

# Recent extensions of the breeding range of Great Black-backed Gulls (*Larus marinus*) in the Great Lakes of North America

by

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## Introduction

The first breeding record of Great Black-backed Gulls (*Larus marinus*) on the Great Lakes was on Lake Huron, in 1954, when a pair bred successfully on Little Haystack Island, just west of the Bruce Peninsula (Krug 1956). However, this may have been an isolated breeding record, since regular nesting is only known to have occurred on two Ontario islands (Pigeon Island and Gull Island), in eastern Lake Ontario during the 1960s and 1970s (Angehrn *et al.* 1979; Peck and James 1983). Lake Ontario remains the stronghold of Great Black-backed Gulls on the Great Lakes today, with Little Galloo Island (New York State) supporting up to 6 pairs annually (Weseloh 1984, and pers. comm.).

Ludwig (1968) predicted that this species seemed "poised at the edge of the Great Lakes for an invasion", but this had not happened by 1979 (Angehrn *et al.* 1979), nor by 1985 (Blokpoel 1987). During the years of the Ontario Breeding Bird Atlas, 1981-85, breeding (always of single pairs) was confirmed at six islands in Lake Ontario and only one in Lake Huron (Blokpoel 1987). Extensive surveys of colonial bird colonies throughout Lake Huron in 1976-77 (USA) and 1980 (Canada) did not find any breeding Great Black-backed

Gulls (Scharf *et al.* 1978; Weseloh *et al.* 1986).

In this paper we report a recent increase in the number of breeding pairs of Great Black-backed Gulls on Lake Huron, which, with an increase in records of summering birds, suggests that the species may finally be starting the 'invasion' of the Great Lakes, which was predicted over 20 years ago.

## Observations

Details of the known breeding records in Lake Huron are presented in Table 1. Prior to 1988 there were only two confirmed reports of breeding (assuming that the 1954 nesting involved only one pair), both off the west side of the Bruce Peninsula, Ontario. However, between 1988 and 1991 we recorded 12 confirmed or probable breeding attempts, at eight separate sites (Table 1). Each nesting attempt appeared to involve birds in full adult plumage, only a single pair at each island in a given year, and always on rocky islands also occupied by breeding Herring Gulls (*L. argentatus*) and/or Ring-billed Gulls (*L. delawarensis*). All Great Black-backed Gull nests we found within gull colonies, during ground-based nest counts of the aforementioned species, were at least 3-6 m from the nearest

Table 1: Confirmed and potential breeding records of Great Black-backed Gulls at sites where breeding has been confirmed on Lake Huron. (Site reference numbers refer to locations shown in Figure 1).

Location	Ref. #	Lat./Long.	Source *	Year	Observations
L. Haystack I.	1	44° 46' 18" N 81° 18' 48" W	a	1954	3 adults & 3 chicks.
			e	1989	1 active nest.
Basswood I.	2	44° 45' 42" N 81° 19' 12" W	bc	1983	1 adult and 1 small chick.
			c	1987	1 adult loafing, early July.
			g	1991	1 adult incubating.
Halfmoon I.	6	45° 26' N 81° 28' W	d	1988	Nest with 3 eggs.
			f	1991	Adult and 3rd year, loafing.
Cavalier I.	4	44° 49' N 81° 21' W	e	1989	1 active nest.
Erie Shingle	8	45° 35' N 81° 38' W	f	1990	Pair; alarm behaviour suggests nest (June).
			d	1990	Pair of adults, not alarming (July).
			d	1991	Pair and 1 large chick.
Kokanongwi Shingle	9	45° 56' N 81° 33' W	f	1990	1 adult, alarm behaviour indicating nesting.
			f	1991	1 adult incubating 3 eggs.
Little Saddlebag I.	10	45° 57' N 84° 03' W	f	1990	Pair with at least 1 large chick.
Goose I.	11	45° 55' N 84° 26' W	d	1990	Pair at nest, with hatched egg(s) found.

Note: \* a Krug (1956); b Blokpoel (1987); c M. Parker, pers. comm.;  
d JPL, pers. obs; e HB, unpubl. data; f PJE, pers. obs.; g HB, pers. obs.

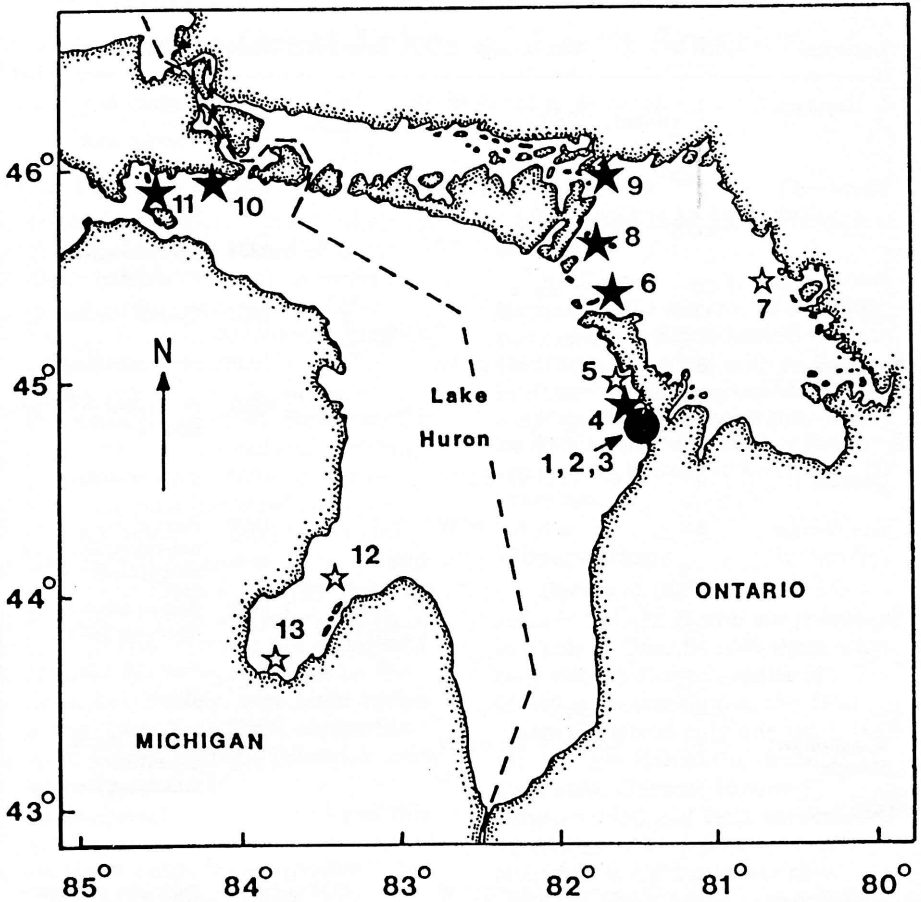


Figure 1: The location of breeding and summering sites of Great Black-backed Gulls on Lake Huron, 1954-91. Filled stars represent nesting locations away from the Basswood I. - Little Haystack I. area (filled circle). Numbers given beside these symbols refer to individual nesting attempts detailed in Tables 1 and 2. Unfilled stars represent other sites at which birds were seen during the breeding season. The dashed line indicates the international boundary.

gull nest. Five of the 12 breeding records in Lake Huron were from the Fishing Islands (numbers 1, 2, 4 and 12 in Table 1 and Figure 1), off Oliphant on the Bruce Peninsula, five were in northwestern Georgian Bay, and two (16%) were in Michigan waters in the extreme northwestern part of Lake Huron (Figure 1).

Breeding was almost certainly attempted in 1990 and 1991 at both Erie Shingle and Kokanongwi Shingle, to the east of Manitoulin Island. However, there was no evidence of breeding at three islands visited in June 1991, 1-2 years after the first breeding record (Cavalier I., Little Saddlebag I. and Goose I.). We did not make regular observations on the Fishing Islands, so it is uncertain whether birds were breeding in the years between those of our breeding observations. However, in the course of other work with colonial waterbirds, two of us (HB and JPL), as well as various Canadian Wildlife Service staff and contractors, have visited many of the aquatic bird colonies in Lake Huron periodically since the mid-1970s, so we believe the increase in numbers of breeding Great Black-backed Gulls to be real, rather than reflecting increased coverage. In summary, since the first breeding record in 1954, there have been a minimum of 11 confirmed or probable breeding attempts on Lake Huron - one in 1983, one in 1988, two in 1989, four in 1990 and three in 1991.

Since 1988, we have also noticed Great Black-backed Gulls loafing during the breeding season, but apparently not breeding, at other islands in Lake Huron (Table 2). Each of these islands supported large colonies of Herring Gulls and Ring-

billed Gulls (Weseloh *et al.* 1986; pers. obs.). Although it is unlikely that the birds in sub-adult or immature plumage had attempted to breed, some of the adults could have been failed breeders (but not necessarily from the islands at which they were seen by us). Others may have been prospecting for suitable breeding sites. At Erie Shingle, a pair of adults were alarm-calling vigorously on a visit in May 1990, but in June the birds were just loafing, indicating that breeding had failed. At Kokanongwi Shingle the nesting attempt in 1990 was unsuccessful, almost certainly due to destruction of the eggs (along with many Herring Gull nests) by humans.

## Discussion

These breeding records for Lake Huron represent northward and westward extensions of the breeding range of Great Black-backed Gulls in the Great Lakes. The nesting in 1990 on Goose Island, Michigan, in the Straight of Mackinac, is the most westerly known for this species (Cramp and Simmons 1983; Godfrey 1986). The two pairs nesting in Michigan in 1990 constitute the first breeding record for Great Black-backed Gulls in that U.S. state, but no established breeding site is yet known. It seems that breeding is now fairly regular in Lake Huron, on isolated rocky islands in the Fishing Islands and to the east of Manitoulin Island. The apparent increase in records of summering sub-adults and adults at other potential breeding islands, and the successful breeding of at least some pairs, indicates that this species is now steadily colonizing Lake Huron as a breeding species. We expect that further breeding

locations will be found before the end of the century. We know of no records of Great Black-backed Gulls nesting or summering in either Lake Michigan or Lake Superior. However, a number of gull colonies on islands in both lakes seem to offer similar nesting opportunities to those in Lake Huron or Lake Ontario.

Great Black-backed Gulls have been expanding their breeding range southward along the Atlantic coast of the United States, and the western Atlantic populations seem to have been increasing overall, since at least the 1930s (Mayfield 1946; Peakall 1967; Drury 1973; Brousseau and Chapdelaine 1990). From the mid 1940s to at least 1985 increasing numbers (predominantly adults) have wintered on the lower Great Lakes (Peakall 1967; Angehrn *et al.* 1979;

Dolbeer 1986; D.V. Weseloh, CWS unpubl. data), and more birds are remaining in the Great Lakes until late in the spring (for example, 80 at Long Point, Lake Erie, in mid May 1991 (Weir 1991) ). Up to 25 Great Black-backed Gulls now winter at the outfall to the Bruce Nuclear Power Station on the Bruce Peninsula, Lake Huron (M. Parker pers. comm.). Band recoveries during the period 1923-77 indicate that birds wintering on the Great Lakes originate from colonies in the St. Lawrence estuary and Maine (Angehrn *et al.* 1979). There are, as yet, no recoveries of birds on the Great Lakes during the breeding season, so we do not know to what extent continued immigration has been responsible for the recent increases, as opposed to recruitment of birds raised on the Great Lakes.

Table 2: Non-breeding records of Great Black-backed Gulls in summer at potential islands in Lake Huron. Site reference numbers refer to locations shown in Figure 1.

Location	Ref. #	Lat./Long.	Source *	Year	Observations
South Limestone I.	7	45° 23' N 80° 32' W	f	1991	1 adult, not breeding.
Little Charity I.	12	44° 01' N 83° 18' W	d	1991	Pair of adults loafing, May 27.
Channel-Shelter I.	13	43° 40' N 83° 49' W	f	1991	2nd year bird, loafing.
Warren I.	5	44° 47' N 81° 20' W	g	1991	Adult & Immature loafing, no nest seen.
Chimney Reef	3	44° 51' N 81° 20' W	g	1991	2 sub-adults, not breeding.

Note: \* d JPL, pers. obs.; f PJE, pers. obs.; g HB, pers. obs.

There have been recent increases in Great Black-backed Gull breeding numbers in Quebec (Chapdelaine and Brousseau 1991; Ladouceur 1991), and colonization of new sites at inland lakes in Vermont (Lake Champlain, M. La Barr pers. comm.), in upper New York State (Meade 1988), and even into the Northwest Territories (Cooch 1977), so the Lake Huron increases seem to be part of general increases away from the Atlantic coast. Numbers breeding on Lake Ontario have increased only slightly over the last 5-6 years (D.V. Weseloh, pers. comm.; pers. obs.), possibly due to the relative scarcity of islands supporting aquatic bird colonies which do not already have breeding Great Black-backed Gulls. However, regular observations in 1991 in the vicinity of gull and tern colonies at Leslie Street Spit, Toronto, indicated that at least 2 adults summered in that area, and breeding is a possibility in future years. By mid August, 1991, up to 16 adults and four sub-adults frequented the Leslie Street Spit area (M.K. McNicholl, unpubl. data).

During the breeding season Great Black-backed Gulls regularly eat fish, carrion, mammals, and eggs, chicks and adults of a variety of colonial larids and other bird species (Cramp and Simmons 1983). On the Great Lakes their breeding territories are often littered with remains of Ring-billed Gulls, both young and adults (pers. obs.), indicating that gulls form an important part of the diet. On Lake Champlain large numbers of Ring-billed Gull eggs are taken at dusk by Great Black-backed Gulls (M. LaBarr pers. comm.). Thus, given the abundance of gull colonies in Lake Huron (Weseloh *et al.* 1986),

why have Great Black-backed Gulls taken so long to 'invade' these areas?

In the Western Palearctic, climatic amelioration has been proposed as one possible explanation for range expansions of Great Black-backed Gulls in some areas (Cramp and Simmons 1983). This factor could have played some part in the overall changes seen in northeastern North America. Another possible explanation for the delayed colonization of Lake Huron is that the founding birds in 1954 nested only once, then vacated the area. Subsequent colonization of one or more pairs in 1983 could have produced recruits into the breeding population from 1987 onwards, since first breeding is usually at 4-5 years old (Cramp and Simmons 1983). Voous (1960) suggested that the Great Black-backed Gull was fundamentally a marine species, and in some way it could be poorly adapted for an inland, freshwater lifestyle. Inland nesting is not infrequent in the Western Palearctic, and breeding birds do forage at inland gull colonies and in agricultural areas in Scotland (PJE, pers. obs.). However, large numbers of nests do not normally occur more than a few miles from the coast (Cramp and Simmons 1983; Lloyd *et al.* 1991). Presumably it is the availability of food, rather than nest-sites, which is the key determinant of breeding distribution in most parts of the range.

Another important factor may have been the presence of toxic contaminants in the Great Lakes ecosystem. Since Great Black-backed Gulls are near the top of the food web, and appear to consume substantial quantities of other gulls

and their eggs on the Great Lakes, one would expect them to have accumulated higher contaminant levels than either Herring or Ring-billed Gulls (which feed more on fish and invertebrates in summer). This is due to a phenomenon known as biomagnification, whereby lipophilic contaminants are concentrated at successively higher trophic levels in the food web. During the 1960s and 1970s most piscivorous birds inhabiting the Great Lakes accumulated high levels of a suite of organochlorine contaminants, often associated with reproductive failures, egg breakage, embryonic mortality, congenital abnormalities and chick edema disease (Fox *et al.* 1991). Levels of most contaminants declined markedly during the 1980s in most aquatic birds studied and reproductive success improved (Government of Canada 1991; Bishop *et al.* in prep.). However, another predator at the top of the food web, the Bald Eagle (*Haliaeetus leucocephalus*) still appears to experience reduced breeding output at nests along the Great Lakes shorelines, compared with nests further inland (Bowerman *et al.* 1991).

Even though there are no data on contaminant residues in Great Black-backed Gulls or their eggs on the Great Lakes, elevated levels in eggs and body tissues during the 1960s and 1970s must have occurred. In that period reproduction could have been impaired, and productivity rendered insufficient to balance adult mortality, let alone fuel further colonization of the Great Lakes. The lower contaminant levels of the 1980s may have permitted more successful breeding, and improved adult

survival, and some of the young produced could have survived to settle as breeders at new sites in Lake Huron. Clearly, banding of young reared on the Great Lakes will help our understanding of the importance of any continued immigration to the current increases on Lake Huron.

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### Literature cited

- Angehrn, P.A.M., H. Blokoel, and P. Courtney.* 1979. A review of the status of the Great Black-backed Gull in the Great Lakes area. Ontario Field Biologist 33(2): 27-33.
- Bishop, C.A., D.V. Weseloh, N. Burgess, J. Struger and R.J. Norstrom.* In prep. The atlas of contaminants in eggs of colonial fish-eating birds of the Great Lakes. Canadian Wildlife Service Technical Report Series.
- Blokoel, H.* 1987. Great Black-backed Gull (*Larus marinus*). pp 184-185 in Atlas of the Breeding Birds of Ontario. (Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, compilers) University of Waterloo Press, Waterloo.

- Bowerman, W.C., D. Best, T.J. Kubiak, S. Postupalsky, and D. Tillitt.** 1991. Bald Eagle reproductive impairment around the Great Lakes: association with organochlorine contamination. Abstracts of the Cause-Effect Linkages II symposium, Sept. 27-28, Traverse City, Michigan. Michigan Audubon Society: Lansing, Michigan.
- Brousseau, P. and G. Chapdelaine.** 1990. Treizieme inventaire des oiseaux marins dans les refuges de la Cote-Nord: techniques et resultats detaillies. Canadian Wildlife Service Technical Report No. 96 CWS (Quebec Region).
- Chapdelaine, G and P. Brousseau.** 1991. Thirteenth census of seabird populations in the sanctuaries of the north shore of the Gulf of St. Lawrence, 1982-88. Canadian Field-Naturalist 105: 60-66.
- Cooch, F.G.** 1977. Changes in the avifauna of the West Foxe Islands, Northwest Territories, 1956-76. Canadian Field-Naturalist 91: 314-317.
- Cramp, S and K.E.L. Simmons (eds.).** 1983. Handbook of the birds of Europe, the Middle East, and North Africa: the birds of the Western Palearctic. Volume 3. Waders to Gulls. Oxford, Oxford University Press.
- Dolbeer, B.** 1986. Early winter population trends of gulls on western Lake Erie, 1950-1984. American Birds 40: 1096-1102.
- Drury, W.H.** 1973. Population changes in New England seabirds. Bird-Banding 44: 267-313.
- Fox, G.A., D.V. Weseloh, T.J. Kubiak, and T.C. Erdman.** 1991. Reproductive outcomes in colonial fish-eating birds: a biomarker for developmental toxicants in Great Lakes food chains. Journal of Great Lakes Research 17: 153-157.
- Godfrey, W.E.** 1986. The Birds of Canada, second edition. National Museums of Canada, Ottawa.
- Government of Canada.** 1991. Toxic Chemicals in the Great Lakes and Associated Effects. Environment Canada, Department of Fisheries and Oceans, and Health and Welfare Canada, Ottawa. 51 pp.
- Krug, H.H.** 1956. The Great Black-backed Gull nesting on Little Haystack Island, Lake Huron. Auk 73: 559.
- Ladouceur, V.B.** 1991. Spring bird sightings, March-May 1991. Trail and Landscape 25: 127-129.
- Lloyd, C., M.L. Tasker and K. Partridge.** 1991. The Status of Seabirds in Britain and Ireland. London, T. & A.D. Poyser.
- Ludwig, J.P.** 1968. Dynamics of Ring-billed Gull and Caspian Tern populations of the Great Lakes. Unpublished Ph.D. thesis, University of Michigan, Ann Arbor. 73 pp.
- Ludwig, J.P.** 1974. Recent changes in the Ring-billed Gull population and biology in the Laurentian Great Lakes. Auk 91: 575-594.
- Mayfield, H.** 1946. The status of Great Black-backed Gulls in Michigan. Jack-Pine Warbler 24: 19-22.
- Meade, G.M.** 1988. Great Black-backed Gull (*Larus marinus*). pp. 170-171 in The Atlas of Breeding Birds of New York State. (Andrle, R.F. and J.R. Carroll, eds.). Ithaca, Cornell University Press.
- Peakall, D.B.** 1967. Recent changes in status of the Great Black-backed Gull. Kingbird 17: 69-73.
- Peck, G.K. and R.D. James.** 1983. The Breeding Birds of Ontario: Nidology and Distribution. Volume 1. Royal Ontario Museum, Toronto.
- Scharf, W.C., G.W. Shugart and M.L. Chamberlain.** 1978. Colonial birds nesting on man-made and natural sites in the U.S. Great Lakes. United States Department of the Interior, Fish and Wildlife Service Technical Report D-78-10. 136 pp.
- Voous, K.H.** 1960. Atlas of European Birds. London: Nelson.
- Weir, R.D.** 1991. Ontario Region. American Birds 45: 441.
- Weseloh, D.V.** 1984. Characteristics of a Great Black-backed Gull colony on Lake Ontario, New York, 1981-1983. Kingbird 34: 91-95.
- Weseloh, D.V., P. Mineau, S.M. Teeple, H. Blokpoel, and B. Ratcliff.** 1986. Colonial waterbirds nesting in Canadian Lake Huron in 1980. Canadian Wildlife Service Progress Note No. 165.
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