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The distribution and population status of the grey seal *Halichoerus grypus* in eastern Canadian waters

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Introduction

Since 1966, when the first detailed report on the status of the grey seal population in eastern Canadian waters was published (Mansfield, 1966), a significant increase in numbers appears to have occurred. At that time the estimated number of pups born was about 1400, but this has now increased to about 4300, in spite of several years' controlled killing at three of the breeding colonies. Part of this increase results from the discovery of a breeding colony at Camp Island about 65 miles ENE of Halifax, which had not been observed on aerial surveys carried out before 1968, and part from better counts of the seals breeding on the ice in the Gulf of St. Lawrence; but a large part of the increase must have resulted from other, as yet unknown, causes.

Breeding colonies

In reviewing the status of the breeding colonies, the population can be conveniently divided into two groups: (a) one which breeds on the ice-free islands of eastern Nova Scotia, and (b) another which breeds in the Gulf of St. Lawrence and is strongly influenced by the highly variable ice patterns from year to year. This latter group has its counterpart in the grey seals of the Baltic Sea.

(a) The breeding colonies unaffected by ice are three in number and accounted for about 40 percent of the pup production in 1971 (Fig. 1: 4, 5, 6).

Sable Island (6). From 1962 until 1965 about 300 pups were produced annually. The number of pups increased to approximately 600 in 1968, 800 in 1969, 900 in 1970, and slightly over 1000 in 1971. Since the island is a long crescent-shaped sand-bar, 25 miles from end to end, there is virtually unlimited space for the formation of breeding colonies, but most seals remain within a fairly restricted area at the eastern end. However little crowding occurs and mortality of pups is low. It was 4.1 percent in 1971.

Basque Islands (5). From 1962, when this colony was first discovered by aerial survey, until 1967 when controlled killing began, the number of pups increased from about 130 to nearly 250. Since 1967 the annual kill has reduced the pup production until it is now about 130 again. It is likely that the resulting disturbance has caused many of the adult seals to move offshore and help increase the Sable Island population.

Camp Island (4). This colony was discovered by aerial survey in 1968 when there appeared to be about 300 pups. The first accurate count was made on the island in January 1970 when 400 pups were seen. The number of pups had decreased to 280 in 1971, possibly as a result of the controlled killing in 1970. Again, part of the adult population may have left for the security of Sable Island.

(b) The breeding colonies in the Gulf of St. Lawrence are affected by ice movements and estimates of the total population have shown wide fluctuations from year to year (Fig. 1: 1, 2, 3).

Deadman Island (2). This small island, 7 miles west of the southern tip of the Magdalen Islands, has been visited regularly by hunters every year for at least the past 15 years. According to a recent informant, between 75 and 125 pups have been killed each year (87 were killed in 1971).

Southern Gulf (1, 3). This area includes Northumberland Strait to the east of the narrows at Cape Tormentine, the eastern shore of Prince Edward Island, George Bay and the western shore of Cape Breton Island. In years of light ice, a breeding colony is nearly always found at Amet Island (1), a small island several miles off the south shore of Northumberland Strait, due south of Charlottetown in Prince Edward Island. At times crowding on the narrow beaches around the island can become so severe that high pup mortality results. For example, in 1967 over 500 pups were tagged on the island and the surrounding ice, but 80 were found dead and many more had been crushed by rafted ice floes. Starvation following desertion and infections resulting from wounds inflicted by teeth and claws would no doubt have killed many more pups before the end of the breeding season.

In years of firm ice few pups are born on or near Amet Island, and George Bay (3) becomes the favoured pupping locality. In 1966 the pup production in this area was estimated from aerial survey to be about 900, and in 1971 about 2000-2500. This may not represent a true increase in numbers since this population has always been particularly difficult to locate and estimates have fluctuated widely. It has been suggested that the completion of the Canso Causeway, linking Cape Breton Island with mainland Nova Scotia, has had a stabilizing effect on the ice of George Bay by preventing its outflow to the south. Unfortunately we have no population counts prior to completion of the causeway in 1955 and this suggestion must remain conjectural.

No other large breeding colonies are known to exist, but occasional pups have been reported from the following localities: the sand bars near Portneuf, 45 miles NE of the junction of the Saguenay and St. Lawrence Rivers (Fig. 1: a); the Bras d'Or Lakes in Cape Breton Island; Five Finger Shoal in Mahone Bay, 30 miles WSW of Halifax, Nova Scotia; Grand Manan Island at the mouth of the Bay of Fundy (Fig. 1: b); and Nantucket Island, Massachusetts, U.S.A. (Andrews and Mott, 1967). Nantucket is interesting in being the only locality outside Canadian waters where grey seals are known to occur.

The total population of grey seals in the Maritime Provinces is considered to be about four times the pup production; that is, approximately 17,000. A refinement of this figure will be possible when an accurate life table has been constructed from the data now in hand.

Dispersal

After the breeding season there is a wide dispersal of pups throughout the Maritime Provinces. Tagged and branded pups have been observed and captured from as far north as Hamilton Inlet on the Labrador coast to as far south as Nantucket, and up the St. Lawrence to near the mouth of the Saguenay River (Fig. 2). A further northward extension of the range is provided by a lower jaw sent in a sample taken from the Eskimo net fishery at Port Burwell at the northern tip of Labrador.

Immature and adult seals also appear to disperse after the breeding season, and summering herds regularly occur in favoured localities often far removed from the breeding colonies: principal among these are Iles Razades and Ile du Bic near the mouth of the Saguenay River; the Miramichi estuary; the Magdalen Islands; Fourchu Bay and Gabarus Bay on the east coast of Cape Breton Island; and Miquelon (French Overseas Territory) off the south coast of Newfoundland. The capture of a branded 3-month-old pup in an otter trawl on Browns Bank (42°32'N, 65°31'W) and the sighting of another branded 3-month-old pup on Lallave Bank (43°09'N, 64°08'W) suggest that many young seals and possibly adults feed on the offshore fishing banks during much of the year.

Competition

Analyses of stomach contents show that the grey seal is primarily a bottom feeder, relying on flounders, skate and hake for its staple diet but eating mackerel, herring and cod when schools of these migrate inshore. Like the grey seal, the harbour seal *Phoca vitulina* relies for its steady diet on flounders and hake, and supplements these with squid, herring, mackerel and cod during their inshore migrations. Although squid, which is rarely eaten by the grey seal, is the preferred food of the harbour seal, there is a broad overlap in other food species consumed. The implied competition in feeding suggests that the reduction of the harbour seal by the bounty system over the last 20 years has been partly responsible for the increase in the number of grey seals.

Mortality

It is impossible to predict just how large the population of grey seals might become. Apart from the mortality imposed by man, which will presumably continue until inshore fisheries for mackerel, herring and salmon are free of predation by the grey seal, mortality of the pups at the breeding colonies is generally low. However, high natural mortality can occur in the Gulf in years of light ice when seals crowd the shores of Amet Island. Causes of mortality in adults are unknown though there is increasing evidence that sharks are important predators of grey seals. In the past three years we have seen an increasing number of mutilated seals at Sable Island bearing scars apparently inflicted by the white shark *Carcharodon carcharias*. Though generally a warm water species, *Carcharodon* has been found occasionally inshore in the Maritime Provinces (Templeman, 1963), presumably following intrusions of warm water from the Gulf Stream. Day and Fisher (1954) attest to the voraciousness of this species by citing records of attacks on a common porpoise *Phocoena phocoena* which was bitten in two and a harbour seal which had its tail and one hind flipper bitten off. Predation from other sources is unknown though the killer whale is occasionally seen in these waters.

Summary

The estimated population of grey seals in eastern Canadian waters appears to have increased substantially in the last five years and now numbers approximately 17,000. This increase which has occurred in spite of controlled killing of pups at three of the breeding colonies, high pup mortality in the Gulf in some years and predation by sharks, may have resulted from changing ice conditions in the Gulf of St. Lawrence and reduction of competition between the grey seal and the harbour seal.

References

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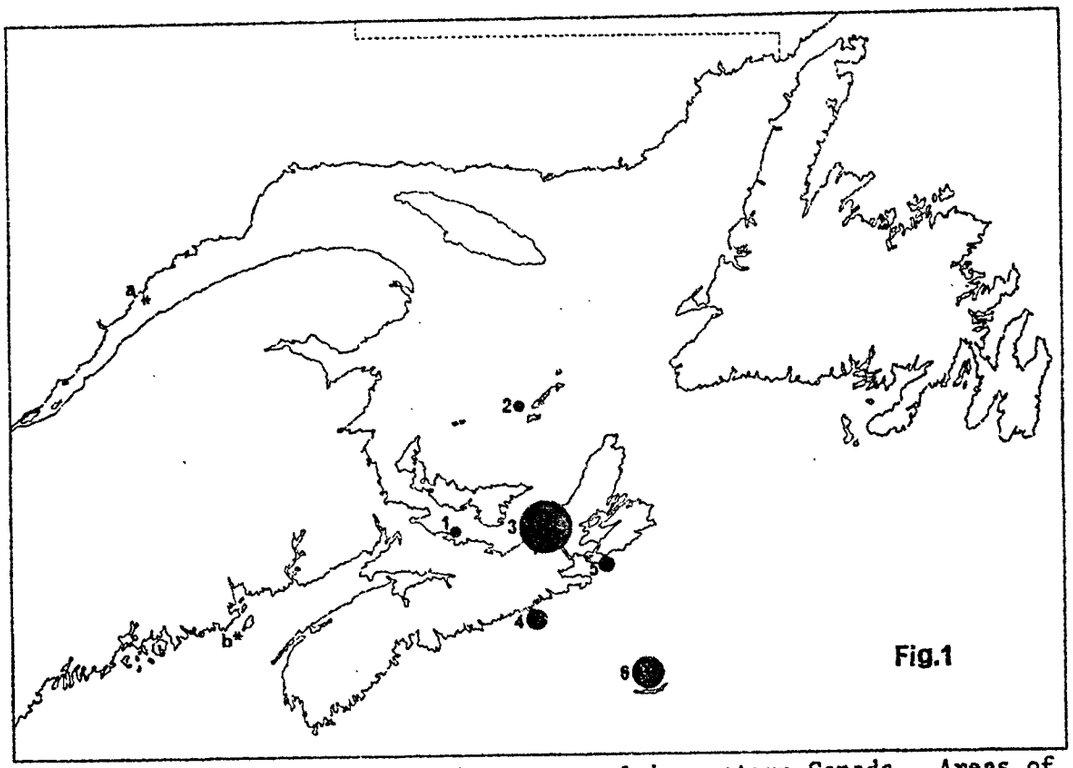

Fig. 1. Breeding colonies of the grey seal in eastern Canada. Areas of circles are in proportion to number of pups born in 1971.
1. Amet Island 2. Deadman Island 3. George Bay 4. Camp Island
5. Basque Islands 6. Sable Island a. Portneuf b. Grand Manan

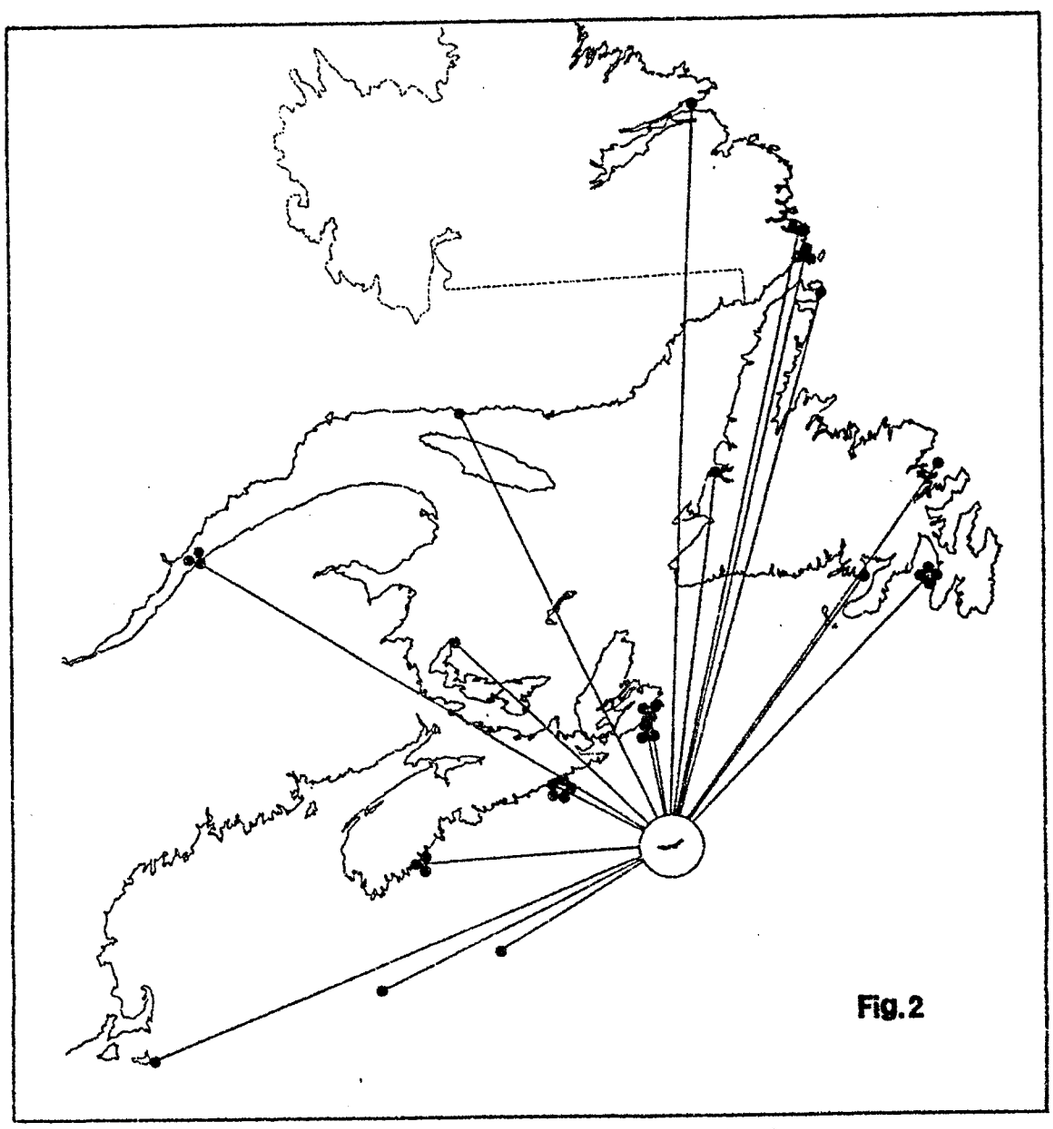

Fig. 2. Dispersal of branded pups from Sable Island.