were assigned their identification numbers in those earlier reports. To all colony sites not mentioned in any of the those earlier reports, we assigned new, hitherto unused, identification numbers in this report.

Regarding the naming of colony sites, we have used Navigation Charts as the basis for island names and for describing unnamed islands, islets and rocks. Where the 1:50,000 Topographical Maps show a different name, we have added this information in brackets.

We use the following abbreviations for bird species: GTBH--Great Blue Heron, GREG--Great Egret, and BCNH--Black-crowned Night-Heron. The methods used for the 1991 survey (and for the 1989 survey of Lake Superior) and for earlier inventories are shown on the right hand page and we use the following abbreviations: GC-- Ground Count, GE--Ground Estimate, and BE--Boat Estimate.

In Appendices 6-8 we also present the results of the earlier (i.e. during 1976-1980) inventories (1) to facilitate comparisons between the two surveys, and/or (2) to provide the colony sites of the previous surveys with the same type of identification numbers as the ones used during the 1991 survey. The original numbers used to identify the 1980 Lake Huron colony sites in Weseloh *et al.* (1986) are here given in App.7 in the rightmost column of the right hand page.

In Appendices 6-8 we sometimes use names for 1976-1980 colony sites that are different from the ones we used in 1991 (and 1989 in the case of Lake Superior). For example, the three Cloud Islands (52A001-52A003, App. 6) were originally given one name (i.e. the Cloud Islands), but they have been separated here into three individual islands.

In some cases, a small cluster of islets was considered as one colony site in the previous and/or present survey. In those cases we use a T (for total) and a bracket to indicate the total number of nests and of colony sites involved (again, see the Cloud Islands).

Appendix 6. Colonies of Great Blue Herons in Canadian Lake Superior in 1989 and 1978.

Colony Site Identification Number	Name or Description of Colony Site ^a	Latitude	Longitude	Survey Method 1989 ^b	Survey Method 1978 ^b
52A001	N I. of Cloud Is.	48°03'30"	89°24'48"	GC	AE
52A002	SW I. of Cloud Is.	48°03'12"	89°24'54"	GC	AE
52A003	SE I. of Cloud Is.	48°03'18"	89°24'36"	GC	AE
52A016	E Sister Is. (= Windago I.)	48°09'30"	89°14'54"	GC	AE
52A017	W Sister Is. (= White I.)	48°09'36"	89°14'36"	GC	AE
52A018	Dog I. (=Singleton I.)	48°11'54"	89°15'30"	BE	AE
52A019	Flatland I.	48°13'06"	89°14'06"	BE	AE
52A035	Buck I.	48°31'18"	88°54'30"	GC	AE
52A036	islet E of Buck I.	48°31'24"	88°54'24"	GC	AE
52A044	E I. of Sand Is.	48°20'18"	88°45'48"	GC	AE
52A046	Clark I.	48°20'30"	88°43'24"	GC	AE
52A048	Gravel I.	48°21'12"	88°42'30"	GC	AE
52A049	Cranberry I.	48°21'54"	88°41'54"	GC	AE
52A050	Nuttall I.	48°39'36"	88°31'36"	BE	AE
52A053	Delaney I.	48°48'18"	88°22'36"	BE	AE
52A059	Tunnel I.	48°27'24"	88°27'36"	BE	AE
52A066	Mood I.	48°31'18"	88°25'36"	GC	AE
52A069	Hawk I.	48°34'30"	88°12'42"	BE	AE
52A071	Cedar I.	48°37'36"	88°06'12"	GC	AE
52A074	Tremblay I.	48°38'30"	88°04'12"	GC	AE
52A075	rk. off Fluor I.	48°40'54"	88°06'06"	BE	AE
42D004	Nest I.	48°44'30"	87°55'42"	GC	AE
42D012	1st i. near Beetle Pt.	48°44'24"	87°39'18"	BE	AE
42D013	2nd i. near Beetle Pt.	48°44'24"	87°39'12"	BE	AE
42D020	I. W of Cobinosh I.	48°45'06"	87°30'06"	GC	AE
42D022	W I. of the Cat Is.	48°49'06"	87°26'06"	BE	AE
42D023	E I. of the Cat Is.	48°48'48"	87°25'36"	BE	AE

^a- See Part 1 of the Atlas (Blokpoel and Tessier 1993) for detailed locations of colony sites^b- GC-Ground Count, BE-Boat Estimate, AE-Aerial Estimate

Appendix 6 (cont'd)

Colony Site Identification Number	1989	1978	Former Colony Site Number ^c
	# nests	# nests	
52A001	3 T	0	1
52A002	-	0	1
52A003	-	0	1
52A016	0	20 T	8
52A017	0	-	8
52A018	0	3	9
52A019	0	2	10
52A035	17	14 T	20
52A036	0	-	20
52A044	5	0	26
52A046	1	2	28
52A048	1	0	29
52A049	0	1	30
52A050	0	22	31
52A053	12	8	33
52A059	0	8	36
52A066	0	18	41
52A069	8	16	43
52A071	0	1	44
52A074	0	5	45
52A075	0	1	46
42D004	8	8	49
42D012	0	8 T	53
42D013	0	-	53
42D020	1	0	-
42D022	0	8 T	57
42D023	0	-	57

^c --Numbers used in Blokpoel et al. 1980

Appendix 6 (cont'd).

Colony Site Identification Number	Name or Description of Colony Site ^a	Latitude	Longitude	Survey Method 1989 ^b	Survey Method 1978 ^b
42D031	S tip of the largest of Les Petits Écrits	48°44'54"	87°13'00"	GC	AE
42D057	S shore of Lawson I.	48°45'24"	86°54'48"	GC	AE
42D064	N I. of the Barclay Is.	48°46'18"	86°41'30"	GC	AE
42D065	centre I. of the Barclay Is.	48°46'18"	86°41'36"	GC	AE
42D066	S I. of the Barclay Is.	48°46'12"	86°41'36"	GC	AE
42D071	N I. of the Sullivan Is.	48°43'12"	86°32'36"	GC	AE
42D072	S I. of the Sullivan Is.	48°42'54"	86°32'30"	GC	AE
42D078	i. WNW of Monmouth I. (=Good Hope I.)	48°45'48"	86°26'18"	BE	AE
42D103	i. W of 42D102	48°27'24"	86°14'24"	GC	GC
42D111	i. E of 42D110	48°23'48"	86°12'18"	GC	GC
42D116	i. S of mouth of White Gravel R.	48°17'24"	86°09'48"	BE	GC
42D124	W-most I. in Simons Hrbr.	48°15'54"	86°09'12"	GC	GC
42D138	W. I. of Is. W of Otter Head I.	48°04'54"	86°01'54"	GE	GC
41N004	Crane I.	47°56'36"	85°47'06"	GC	AE
41N006	Michipicoten I.	47°45'00"	85°46'42"	---	AE
41N008	Hope I.	47°41'48"	85°47'24"	---	AE
41N010	i. E of Le Petit Mort Rks.	47°55'18"	85°39'36"	GC	AE
41N015	i. E of Floating Heart Bay	47°55'06"	85°31'18"	GC	AE
41N052	Entrance I.	47°48'18"	84°56'12"	GC	AE
41N057	i. N of Chalfant I.	47°37'06"	85°01'12"	GC	GE
41N065	NW tip of Devil's Warehouse I.	47°34'12"	85°00'24"	GC	AE
41N072	i. S of South Lizard I.	47°23'18"	84°49'18"	GC	AE
41N074	i. NW of main Agawa I.	47°21'42"	82°42'06"	GC	GC
41N075	1st i. SW of main Agawa I.	47°21'12"	84°42'00"	GC	GC
41N076	2nd i. SW of main Agawa I.	47°21'12"	84°41'54"	GC	GC
41N077	3rd i. SW of main Agawa I.	47°21'12"	84°41'48"	GC	GC

^a- See Part 1 of the Atlas (Blokpoel and Tessier 1993) for detailed locations of colony sites^b- GC-Ground Count, BE-Boat Estimate, AE-Aerial Estimate

Appendix 6 (cont'd)

Colony Site Identificaton Number	1989	1978	Former Colony Site Number
	# nests	# nests	
42D031	1	0	59
42D057	8	0	66
42D064	0	7 T	69
42D065	0	-	69
42D066	0	-	69
42D071	0	1	71
42D072	1	0	71
42D078	0	1	74
42D103	0	1	91
42D111	13	32	96
42D116	2	2	101
42D124	13	24	104
42D138	5	32	113
41N004	12	4	125
41N006	-	8	126
41N008	-	5	128
41N010	3	0	130
41N015	4	0	-
41N052	8	14	136
41N057	9	9	138
41N065	10	11	142
41N072	21	14	145
41N074	0	2 T	147
41N075	0	-	147
41N076	0	-	147
41N077	0	-	147

° --Numbers used in Blokpoel et al. 1980

Appendix 6 (cont'd)

Colony Site Identification Number	Name or Description of Colony Site ^a	Latitude	Longitude	Survey Method 1989 ^b	Survey Method 1978 ^b
41N078	l. SE of main Agawa Rock	47°21'24"	84°41'30"	GC	GC
41N079	l. E of 41N078	47°21'30"	84°41'24"	GC	GC
41N080	l. W of Agawa Pt.	47°21'36"	84°41'12"	GC	GC
41N084	Ossifrage I.	47°10'30"	84°42'54"	GC	AP
41K013	S l. of chain of 3 is. S of Batchawana I.	46°52'10"	84°26'30"	BE	GC
41K014	middle l. of chain of 3 is. S of Batchawana I.	46°52'15"	84°26'30"	BE	GC
41K015	N l. of chain of 3 is. S of Batchawana I.	46°52'19"	84°26'30"	GC	GC
41K016	l. 0.5 km W of 41K013	46°52'12"	84°26'54"	BE	GC

^a- See Part 1 of the Atlas (Blokpoel and Tessier 1993) for detailed locations of colony sites

^b- GC-Ground Count, BE-Boat Estimate, AE-Aerial Estimate

Appendix 6 (cont'd)

Colony Site Identification Number	1989	1978	Former Colony Site Number ^c
	# nests	# nests	
41N078	0	↑ -	147
41N079	0	-	147
41N080	0	└ -	147
41N084	5	0	149
41K013	0	6+	165
41K014	27	10+	165
41K015	5	0	165
41K016	4	0	16

^c -Numbers used in Blokpoel et al. 1980

Appendix 7. Colonies of herons and egrets on Canadian Lake Huron in 1991 and 1980

Colony Site Identification Number	Name or description of colony site	Latitude	Longitude	Survey Method ^a	
				1991	1980
41K022	1st i. S of Pumpkin Pt.	46°23'12"	84°07'48"	BE	GC
41J044	Maggs I.	46°08'54"	83°36'48"	BE	GC
41J049	Bigsby I.	46°10'18"	83°25'48"	GC	GC
41J055	Middle Grant I.	46°08'12"	83°19'24"	GC	GC
41J065	Richelleu I.	46°09'54"	83°09'30"	BE	GC
41J141	Pirate I.	46°03'54"	83°54'30"	BE	GC
41J142	Cedar I.	46°14'42"	83°43'30"	BE	GC
41J143	Janden I.	46°04'30"	83°53'48"	---	GC
41G005	Batture I.	45°58'18"	83°04'12"	---	GC
41G009	S end of Inner Duck I. (=Thibault I.)	45°45'30"	82°55'48"	---	GC
41G033	Three is. W of Walker Pt.	45°33'18"	82°05'06"	---	GC
41G037	Boom Pt., Cockburn I.	45°51'12"	83°21'00"	---	GC
41G038	Kitchener I.	45°54'12"	83°30'06"	---	GC
41G039	Maiden I.	45°34'24"	82°06'06"	---	GC
41H003	i. N of Ten Mile Pt. (=Loon I.)	45°53'30"	81°49'48"	BE	GC
41H040	Papoose I.	45°51'30"	81°21'24"	---	GC
41H136	Perseverance I.	45°28'00"	81°50'36"	---	GC
41H137	James I.	45°26'06"	81°44'24"	---	GC
41H140	Snake I. and NW shoal	45°20'18"	81°37'30"	---	GC
41H280	Green I.	45°54'36"	81°19'24"	---	GC
41H281	Birnie I.	45°26'06"	80°28'06"	---	GC
41A013	Ghegheto I.	44°49'06"	81°20'42"	BE	GC
41A022	Warren I.	44°47'12"	81°20'12"	GC	GC
41A024	i. N of the Argyle Is.	44°46'54"	81°19'30"	GC	GC
41A034	Barrier I.	44°58'36"	81°04'42"	---	GC
41A043	1st i. SE of Gray I.	44°58'42"	81°01'06"	GC	GC
41A053	Nottawasaga I.	44°32'12"	80°15'36"	GC	GC
41A056	Chantry I.	44°29'36"	81°24'12"	GC	GC
41A061	i. S of Lyall I.	44°56'12"	81°24'30"	---	GC
41A062	i. 0.3 km S of Birch I.	45°47'15"	81°16'40"	GC	---

^a -GC-Ground Count, BE-Boat Estimate

Appendix 7 (cont'd)

Colony Site Identification Number	1991 Results			1980 Results			Colony Site Number in 1980 ^c
	GTBH	GREG	BCNH	GTBH	GREG	BCNH	
41K022	3	0	0	0	0	0	K8E003
41J044	0	0	0	11	0	0	J4005
41J049	0	0	0	5	0	0	J3021
41J055	19	0	0	30	0	0	J3015
41J065	17	0	0	28	0	0	J3006
41J141	6	0	0	2	0	0	J4015
41J142	6	0	0	42	0	0	J4010
41J143	0 ^b	0 ^b	0 ^b	6	0	0	J4014
41G005	0 ^b	0 ^b	0 ^b	5	0	0	G14001
41G009	0 ^b	0 ^b	0 ^b	3	0	0	G15010
41G033	0 ^b	0 ^b	0 ^b	3	0	1	G9004
41G037	0 ^b	0 ^b	0 ^b	10	0	0	G14004
41G038	0 ^b	0 ^b	0 ^b	4	0	0	G14006
41G039	0 ^b	0 ^b	0 ^b	9	0	0	G9007
41H003	34	0	0	77	0	0	H13012
41H040	0	0	0	0	0	0	H14029
41H136	0 ^b	0 ^b	0 ^b	12	0	0	H5009
41H137	0 ^b	0 ^b	0 ^b	0	0	2	H5008
41H140	--	--	--	0	0	1	H5005
41H280	42 ^b	0 ^b	0 ^b	40	0	0	H14011
41H281	0 ^b	0 ^b	0 ^b	50	0	0	H8030
41A013	64	0	0	8	0	0	A14008
41A022	0	0	29	0	0	56	A14017
41A024	0	0	9	0	0	0	A14020
41A034	0 ^b	0 ^b	0 ^b	35	0	0	A14028
41A043	0	0	3	0	0	0	A16006
41A053	105	7	107	53	0	172	A9001
41A056	124	6	100	24	0	97	A6001
41A061	--	--	--	97	0	0	A14004
41A062	0	0	14	--	--	--	--

^b - Not visited in 1991. Data are for 1989

^c - Numbers used in Weseloh et al. 1986

Appendix 8. Colonies of herons and egrets in the Canadian lower Great Lakes area in 1991 and 1976/77

Colony Site Identification Number	Lake or river ^a	Name or Description of Colony Site Location	Lat.	Long.	SM ^b 1991	SM ^b 1976 or 1977
40J006	LSC	Squirrel Island	42°32'12"	82°33'50"	GC	... ^c
40J008	ISC	Basset Island	42°30'00"	82°35'36"	GC	---
40G001	LE	Middle Sister Island	41°50'48"	83°00'06"	GC	GC
40G003	LE	East Sister Island	41°48'48"	82°51'30"	GC	GC
40G006	LE	Middle Island	41°40'54"	82°40'54"	GC	---
40G007	LE	N end of Pelee Island	41°49'42"	82°38'24"	---	BE
30M002	NR	Unnamed I. #1 (closest to shore)	43°04'24"	79°04'36"	GE	GE
30M003	NR	Unnamed I. #2 (2nd closest to shore)	43°04'24"	79°04'36"	GE	GE
30M026	NR	Unnamed I. #3 (farthest from shore)	43°04'18"	79°04'36"	GC	---
30M008	LO	Eastport	43°16'42"	79°47'24"	GC	---
30M010	LO	2 nd I. N of CCIW (Farr Island)	43°18'42"	79°48'42"	GC	GC
30M012	LO	Muggs Island	43°37'36"	79°23'12"	GC	---
30M013	LO	Tommy Thomson Park, Pen. A	43°37'18"	79°20'36"	GC	GC
30M014	LO	Tommy Thomson Park, Pen. B	43°37'24"	79°20'30"	GC	GC
30M015	LO	Tommy Thomson Park, Pen. C	43°37'36"	79°20'24"	GC	GC
30N001	LO	High Bluff Island	43°58'24"	77°44'54"	GC	GC
30N002	LO	Gull Island	48°58'54"	77°44'36"	GC	GC
30N003	LO	Scotch Bonnet Island	43°54'00"	77°32'36"	GC	GC
30N004	LO	False Ducks I. (= Swetman I.)	43°56'48"	76°48'36"	GC	BE
30N006	LO	Beaver Meadow, East Lake	43°57'40"	77°11'00"	GC	---
31C001	LO	Pigeon Island	44°04'06"	76°32'54"	---	GC
31C004	LO	Snake Island	44°11'24"	76°32'36"	GC	GC
31C017	LO	Cressy Marsh	44°04'12"	76°53'36"	GC	---
31C024	SLR	Little Cataraqui R. Marsh	44°15'40"	76°31'45"	GC	---
31C027	SLR	2 km N of Johnstown	44°45'36"	75°28'48"	GC	---

^a -- LSC-Lake St. Clair, DR - Detroit River, LE - Lake Erie, NR - Niagara River, LO - Lake Ontario, SLR-St. Lawrence River

^b --- SM-Survey Method, GC - ground count; BE - boat estimate; GE - ground estimate

^c --- no data

Appendix 8 (cont'd)

Colony Site Identification Number	1991			1976/1977 ^d		
	GTBH	GREG	BCNH	GTBH	GREG	BCNH
40J006	0	0	10	---	---	---
40J008	0	0	88	---	---	---
40G001	30	0	0	31	3	0
40G003	248	141	106	45	10	350 [*]
40G006	90	2	45	0 [*]	0 [*]	0 [*]
40G007	0 ^f	0 ^f	0 ^f	0	8	870
30M002	0	0	200	0	0	65T ^g
30M003	0	0	13	0	0	---
30M026	0	0	213	---	---	---
30M008	0 ^h	0 ^h	60 ^h	0	0	5T ⁱ
30M010	0 ^h	0 ^h	14 ^h	0	0	---
30M012	0 ^f	0 ^f	0 ^f	0	0	56 ^j
30M013	0	0	14	0	0	0
30M014	0	0	111	0	0	0
30M015	0	0	667	0	0	0
30N001	0	0	37	0 ^k	0 ^k	79 ^k
30N002	0	0	0	0 ^l	0 ^l	27 ^l
30N003	0	0	27 ^f	0	0	0
30N004	0	0	48 ^f	--	--	--
30N006	17	0	0	--	--	--
31C001	0 ^f	0 ^f	0 ^f	0	0	65 ^m
31C004	0	0	16	0	0	0
31C017	3	0	0	---	---	---
c.)31C024	0	0	2	---	---	---
31C027	125	0	0	---	---	---

^d - Data for Lake Erie and adjacent waters are for 1977 (Blokpoel and McKeating 1978), unless otherwise indicated

^e - Data are for 1978 (Weseloh et al. 1988)

^f - Data are for 1990 (CWS files)

^g - T- total for the bracketed colonies

^h - Data are from Moore et al. 1995

ⁱ - Data are for 1975 (Dobos et al. 1988)

^j - Data are for 1977 (ONRS files)

^k - Data are for 1978 (LaForest, 1993)

^l - Data are for 1975 (LaForest, 1993)

^m - Data are for 1976 (Weir, 1989)