DISTRIBUTION AND ABUNDANCE OF THE EIDER DUCK *(SOMATERIA MOLLISSIMA SEDENTERIA AND S.M. BOREALIS)* ALONG THE COAST HUDSON BAY, HUDSON STRAIT AND UNGAVA BAY

REPORT

DISTRIBUTION AND ABUNDANCE OF THE EIDER DUCK (*SOMATERIA MOLLISSIMA SEDENTARIA* AND *S.M. BOREALIS*) ALONG THE COASTS HUDSON BAY, HUDSON STRAIT AND UNGAVA BAY

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INTRODUCTION

This report is a summary and an analysis of the results of an aerial survey conducted between 28 June and 2 July 1978, along the eastern coastline of Hudson Bay, Hudson Strait (Québec coastline) and Ungava Bay. The main objectives of the survey were as follows:

1 - To determine the location of important concentrations of eider duck (*Somateria mollissima sedentaria* and *Somateria mollissima borealis*) nesting populations along the coastal areas.

2 - To compare the results of the 1979 survey whith those of the 1954, survey conducted by F.G. Cooch.

In addition to data on the eider duck, information was also collected on the following species (Appendix 1): Red-throated Loon (*Gavia stellata*), Double-crested Cormorant (*Phalacrocorax auritus*), Whistling Swan (*Olor columbianus*), Canada goose (*Branta canadensis*), Snow goose and Blue Goose (*Chen caerulescens*), Mallard (*Anas platyrhinchos*), Black duck (*Anas rubripes*), Pintail (*Anas acuta*), Green-winged Teal (*Anas carolinensis*), Greater Scaup (*Aythya marila*), Goldeneye sp. (*Bucephala* sp.), Oldsquaw (*Clangula hyemalis*), King Eider (*Somateria spectabilis*), Surf Scoter (*Melanita perspicillata*), Black Scoter (*Oidemia nigra*), Common Merganser (*Mergus merganser*), Red-throated Merganser (*Mergus serrator*), Marsh Hawk (*Circus cyaneus*), Osprey (*Pandion haliaetus*), Spotted Sandpiper (*Actitis macularia*), Yellowlegs (*Totanus* sp.), Plover (*Charadrius* sp.), Sandpipers, Glaucous Gull (*Larus hyperboreus*), Iceland Gull (*Larus glaucoides*), Great Black-backed Gull (*Larus marinus*), Herring

Gull (*Larus argentatus*), Black-legged Kittiwake (*Rissa tridactyla*), Arctic Tern (*Sterna paradisaea*), Thick-billed Murre (*Uria lomvia*) and Black Guillemot (*Cepphus grylle*).

This report must also be regarded as a preliminary appraisal of the distribution and density of the various species nesting along the eastern coastline of Hudson Bay, Hudson Strait and Ungava Bay. It is our hope that it will be useful in orienting more detailed surveys.

METHODS

Figure 1.1 shows the flight lines of our aerial survey along the coastline. We used a De Havilland Twin Otter. The first observer, sitting in the co-pilot's seat, counted the number of birds of each species identified recording them in relation to survey zones described in the "Manuel technique de récolte de données sur les oiseaux migrateurs (1977)". He also determined the sex ratio (♂:♀) for numerous groups of eider ducks. All information was recorded on tape. The second observer, sitting in the back seat, made handwritten notes on the topography of the sites used by the birds, located the exact site of some flocks and photographed various types of habitats. Photographs were also taken of part of Thick-billed Murre colonies on Digges Islands, Cape Wolstenholme and Akpatok Island. The photographic equipment included a 70 mm camera with a 120 mm lens and a 35 mm automatic with a 135 mm lens. Direct communications between the two observers and the pilot were made through the aircraft's intercom system.

The survey was conducted according to the following schedule:

Hudson Bay

- 28/6/78: 18 h 05 - 19 h : Pointe Louis XIV to Poste-de-la-Baleine
  * Technical difficulties with the aircraft's communication system compelled us to return to LG2 and to postpone our survey until 30 June.

- 30/6/78: 13 h 45 - 17 h 40 : Poste-de-la-Baleine to Inoudjouac
  19 h 20 - 22 h 30 : Inoudjouac to Povungnituk

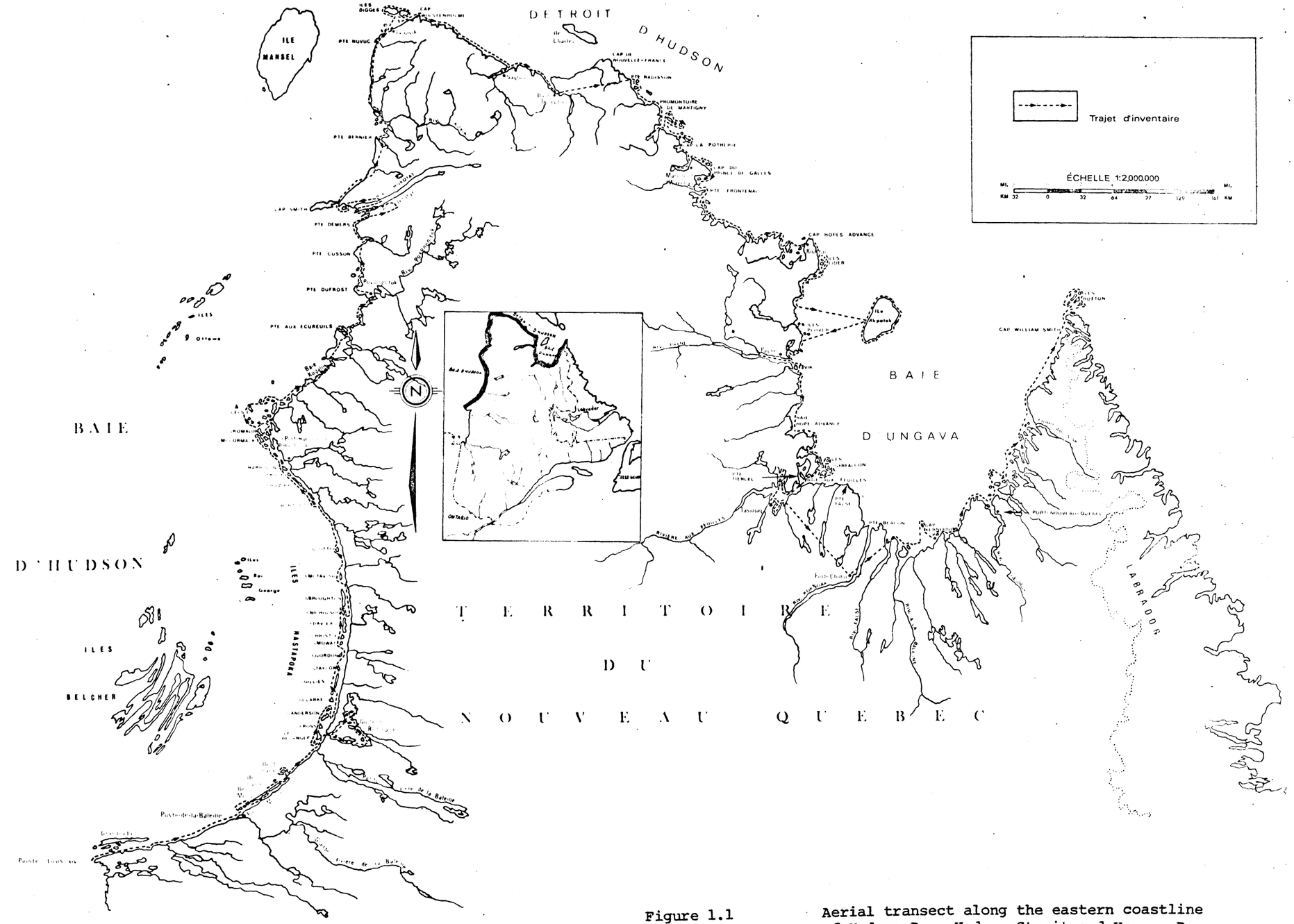

Figure 1.1 Aerial transect along the eastern coastline of Hudson Bay, Hudson Strait and Ungava Bay.

- 1/7/78: 7 h 45 - 10 h 30 : Povungnituk to Digges Islands (limit of the Hudson Bay coastline).

Hudson Strait

- 1/7/78: 10 h 30 - 13 h 00 : Digges Islands to Deception Bay
  14 h 20 - 17 h 20 : Deception Bay to Koartac

Ungava Bay

- 1/7/78: 18 h 40 - 19 h 15 : Cape Hope Advance to Bay des Rosières
  19 h 35 - 20 h 15 : Akpatok Island
  20 h 26 - 22 h 00 : Payne Bay to Baie aux Feuilles
  22 h 00 - 22 h 40 : Baie aux Feuilles to Fort Chimo (inland itinerary)

- 2/7/78: 10 h 00 - 12 h 30 : False River to Button Islands

Sea condition

Generally, the sea was calm from Pointe Louis XIV (Hudson Bay) to Pointe False (Ungava Bay). Wind conditions varied from 1 to 2 (Beaufort scale). From False Point to Button Islands, the wind rose from 2 to 4 towards the end of the survey. Thus, it can be said that operations were carried out under excellent weather conditions, except for the last 100 kilometers over the eastern coastline of Ungava Bay.

The distribution of flocks may have been influenced by the presence of ice in some areas. Table 1.1 gives ice conditions according to Simpson's (1973) proposed scale.

Table 1.1 - Ice conditions along the eastern coastline of Hudson Bay, Hudson Strait (Québec coastline) and Ungava Bay between 28 June and 2 July.

SECTIONS	RATE*
(1) Pointe Louis XIV to Poste-de-la-Baleine	0
(2) Manitounuk islands	0
(3) Nastopoka islands	0
(4) Lake Guillaume - Delisle	0
(5) Hopewell islands	0
(6) Komalux island to Povungnituk	5/10 to 8/10
(7) Povungnituk to Ivujivik	8/10 to 10/10
(8) Ivujivik to Pointe Radisson	8/10 to 10/10
(9) Pointe Radisson to Pointe Frontenac	8/10 to 10/10
(10) Pointe Frontenac to Koartac	5/10 to 8/10
(11) Eiders islands	5/10 to 8/10
(12) Plover island	N/A
(13) Ivik island to Tiercel island (Gyrfalcon island)	8/10 to 10/10
(14) Baie aux Feuilles	1/10 to 5/10
(15) Pointe False to Pointe Beacon	N/A
(16) East Side (Ungava Bay)	5/8 to 8/10

* Simpson's scale (1973)

0 - no ice

1/10 - 5/10

5/10 - 8/10

8/10 - 10/10

10/10 - no water

Analysis of results

The raw data are included in Appendix 1. Comparative density gradients were recorded on maps (1:2,000,000) (birds/km) for the Eider Duck, Arctic Tern and Black Guillemot. Hudson Bay was divided into 7 sections, Hudson Strait into 3 and Ungava Bay into 6. The limits of coastal sections were determined by the topographical uniformity of the islands off the coast. Density gradients observed in 1978 are compared with those of Cooch (1954) for the Eider Duck.

RESULTS

Interpretation of results for the Eider Duck

All through our survey we have endeavoured to determine the male/female ratio for the eider duck population. Table 1.2 contains data for the 3 sections included in the survey.

Table 1.2 - Sex ratio of eider duck flocks in Hudson Bay, Hudson Strait and Ungava Bay.

DISTRICT	SAMPLE (BIRDS)	MALE/FEMALE RATIO
Hudson Bay	874	0.89 : 1 N.S.*
Hudson Strait	285	0.87 : 1 N.S.
Ungava Bay	863	1.09 : 1 N.S.

* The sex ratio is not significantly different from the theoritical ratio of 1:1 ($\alpha = 0.05$)

Cooch's 1965 report includes sex ratios of birds counted on the ground in the Cape Dorset area. His data (Table 1.3) indicate that at the early in the migration, the males outnumber females and that the ratio to balance (1 : 1) as the nesting period approaches.

As sex ratios for the various regions surveyed are generally 1: 1; our opinion is that our density ratings apply to nesting flocks. In addition to this, the behaviour of many eider duck flocks prompted us to

beleive they were nesting birds, i.e. males and females on islands, males and females on the small lakes of large islands(Nastapoka and Hopewell), males following females in flight over the islands. These behaviour patterns correspond to the pre-nesting phase (Cooch, 1955).

Table 1.3 - Sex ratio of eider ducks counted in the Cape Dorset Area 1955-56 (Cooch) (1965).

DATE	MALE/FEMALE RATIO	
	1955	1956
13 May	----	4.9 : 1
15 May	7.8 : 1	6.7 : 1
17 May	5.3 : 1	6.0 : 1
22 May	3.2 : 1	4.9 : 1
28 May	3.2 : 1	4.5 : 1
30 May	1.5 : 1	2.8 : 1
31 May	1.7 : 1	2.2 : 1
1 June	1.1 : 1	1.7 : 1
2 June	1.1 : 1	1.3 : 1
3 June	1.1 : 1	1.2 : 1
5 June	----	1.1 : 1
7 June		1.1 : 1
9 June		1.1 : 1
11 June		1.1 : 1
13 June		1.1 : 1

Eider duck - distribution and density

Hudson Bay

The *sedentaria* sub-species, easily identified by the female's grey plumage, was found along the coast. Heavy concentrations were recorded in sections 3, 5 and 6 (Figure 1.2). Densities were as follows: 2.86, 4.12 and 1.40 birds/km respectively. Cooch's data also indicate that sections 3, 5 and 6 are the most densely populated areas (Table 1.4). Many islands included in sections 3 and 5 are large in size. Most islands share a common topography: their landward (east) shores are high and abrupt cliffs, whereas the seaward (west) shore is gently sloping. They contain a large number of small lakes on some of which small groups (2-20 birds) were observed. However, small islands and islets surrounding the larger ones seem to harbour larger flocks of eider.

Hudson Strait

The *borealis* sub-species was found along this coastline. Heaviest concentrations are found in section 9 (Figure 1.2). Concentrations recorded were 3.6 birds/km, the most heavily populated islands are located between Martigny Promontory and Cap de la Potherie. Section 8 is unsuitable for nesting due to its lack of islands and abrupt shoreline.

Ungava Bay

Of the three large areas surveyed, Ungava Bay has the largest bird concentration. In sections 11 and 13, densities were respectively

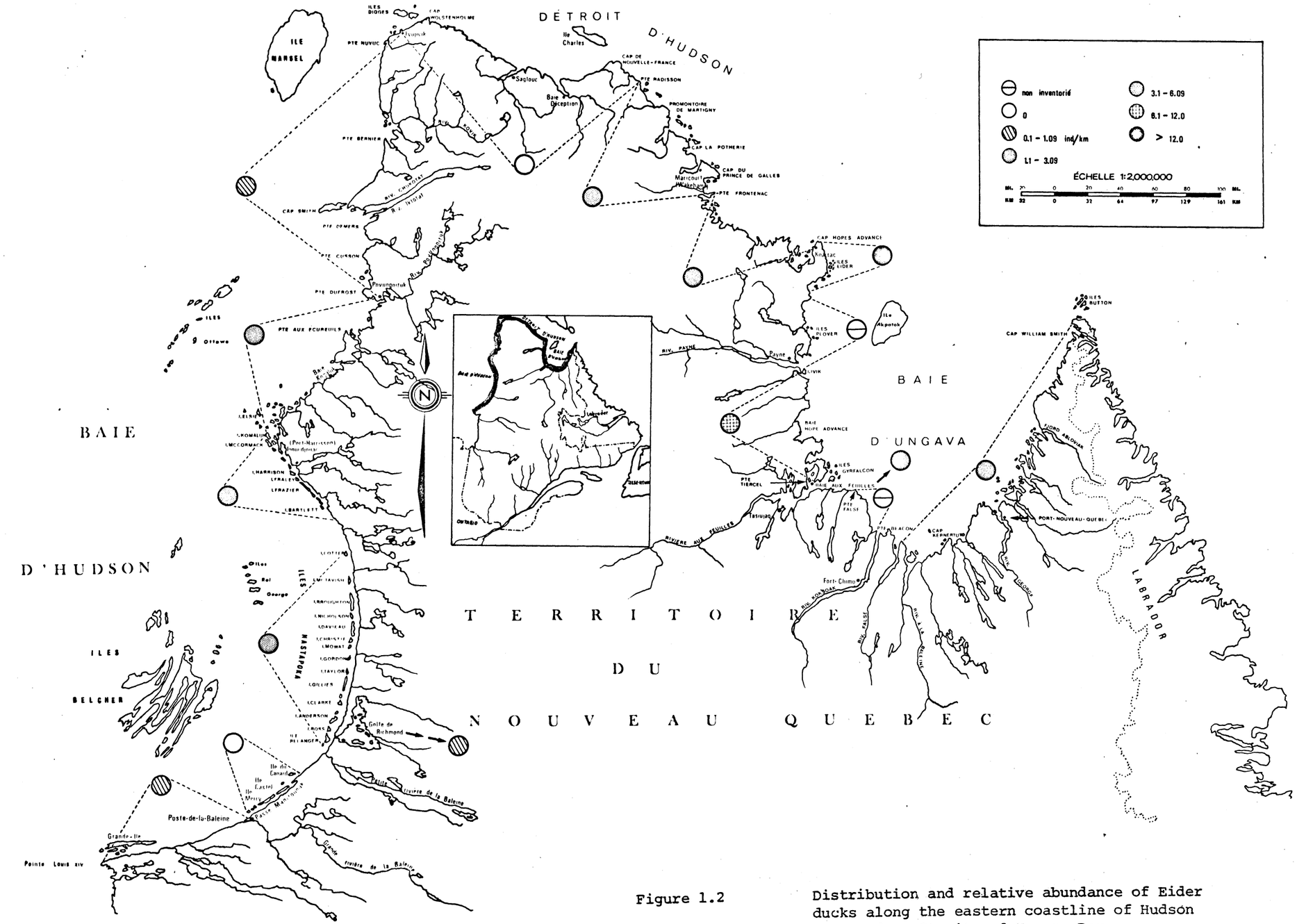

Figure 1.2 Distribution and relative abundance of Eider ducks along the eastern coastline of Hudson Bay, Hudson Strait and Ungava Bay.

14.16 and 6.11 birds/km (Table 1.4). High concentrations were also recorded by Cooch (1954) for these two sections and for section 15. We have no data for this last section as it was not included in our survey. However, our density data for section 11 differ markedly from Cooch's. Cooch (op. cit.) explained the low concentration he recorded: "The Eider Islands, near Cap Hope's Advance, have been noted for their concentrations of breeding birds. At one time Hudson's Bay Company posts were stocked with eggs from these islands. It has been reported also that Eskimos have visited the islands each summer for many years to hunt and collect eggs; 1954 was no exception, as a camp of nine tents was noted within a mile of the nesting area. This has greatly reduced the number of birds in the area. A considerable amount of slob ice was noted in this area and it is felt that the counts were lower than actual concentrations". No camp was noted in 1978, although ice conditions were rather severe (Table 1.1).

The topography and geography of Eider and Gyrfalcon islands are similar. They are very rocky and irregular in appearance. Rock outcrops seem highly suitable for Eider duck nesting. Edwards (1957) noted that eiders in the Payne Bay district definitely favoured broken terrain and avoided islands where the physiography was regular. Cooch (1965) mentions that in the Cape Dorset district, 10% of the nests were found in open, flat and grassy terrain, and that 90% were in rocky terrain (protected by rock outcrops).

Table 1.4 - Distribution, in 1954 and 1978, of the Eider Duck throughout the 7 coastal sections of Hudson Bay, 3 sections of Hudson Strait and 6 sections of Ungava Bay.

SECTORS	1954		1978	
	BIRDS COUNTED	BIRDS/KM	BIRDS COUNTED	BIRDS/KM
Hudson Bay				
(1) Pointe Louis XIV to Poste-à-la-Baleine	113	0.79	25	0.17
(2) Manitounuk islands	161	2.25	0	0
(3) Nastapoka islands	941	3.74	720	2.86
(4) Guillaume - Delisle Lake (70 lin. km)	---	---	8	0.11
(5) Hopewell islands	679	6.90	406	4.12
(6) Komaluk island at Povungnituk	636	5.41	165	1.40
(7) Povungnituk to Ivujivik	415	1.33	231	0.75
Hudson Strait				
(8) Ivujivik to Pointe Radisson	0	0	0	0
(9) Pointe Radisson to Pointe Frontenac	382	2.47	557	3.60
(10) Pointe Frontenac to Koartac	---	---	194	1.23
Ungava Bay				
(11) Eider islands	403	5.2	1098	14.16
(12) Plover islands	225	2.20	---	---
(13) Ivik island - Tiercel island (Gyrfalcon islands)	1212	8.91	831	6.11
(14) Baie aux Feuilles	[illegible]	[illegible]	154	1.12
(15) Pointe False to Pointe Beacon	601	9.20	---	---
(16) Eastern coast (Ungava Bay)	795	2.29	855	2.47
TOTAL	6563		5244	

The islands included in section 16 are generally lower, less rocky and flatter than those of sections 11 and 13. The recorded density was 2.47 birds/km.

Size and fluctuation of Northern Québec's Eider Duck population

1° - The greatest concentrations of eider ducks are found in Ungava Bay. Eider and Gyrfalcon islands harbour close to 65% of the Ungava Bay flocks and more than 36% of the number of ducks recorded throughout the whole area under survey.

2° - Almost 72% of the birds recorded in the Hudson Bay district (Québec coastline) were found at Nastapoka and Hopewell islands. Flocks of the *sedentaria* sub-species appeared less concentrated than those of the *borealis* sub-species.

3° - Because aerial surveys are subject to too many imponderable factors we can not make a realistic evaluation of population change between 1954 and 1978. Considering comparable sectors only, the total number of eiders recorded decreased by 14.8%. If we make allowances for the numerous factors that may influence aerial surveys, the results do not necessarily indicate any reduction. However, a more specific analysis of results shows that the recorded numbers of the *sedentaria* sub-species have greatly decreased whereas the *borealis* sub-species has apparently increased. In the Hudson Bay district, it is possible to compare 6 sections, and the results indicate a 47.2% reduction of the birds recorded. In the case of the *S.m. borealis* sub-species, it is possible to compare 4 sections (1 in Hudson Strait and 3 in Ungava Bay) and the results indicate a 19.7% increase.

It is our opinion that population levels generally remained unchanged, although there is evidence of a reduction of the *sedentaria* sub-species.

Artic Tern and Black Guillemot - Distribution and density

Tables 1.5 and 1.6 summarize the number of birds and the relative concentration of Arctic Terns and Black Guillemots in Hudson Bay, Hudson Strait and Ungava Bay. Figures 1.3 and 1.4 show the distribution of the two species. The Arctic Tern is found in greater concentrations in Hudson Bay's sections 1 and 6. As for the Black Guillemot, Hudson Bay's section 6 and Hudson Strait's section 9 reveal the highest concentrations.

Table 1.5 - Distribution of the Arctic Tern (*Sterna paradisaea*) throughout the 7 coastal sections of Hudson Bay, 3 sections of Hudson Strait and 6 sections of Ungava Bay.

SECTIONS	NUMBER OF BIRDS	BIRDS/KM	NUMBER OF KNOWN COLONIES ACCORDING TO TODD'S (1963) MAP
Hudson Bay			
(1) Pointe Louis XIV to Pointe-de-la-Baleine	782	5.48	2
(2) Manitounuk islands	75	1.04	0
(3) Nastapoka islands	0	0	0
(4) Guillaume - Delisle Lake	0	0	0
(5) Hopewell	5	.05	0
(6) Komaluk island to Povungnituk	659	4.00	3
(7) Povungnituk to Ivujivik	403	1.29	0
Hudson Strait			
(8) Ivujivik to Pointe Radisson	0	0	0
(9) Pointe Radisson to Pointe Frontenac	101	0.65	1
(10) Pointe Frontenac to Koartac	0	0	0
Ungava Bay			
(11) Eider islands	0	0	0
(12) Plover islands	---	---	0
(13) Ivik island - Tiercel island (Gyrfalcon islands)	2	tr.	1
(14) Baie aux Feuilles	0	0	0
(15) Pointe False to Pointe Beacon	---	---	0
(16) Eastern coastline (Ungava Bay)	112	0.30	2
TOTAL	2139		

Table 1.6 - Distribution of the Black Guillemot (*Cepphus grylle*) throughout the 7 coastal sections of Hudson Bay, 3 sections of Hudson Strait and 6 sections of Ungava Bay.

SECTIONS	NUMBER OF BIRDS	DENSITY (BIRDS/KM)
Hudson Bay		
(1) Pointe Louis XIV to Pointe-de-la-Baleine	150	1.05
(2) Manitounuk islands	0	0
(3) Nastapoka islands	6	tr.
(4) Guillaume - Delisle Lake		
(5) Hopewell islands	31	0.31
(6) Komaluk island to Povungnituk	439	2.66
(7) Povungnituk to Ivujivik	2	tr.
Hudson Strait		
(8) Ivujivik to Pointe Radisson	0	0
(9) Pointe Radisson to Pointe Frontenac	435	2.81
(10) Pointe Frontenac to Koartac	155	1.17
Ungava Bay		
(11) Eider islands	80	1.03
(12) Plover islands	---	---
(13) Ivik island - Tiercel island (Gyrfalcon islands)	100	1.26
(14) Baie aux Feuilles	0	0
(15) Pointe False to Pointe Beacon	---	---
(16) Eastern coastline (Ungava Bay)	15	0.04
TOTAL	1404	

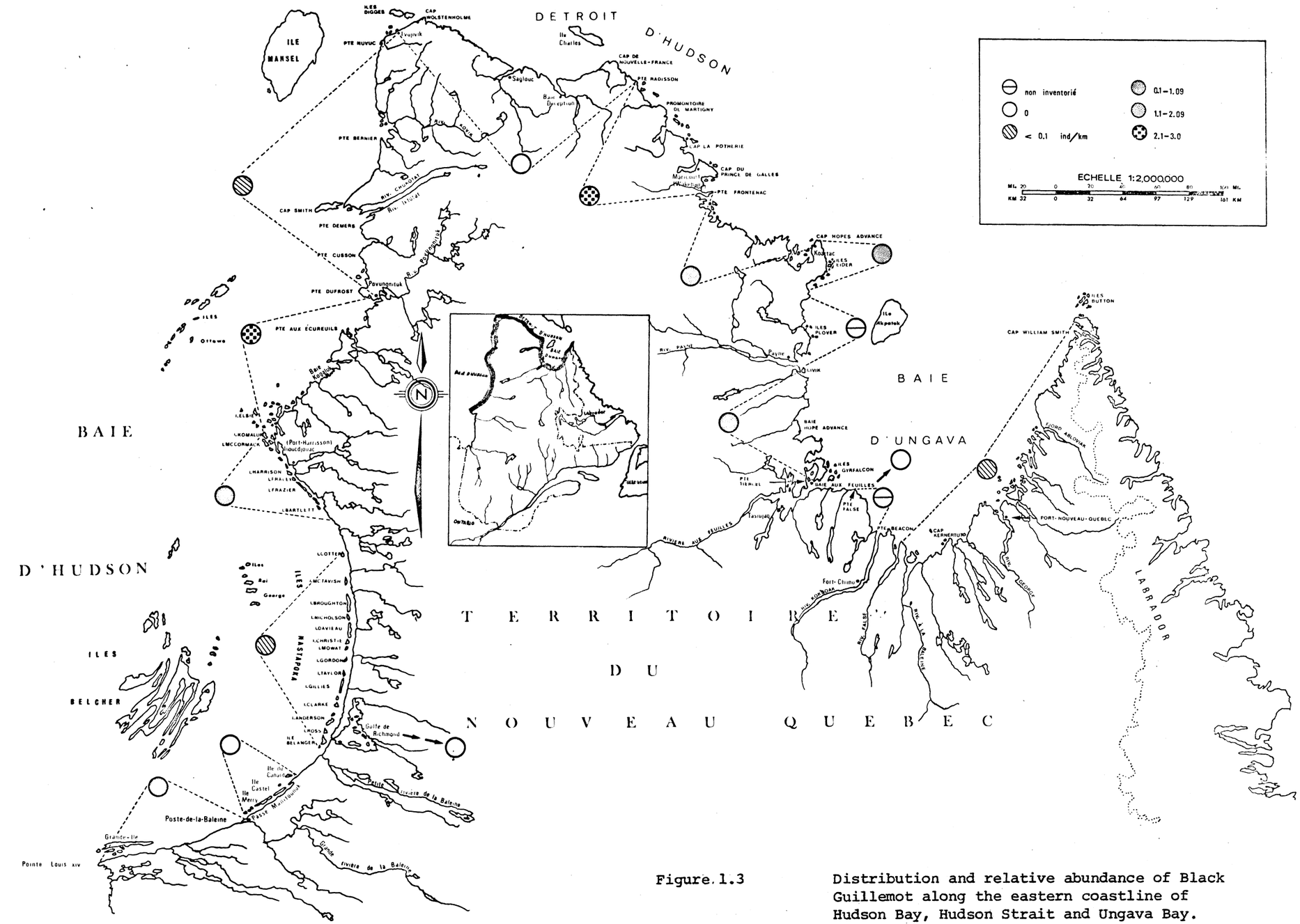

Figure 1.3 Distribution and relative abundance of Black Guillemot along the eastern coastline of Hudson Bay, Hudson Strait and Ungava Bay.

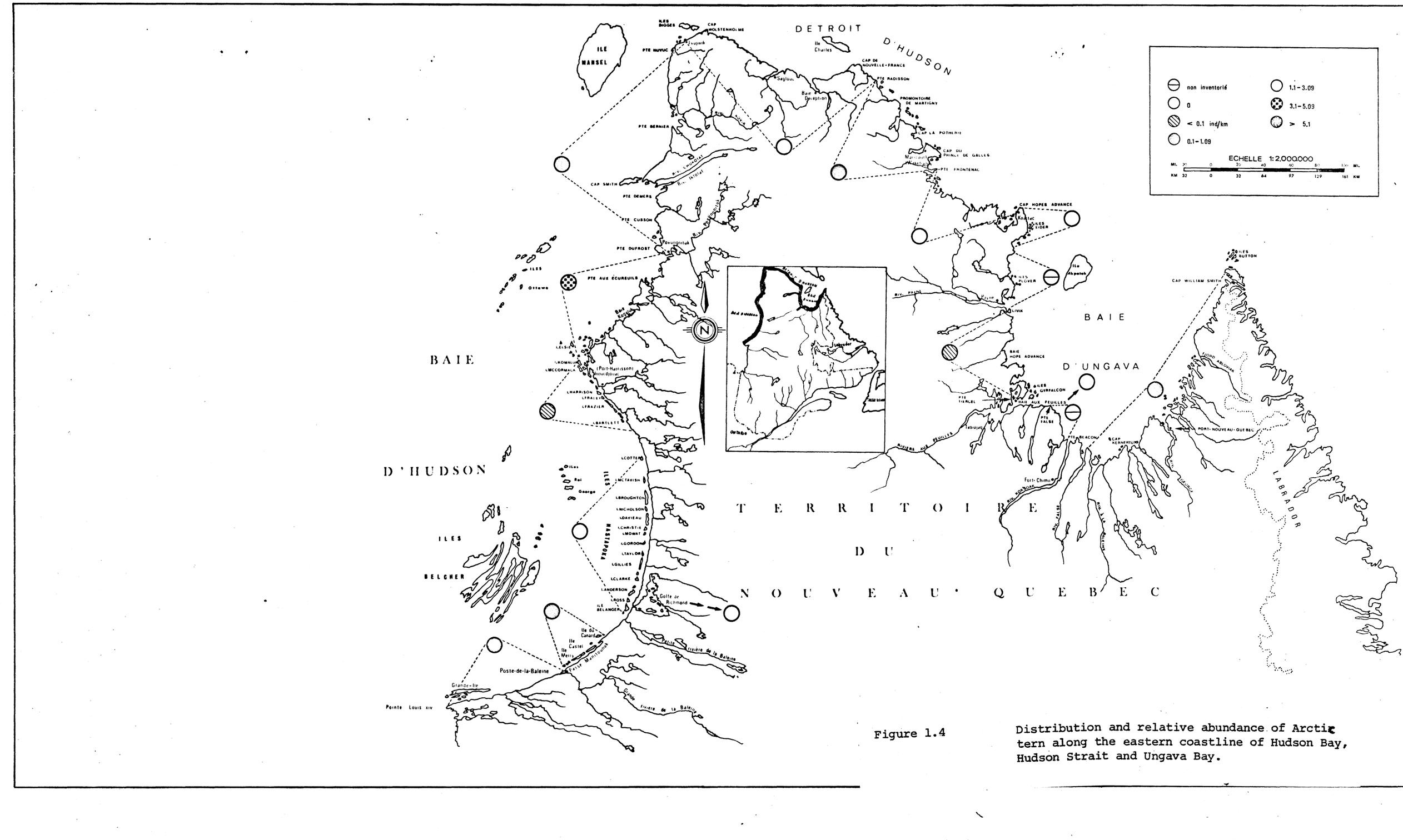

Figure 1.4 Distribution and relative abundance of Arctic tern along the eastern coastline of Hudson Bay, Hudson Strait and Ungava Bay.

REFERENCES

Cooch, F.G. 1954. Eider duck survey, Eastern Arctic, 1954. Unpubl. Report. Can. Wildl. Serv. 19 p.

Cooch, F.G. 1965. The breeding biology and management of the Northern Eider (*Somateria mollissima borealis*) in the Cap Dorset Area, Northwest Territories. Can. Wildl. Serv. Wildl. Mgt. Bull. 2(10). 68 p.

Edward, W.A. 1957. Report on eider duck project, Payne Bay, P.Q. Typed Report. Dept. of Northern Affairs and Natl. Resources. Arctic Div. 7 p.

Simpson, W. 1973. Golfe Saint-Laurent utilisations des eaux et activités connexes. Direction générale des Terres, Environnement Canada, Etude géographique no. 53. 20 p.

Todd, W.E.C. 1963. The birds of the Labrador Peninsula. Univ. of Toronto Press, Toronto. 819 p.

APPENDIX 1

AKPATOK

Thick-billed Murre 2,000,000
Glaucous Gull 17
Black Guillemot 17
Common Eider 2

BUTTON ISLANDS

Glaucous Gull 210
Black-legged Kittiwake 1000

* Digges islands - Cap Wolstenholme

		Larids spp.	Glaucous Gull	Great Black-backed Gull	Herring Gull	Gull spp.	Black Guillemot	Arctic Tern	Red-throated Loon	Loon spp.	Marsh Hawk	Plover spp.	Yellowlegs spp.	Double-crested Cormorant	Sandpiper spp.	Spotted Sandpiper	Canada Goose	Brant	Blue Goose	Snow Goose	Whistling Swan	Dabbling Ducks spp.	Black Duck	Pintail	Mallard	Green-winged Teal	Red-breasted Merganser	Common Merganser	Merganser spp.	Goldeneye spp.	Greater Scaup	Common Eider	King Eider	Oldsquaw	Surf Scoter	Common Scoter	White-winged Scoter	Scoter spp.	Duck spp.	Thick-billed Murre	Osprey
1	Pte Louis XIV - Poste-de-la-Baleine					69	150	782				1			4		103						192	12	7	4			19	4	4	25			4100	800	909	698	10		
2	Poste-de-la-Baleine - Duck island		9		20	88				10				1				8					11				65		1	82					400	161	31	318			
3	Bélanger island - Cotter island			1	58	361	6	75									181					6	20					6	288	365		720	5	45		650	2510	810			
4	Richmond Gulf					32					1												21				120			9		8					30			1
5	Bartlett isl. - Komaluk isl.			2		51	31	5									24														406		249		100	150	3800			
6	Komaluk island - Povungnituk					11	439	659	1						1	2	340		1				2	10			24		19	2	2	165		719			250	450			
7	Povungnituk - Ivujivik					223	2	403					1		12		1200		44	21	20			6					3			231	25	52					16		
8	Ivujivik - Pte Radisson	40	51			2																											10					2,375,000*	
9	Pte Radisson - Pte Frontenac					343	435	101	3																						557	19	38						.	
10	Pte Frontenac - Cap Hope Advance		1			285	155		6								16														194		8						46	
11	Cape Hope Advance - Baie des Rozières					65	80		1								47														1098	3	50						1	
12	Baie des Rozières - Ivik island					54			2								1																6							
13	Ivik island - Pte Tiercel					106	100	2	6																				2	10		831		7							
14	Baie aux Feüilles					279											2						4								154									
15	Pte False - Pte Beacon																																							
16	False River - Button islands		5	13	210	28	15	112	1							4	95						1				26		5			855		10	19	17		24	54		
TOTAL		40	66	16	288	2002	1407	2139	20	10	1	1	1	1	17	6	2009	8	45	21	20	6	251	28	7	4	235	6	337	472	6	5244	52	1194	4519	1728	3880	6100	80	2,375,047	1