Committee on the Status of Endangered Wildlife in Canada

Comité sur le statut des espèces menacées de disparition au Canada

Ottawa, Ont. K1A 0H3
(819) 997-4991

STATUS REPORT ON THE NORTHERN BOTTLENOSE WHALE *HYPEROODON AMPULLATUS* IN CANADA

BY

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AND

EDWARD MITCHELL

STATUS ASSIGNED IN 1993
REPORT ACCEPTED, NO STATUS DESIGNATION REQUIRED

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Current Status Of The Northern Bottlenose Whale, *Hyperoodon ampullatus**

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Reeves, Randall R., and Edward Mitchell. 1992. Current status of the Northern Bottlenose Whale, *Hyperoodon ampullatus*. Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Canadian Wildlife Service, Ottawa, Ontario.

The Northern Bottlenose Whale, *Hyperoodon ampullatus*, is a deep-diving, medium-sized teuthophage endemic in the North Atlantic Ocean. Its known distribution is centered in areas with cold, deep water along and seaward of the edge of the continental shelf. Migratory movements are poorly documented, as are stock relations among the animals found in apparently disjunct centers of spring and summer abundance. In the western North Atlantic, Bottlenose Whales are present during much of the year in The Gully near Sable Island, Nova Scotia, and in the Labrador Sea. Northern Bottlenose Whales were hunted mainly by British and Norwegian whalers during the second half of the nineteenth century and by Norwegian and Canadian whalers during the twentieth century. Although population size has been assessed in only relatively small parts of its total range, the Northern Bottlenose Whale remains widely distributed and locally abundant in some areas. It has been protected from commercial whaling since 1977 and is no longer hunted regularly anywhere in its range. Although it is unlikely that the populations of Bottlenose Whales have recovered fully from the effects of past commercial exploitation, the species does not appear to be threatened or endangered at present.

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* Report accepted by COSEWIC 15 April, 1993 - no status designation required.

La baleine à bec commune, *Hyperoodon ampullatus*, est un teuthophage de l'ocean Atlantique Nord, de taille moyenne, plongeur de grandes profondeurs. Sa distribution connue est concentrée en eaux froides profondes, le long et au large du plateau continental. Les activités migratoires sont peu connues ainsi que les interrelations entre les animaux des grands regroupements observés dans les centres de printemps et d'été, apparemment distincts. Dans l'Atlantique Nord de l'ouest, les baleines à bec communes se tiennent dans le "Gully", pres de Sable Island, en Nouvelle-Écosse, et dans la mer du Labrador. Les baleines à bec communes ont surtout été chassées par les baleiniers britanniques et norvégiens durant la seconde moitié du 19° siècle, et par des baleiniers canadiens et norvégiens au 20° siècle. Bien que la taille des populations n'aient été evaluée que dans une petite portion de son habitat, les baleines à bec communes sont encore répandues, nombreuses dans certains groupes topiques. L'espèce est protégée de la pêche commerciale depuis 1977 et on n'en fait plus une chasse régulière, où qu'elle soit. Il est improbable que la baleine à bec commune soit completement rétablie des effets de l'exploitation commerciale qu'elle a subie dans le passé, mais l'espèce ne semble pas menacée présentement ni en danger de disparition.

Key Words: Cetacea, Odontoceti, *Hyperoodon ampullatus*, Northern Bottlenose Whale, *baleine à bec commune*, whaling

The Northern Bottlenose Whale, *Hyperoodon ampullatus* (Forster 1770) [Figure 1], of the North Atlantic Ocean is part of an anti-tropically distributed species pair. Its congener, the Southern Bottlenose Whale, *Hyperoodon planifrons*, is a widely distributed inhabitant of the Southern Ocean. The recognition of two separate species of *Hyperoodon* rests most notably on the geographical isolation of the two groups and on the difference in shape of the maxillary crests, those of *Hyperoodon planifrons* being generally much flatter than those of *Hyperoodon ampullatus* (Fraser 1945; Mead 1989).

The Northern Bottlenose Whale was exploited in a multinational,

multispecies pelagic whale fishery, involving mainly Great Britain and Norway, beginning in the second half of the nineteenth century. Its conservation status has been the subject of some discussion, particularly within the Scientific Committee of the International Whaling Commission (IWC) (e.g. Mitchell 1977b; Klinowska 1991). Since the early 1970s the Northern Bottlenose Whale has been only lightly exploited.

The purpose of this report is to review the current status of the Northern Bottlenose Whale, particularly in the western North Atlantic. In addition to reviewing the literature, we present some unpublished information on sightings and catches by British whalers during the nineteenth century and some biological data on whales taken off Nova Scotia during the 1960s. Also, we have compiled and interpreted some recent sightings made off eastern Canada during environmental-assessment and other surveys.

Distribution and Stock Identity

Gray (1882), a Scottish whaler, gave the distribution of the Northern Bottlenose Whale as:

> ... from the entrance of Hudson's Straits and up Davis Straits, as far as 70° north lat., and down the east side round Cape Farewell, all round Iceland, north along the Greenland ice to 77° north lat.; also along the west coast of Spitzbergen and east to Cherry Island [Bear Island or Bjornøya], in lat. 72° north and long. 19° east.

He had not observed it outside these limits but guessed that it could be found south to the Strait of Belle Isle in the west, and east as far as Novaya Zemlya. According to Benjaminsen (1972) Bottlenose Whales rarely have been caught on the European continental shelf. Only one was taken in the shallow North Sea during 1938-72, and none in the shallow Barents Sea in spite of intensive Norwegian whaling there (Benjaminsen and Christensen 1979). There are, however, records of Bottlenose Whales from Varanger Fiord, the Murman coast, and the White Sea (Birula 1934; Tomilin 1967; Golenchenko 1967; Ivashin 1988).

Areas of Bottlenose Whale abundance in the Northeast Atlantic are well

defined from whaling records (Jonsgård and Øynes 1952; Benjaminsen 1972; Benjaminsen and Christensen 1979): (1) between Iceland and Jan Mayen, (2) southwest of Svalbard, (3) off the Möre coast of Norway, and (4) off the Andenes coast of Norway. The two coastal areas have a narrow shelf, and the catches have been mainly in waters deeper than 1000 m. Bottlenose Whales also have been taken in Denmark Strait, off southern Iceland, and between Iceland and Norway. They occur in deep waters south and west of Iceland during at least early June to early October (Sigurjónsson and Gunnlaugsson 1990).

Norwegian whalers were convinced that Bottlenose Whales reached the northernmost areas of their distribution in the Northeast Atlantic in spring and early summer, and that by July the whales had begun to migrate south (Ohlin 1893; Risting 1922; Jonsgård and ϕynes 1952). Sigurjónsson and Gunnlaugsson (1990) found that Bottlenose Whales were most frequently observed on the Icelandic whaling grounds early in the June-October whaling season. After 14 July, they were less widely distributed, and their distribution was concentrated in the northwest corner of the operational area. The temporal and latitudinal pattern of strandings along European coasts has been interpreted as evidence of a seasonal north-south migration (Turner 1886; Fraser 1953; Benjaminsen and Christensen 1979).

There are two known centers of spring and early summer abundance in the western North Atlantic: (1) off Cape Chidley and across the mouth of Hudson Strait to the mouths of Frobisher Bay and Cumberland Sound, mainly along and just seaward of the 1000 m contour (Lindsay 1911; Christensen 1977; Benjaminsen and Christensen 1979) [Figure 2], and (2) in The Gully near Sable Island off the Atlantic coast of Nova Scotia (Winn et al. 1970; Mitchell 1974; Mitchell and Kozicki 1975) [Table 1; Figure 3]. Norwegian whalers reported seeing several hundred Bottlenose Whales during spring and early summer at about 64°N off West Greenland (Benjaminsen and Christensen 1979).

There are only two specimen records from the Gulf of St. Lawrence (Beaugé 1942; Mitchell 1977a), one from Trinity Bay (Sergeant and Fisher 1957), and one from the Bay of Fundy (Case and Densmore 1970; Mitchell and Kozicki 1975). These

specimens have been considered either "strays" or individuals that have migrated from one of the local concentrations mentioned above (Mitchell and Kozicki 1975). The northernmost record for the west side of Davis Strait is a sighting 7 August 1906 at 67°04'N, 58°25'W, within sight of the east coast of Baffin Island, near Cape Dyer (*Eclipse* 1906). The southernmost record on the American east coast is a capture near Newport, Rhode Island, at 41°30'N (Mitchell and Kozicki 1975).

We have no definite evidence that Bottlenose Whales move west through Hudson Strait and into Hudson Bay. If such movement occurs at all, it is exceptional. In the Churchill post journal of the Hudson's Bay Company, the entry for 22 August 1771 states that the crew of the whaling brig *Charlotte* saw a Bottlenose Whale in and near the Churchill River (Hudson's Bay Company Archives, Winnipeg, Manitoba, B.42/a/80/fo. 82d).

Although Mitchell and Kozicki (1975) were skeptical of Sergeant's (1961) suggestion that Bottlenose Whales winter in the Labrador Sea, British whalers commonly observed them at the South-West Fishing in southern Davis Strait and the Labrador Sea (cf. Reeves et al. 1983) from as early as mid-April through May (Table 2), and recent sightings off the southeast coast of Baffin Island and in the Labrador Sea from February through October (Tables 3 and 4; Figure 2) indicate that at least some are present at high latitudes during much of the year.

Mitchell and Kozicki (1975) speculated that some Bottlenose Whales winter on the continental slope and offshore from Cape Cod to the Grand Bank. During aerial surveys of the continental shelf and slope (to 5 nautical miles [9.3 km] seaward of the 1000 fathom [1829 m] isobath) between Cape Hatteras, North Carolina, and Cape Sable, Nova Scotia, from October 1978 to January 1982, only two sightings were made that were probably of Northern Bottlenose Whales (Cetacean and Turtle Assessment Program 1982; Robert D. Kenney, personal communication, 19 February 1988). One was of a single animal near the Northeast Peak of Georges Bank on 30 May; the other of two animals near the shelf break east of Cape May, New Jersey, on 12 June.

There is no genetic or biochemical evidence for separate biological populations of Northern Bottlenose Whales, although their distribution in at least spring and early summer is apparently discontinuous. The IWC's Subcommittee on Small Cetaceans has recognized the likelihood of separate stocks (Mitchell 1975a). Patches of Bottlenose Whale abundance are widely spaced and thus might be taken to represent feeding substocks (*sensu* Katona [1986] for Humpback Whales, *Megaptera novaeangliae*). Mitchell (1977b) suggested that two statistical areas be used for convenience, dividing catches east and west of Cape Farewell into Northeast Atlantic and Northwest Atlantic, respectively.

Protection

National regulations of the Norwegian pelagic whale fishery in the North Atlantic came into force in 1938, but these were aimed mainly at regulating effort to control the take of Minke Whales, *Balaenoptera acutorostrata* (Jonsgård 1977a; *also see* Foote 1975). The Northern Bottlenose Whale has been listed since 1977 as a protected species in the Schedule of the International Convention for the Regulation of Whaling.

Like other cetaceans, the Northern Bottlenose Whale is fully protected by national legislation in the U.S.A. and the United Kingdom. In Canada the Cetacean Protection Regulations of 1982, under the Fisheries Act, allow Indians and Inuit to hunt cetaceans for their own consumption, but there is no regular subsistence hunt for Bottlenose Whales. Commercial hunting of cetaceans is forbidden, except under licence. There is no commercial Bottlenose Whale fishery in Canada at this time.

Since 1984 the Northern Bottlenose Whale has been on Appendix I of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). This classification means that international commerce in products is banned. Before 1973, the market for toothed whale meat (from Bottlenose, Killer, *Orcinus orca*, and Pilot whales, *Globicephala melas*) obtained in the Norwegian small whale fishery was mainly for pet food in the United Kingdom and for animal food in the Norwegian fur industry (Jonsgård 1977b). A British ban on the

importation of whale meat for pet food in 1973 eliminated the international component of this market.

The products obtained from the few Bottlenose Whales taken in recent years at the Faroe Islands (*e.g.*, 2 in 1978 - *International Whaling Statistics* XCIII:36; 3 in 1988 - Anonymous 1990a; 2 in 1989 - Bloch and Desportes 1991) presumably have not been exported. These takes have been described as "traditional" and are said to result from the whales' tendency to "strand themselves, often in one particular locality" (Olafsson 1990).

Exploitation

The British Fishery

The first sizeable catch on record was of 28 Bottlenose Whales by the *Chieftain* of Kirkaldy in about 1850 (D. Gray letter to T. Southwell, 1881, *in* Southwell 1860-1908; Lubbock 1937; Gray 1941). The *Polar Star* of Peterhead "tried the bottlenosed whale fishing" in 1860 (*Aberdeen Daily Free Press*, Aberdeen, Scotland, 31 January 1893), as did the Hudson's Bay Company's bark *Ocean Nymph* while en route to Hudson Bay in July 1866 (Hudson's Bay Company Archives, Winnipeg, Manitoba, C.1/617). In 1877 the *Jan Mayen* of Peterhead took ten Bottlenose Whales, having missed the annual seal hunt in the Greenland Sea (Gray 1941). When Gray (1882) verified from his catch in 1880 that the spermaceti from the male Bottlenose Whale's head had many of the same properties as the spermaceti from Sperm Whales, *Physeter catodon*, the hunt for Bottlenose Whales became more popular with the Scottish whalers. From 1877 to 1892 they took approximately 1668 Bottlenose Whales (Table 5).

The British fishery ended abruptly in 1892. Although Southwell (1885) blamed the decline of the fishery in 1884 on overfishing and bad weather, it seems clear that the British withdrawal was caused primarily by a steep reduction in the price of Bottlenose oil, from £90 per ton in the early 1880s to less than £20 per ton in the early 1890s (Figure 4).

The Norwegian Fishery

Norwegian sealers entered the seal fishery in the Greenland Sea in 1849 (Gray 1941) and made desultory attempts to take Bottlenose Whales. Vessels from Norway were outfitted specially for the Bottlenose fishery for the first time in 1883 (Nansen 1925). Besides carrying whaleboats for chasing, Norwegian Bottlenose Whale catchers had cannons mounted on the mothership (Ohlin 1893). The Norwegians took nearly 17 500 Bottlenose Whales from 1883 through 1892 (Christensen 1976). Most of the oil went to London and Glasgow, glutting the market and driving down the price of Bottlenose oil (D. Gray letter to T. Southwell, 1887, *in* Southwell 1860-1908). The Norwegian Bottlenose Whale fishery also affected American exports of Sperm oil by making large quantities of Bottlenose oil available in Europe at comparatively modest prices (*e.g.*, letter from D. Gray to T. Southwell, 1894, *in* Southwell 1860-1908; *Whalemen's Shipping List*, New Bedford, Massachusetts, 55(5), 23 February 1897).

The highest catch on record was in 1896, when 80 Norwegian vessels took 3301 Bottlenose Whales (Christensen 1976). The total Norwegian catch through 1926 was more than 57 500. By 1927, the fleet of Bottlenose catchers had declined to a single vessel. No catch was reported from 1931 to 1936, but after 1937 Bottlenose whaling continued ancillary to the pelagic Minke Whale fishery. Long-finned Pilot Whales and Killer Whales were also taken (Mitchell 1977b). The total recorded Bottlenose catch by Norway from 1927 through 1973 was more than 5900 (Christensen 1976). Nearly all the Bottlenose Whales taken by Norwegian whalers from 1882 through 1973 were in the Northeast Atlantic, i.e. east of Cape Farewell, except for the 818 taken off Labrador in 1969-71 (Christensen 1975; Benjaminsen and Christensen 1979).

Product Yields

A large adult male (Figure 5) could yield as much as 2 to 3 tons of oil and 2 to 3 hundredweight of spermaceti (Gray 1882, 1941), although the average oil yield was no more than a ton (Ohlin 1893) [Table 5]. Ohlin (1893) noted that the oil yield of an old male ("toendebund") was equivalent to that of three or four "smaller or ordinary" whales. Females produced no spermaceti. The major

difference in yield between males and females may have induced the whalers to hunt selectively for adult males. As suggested by Mitchell (1977b), proportionately more of a given age or sex class may have been taken in the early years of the Bottlenose fishery if succorant behavior was stronger in, for example, adult females or dominant bulls than in other segments of the population. Gray's (1882) catch in 1882 consisted of 96 adult males, 56 females, and 51 "younger" males. The previous year at least 28% of his catch consisted of females (Table 6). Of 25 Bottlenose Whales taken off Nova Scotia for which sex was recorded, the male:female ratio was 2:3 (Table 1).

Whaling Tactics and Hunting Loss

The tendency of Bottlenose Whales to approach vessels ("seeking") and to gather round injured companions (succorant or care-giving behavior) meant that much of a group could be killed in a day (Gray 1882). Although some Scottish whalers noted that the whales became warier after a few years of hunting pressure (Southwell 1884), the Norwegians continued to rely on the ship-approaching and succorant behavior of the Bottlenose Whales (Ohlin 1893).

Bottlenose Whales were difficult to kill, and there was a substantial loss rate, at least in the early years (Gray 1882). On one day D. Gray's crew fired 25 shots at Bottlenose Whales but fastened to only nine, two of which were lost when the harpoon broke (D. Gray letter to Southwell, 1881 *in* Southwell 1860-1908). In 1882 the crew of the *Eclipse* fired 338 shots, of which 224 "took effect"; 21 struck whales escaped when the harpoon drew or the line broke (Lubbock 1937).

Population Sizes and Trends

Mitchell (1975b) used catch data from the late nineteenth century (Risting 1922; Lubbock 1937) for a series of cumulative catch estimates of "initial" population size. Especially considering the late age at first ovulation and lengthy calving interval of Bottlenose Whales (Benjaminsen 1972; Christensen 1973) and that Mitchell used only data on secured catch and made no adjustment

for hunting loss, his estimates ranging between 14 000 and 26 000 in the Northeast Atlantic in the 1880s are probably conservative.

A more complete series of Norwegian catch data indicated a total North Atlantic catch of 29 782 from 1890 to 1900 (Christensen 1976). Christensen (1976) reasoned that if one whale was struck and lost for every 3 or 4 secured during the early years of the fishery, then there must have been 40 000 to 50 000 Bottlenose Whales east of Greenland when whaling began. Mitchell (1977b) used Christensen's (1976) catch series and applied a 10% "lost-and-killed" rate, concluding that there must have been at least 28 000 Bottlenose Whales east of Greenland in 1889.

From shipboard sightings surveys in summer 1987, Gunnlaugsson and Sigurjónsson (1990) estimated 4925 (c.v.=0.16) Bottlenose Whales in an area around Iceland, *ca* 07°W to 42°W and 55°N to 69°N, and 902 (c.v.=0.45) around the Faroe Islands, *ca* 07°E to 12°W and 52°N to 67°N. The surveyed areas included a relatively small part of the species range in the central and eastern North Atlantic. The estimates did not include a correction for submerged whales that were missed (negative bias), nor did they include an adjustment to account for the ship-approaching behavior of Bottlenose Whales (positive bias). ϕien (1990) noted the difficulty of applying conventional line-transect analyses to sightings data for a species, like the Northern Bottlenose Whale, that has such prolonged dive times (14-70 min, *fide* Benjaminsen and Christensen 1979).

Catches of Bottlenose Whales west of Greenland have been much smaller than those east of Greenland. The total Scottish catch in "Davis Strait" was only 235 whales, 1877-92 (Table 5). The cumulative Norwegian catch off Labrador was 818 whales, 1969-71 (Christensen 1975). A total of 87 Bottlenose Whales was taken off Nova Scotia, 1962-67 (Mitchell 1975b) [Table 1].

The reported catch of 20 Bottlenose Whales at Newfoundland in 1953, from the *International Whaling Statistics* (Mitchell 1975b:54), is a transcriptional error. Twenty Minke Whales and one Bottlenose Whale were taken that year. The Bottlenose was one of two seen in Trinity Bay in the 1953 season (Sergeant and Fisher 1957). In waters along Hall Peninsula, southeastern Baffin Island, the

Bottlenose Whale was judged to be the most common cetacean during the period from May to October 1978 (Smith et al. 1979). On the basis of at-sea observations and photoidentification in 1988-90, Whitehead and Faucher (1990; *also see* Whitehead 1990) estimated that a "resident" population of Bottlenose Whales in The Gully area off Nova Scotia numbered in the low hundreds.

Habitat

Gray (1882) found the densest concentrations of Bottlenose Whales along the edges of pack ice in spring and summer, although he claimed that they were rarely encountered "amongst" the ice. In his experience, they seemed to prefer sheltered, open embayments, which they would leave as ice encroached. Norwegian whalers found Bottlenose Whales several nautical miles "inside the ice edge" off Svalbard and Labrador and on one occasion as much as 10 nautical miles into the ice off Labrador (Benjaminsen and Christensen 1979). Aerial observations along the ice edge off Labrador gave observers the impression that the whales were moving "in and out under the ice, possibly to feed" (Conover, Parsons, and Orr 1979:5-20).

As indicated above, Bottlenose Whales are found in greatest abundance in waters deeper than 1000 m. Records of sightings made from Icelandic whaling vessels on the whaling grounds west and southwest of Iceland, 1979-88, confirm that Bottlenose Whales inhabit waters mainly near or seaward of the 1000 m depth contour (Sigurjónsson and Gunnlaugsson 1990). The main concentration area was northwest of the Reykjanes ridge. Whitehead (1990) suggested that Bottlenose Whales are most readily found in a very small area of a few square kilometers at the entrance of The Gully off Nova Scotia. The whales apparently occupy this area year-round.

The distribution of Bottlenose Whales during spring and early summer is said to be concentrated near the boundaries between cold polar currents and warmer Atlantic currents (Murray and Hjort 1912). They have been observed in areas with surface temperatures as high as 17°C (Winn et al. 1970) and as low as -2°C (Ohlin 1893). Benjaminsen and Christensen (1979) found them to be most

abundant east and northeast of Iceland during April and May in waters with surface temperatures between -1.3° and -0.9°C.

General Biology

Life History

"Mature" fetuses were found in Bottlenose Whales in the Greenland Sea in May and June, and females accompanied by calves were seen there in June (Gray 1941). Based on the lengths of 251 fetuses and their dates of capture, Benjaminsen (1972) concluded that the peak of births is from April through June. He considered the mean length at birth to be about 3 m. Using the same sample of fetal lengths, Benjaminsen (1972) estimated the gestation period as about 12 months. Thus, the peak time of mating and births is spring and early summer. The lactation period has not been determined but is probably at least a year. The female reproductive cycle involves an average calving interval of at least 2 years (Mitchell 1975a; Benjaminsen and Christensen 1979).

Females reach sexual maturity at a length of 6.7 to 7.0 m (Benjaminsen 1972), which corresponds to an age of 8 to 13 dentinal growth-layer-groups (GLGs; probably formed annually) [Christensen 1973, 1975]. Christensen (1973) estimated that females ovulate for the first time at an age of 7 to 18 GLGs and that 80% attain sexual maturity at ages of 8 to 12 GLGs.

Sexual maturity in males is attained at a length of 7.3 to 7.6 m (Benjaminsen 1972). Benjaminsen (1972) estimated from a sample of 19 specimens that sexual maturity in males was reached at ages of 9 to 11 GLGs.

Christensen's (1973) age-length curve based on 75 males from Labrador indicated that lengths of 7.3 to 7.6 m correspond to ages of 7 to 9 GLGs. Testes weights plotted against age for the same sample suggested that accelerated growth of testes occurs at 8 to 12 GLGs. According to the histological appearance of the testes, all males younger than 7 GLGs were classified as immature, "maturing" whales (10-75% of tubules mature) were in the 7 to 11 GLG range, and all animals older than 11 GLGs were sexually mature (Christensen 1975; Benjaminsen and Christensen 1979).

Behavior

Bottlenose whales are generally found in groups of 4 to 10, "although many different herds are frequently in sight at the same time" (Gray 1882). In seven sightings of 31 whales in the Northeast Atlantic, the mean group size was 4.43 (c.v. 0.13 [ϕien 1990]). There is some segregation in Bottlenose Whale populations, with adult males sometimes travelling separately from the younger males and females (Gray 1882; Ohlin 1893). Preliminary analyses of photoidentification data from The Gully suggest that female Bottlenose Whales form permanent groups while males move between such groups (Whitehead 1990).

Insert from Kastelein and Gerrits 1991]

The squid *Gonatus fabricii* is the most important prey of Northern Bottlenose Whales during spring and summer. Some whale stomachs have been found to contain as much as 20 to 25 liters of beaks and other undigested parts of *Gonatus fabricii* as well as fish (Benjaminsen and Christensen 1979). In addition to squid, they take sea cucumbers (Holothuroidea), sea stars (Asteroidea), euphausiids, *Thysanopoda* sp., and Herring, *Clupea harengus*. Stomachs of whales killed off Iceland contained, in addition to squid, Cusk, *Brosmius brosme*, Lumpsucker, *Cyclopterus lumpus*, and Redfish, *Sebastes* sp.; those off Labrador, Greenland Halibut, *Reinhardtius hippoglossoides*, Redfish, Rabbit-fish, *Chimaera monstrosa*, Piked Dogfish, *Squalus acanthias*, Ling, *Molva olva*, Skate, *Raja* sp., and Deep-sea Prawns, *Pandalus* sp. (Benjaminsen and Christensen 1979).

Limiting Factors

Although British whalers found little or no evidence that Bottlenose Whales were preyed upon by Killer Whales (Gray 1941), Jonsgård (1968a) reported an observation by Norwegian whalers of a Bottlenose Whale being killed by Killer Whales as well as an attack by a pod of Killer Whales on two harpooned Bottlenose Whales. Jonsgård (1968b) described Bottlenose Whales with one or both flippers missing and mentioned that some injured animals bore tooth marks from Killer Whales. Bottlenose Whales occasionally come ashore alive (Anonymous 1990b).

Bottlenose Whales are generally absent from semi-enclosed areas such as

Hudson Bay, the Gulf of St. Lawrence, and the Baltic Sea. Their near total dependence on squid for food suggests that their overall distribution is determined largely by the availability of squid, particularly *Gonatus fabricii*. Bottlenose Whales characteristically inhabit specific ocean areas with particular conditions (*see* Habitat).

Special Significance of the Species

Apart from its economic significance, the Northern Bottlenose Whale is scientifically interesting. It has been considered "the Sperm Whale of the Ziphiidae" because of apparent similarities in morphology (*e.g.*, strong sexual dimorphism, presence of spermaceti in the head) and behavior (*e.g.*, possible harem structure of groupings, deep diving, dietary preference for squid) between the two species (Mitchell 1977b). Whitehead (1990) suggested that in spite of some obvious similarities, Bottlenose Whales differ from Sperm Whales in that they are less wide-ranging and more tied to particular spots in the ocean where their peculiar habitat requirements are met. Clarke and Kristensen (1980) noted that the squids eaten by two stranded Northern Bottlenose Whales, one found at the Faroe Islands and one at Jutland in Denmark, were considerably smaller (average weight estimated at 157 g) than the squids eaten by Sperm Whales near Iceland (average 1540 g).

The large maxillary crests of the Northern Bottlenose Whale's skull are thought to have a function related to acoustic behavior (Norris 1964; Mitchell and Kozicki 1975). Similar maxillary crests are present in only one other cetacean genus, *Platanista*, the functionally blind river dolphins of the Indian Subcontinent that swim on their sides while scanning the bottom (sonically) for prey (Herald et al. 1969). It is not known whether the Bottlenose Whale is also a side-swimmer.

Clarke (1986) referred to the value of studying the diet of deep-diving oceanic cetaceans, such as the Bottlenose Whales, as a way of assessing the distribution and ecology of squids and deep-sea fishes. In some respects at

least, whales may be more efficient samplers of cephalopods than are trawl nets (Clarke 1980). Knowledge of squid distribution and ecology has also been used to make inferences about the movements of Bottlenose Whales (Clarke and Kristensen 1980).

The Northern Bottlenose Whale is reputed to dive for periods of up to 2 hours. Only the Sperm Whale is known to be capable of dives of comparable duration (Watkins et al. 1985). The Northern Bottlenose Whale's ship-approaching behavior and concentrated distribution make it a more promising species for observation than the other ziphiids, whose surface behavior is more cryptic (*e.g., see* Whitehead 1990; Whitehead and Faucher 1990).

Evaluation

There has been much controversy about the status of Northern Bottlenose Whales in the Northeast Atlantic and about the reasons for the westward expansion of the Norwegian fishery. This controversy has centered on questions about the relative importance of economic factors versus depletion of whales in causing the fishery's decline and the changes in areas of operation.

Nansen (1925:235) stated that the decline of the Norwegian Bottlenose Whale fishery in the 1920s was caused by "the comparative scarcity of whales." However, there apparently were enough left to sustain catches totalling close to 6000 Bottlenose Whales ancillary to the Minke Whale fishery from 1937 to 1973.

A few years after Bottlenose whaling started north of Iceland and continued east of Iceland and near Jan Mayen, Bottlenose Whales were "scarcely to be seen in these areas" (Christensen 1975). By the late 1960s, "the vessels had to move into the Labrador Sea to catch this species." However, while acknowledging that the population of Bottlenose Whales might have been reduced between 1946 and 1972, Christensen et al. (1977) argued that the westward expansion of Norwegian whaling "was not caused by a drastic depletion of the stock or stocks in the North East Atlantic." Mitchell (1977b) noted that the peak catch of 689 in 1965 and the high catches of 477 and 529 in 1969 and 1970, respectively, were comprised largely of animals in Denmark Strait and Davis Strait "that had not

been exploited heavily for over fifty years."

Christensen et al. (1977) were unable to explain the transfer of effort from the Spitsbergen catching ground to the North and East Iceland-Jan Mayen ground in the 1960s but concluded that "the available data do not indicate any depletion off Spitsbergen." In their view, the westward expansion of Bottlenose whaling to the Labrador Sea in 1969 was made possible by the entry of larger boats into the fishery. According to Christensen et al., the "availability" of Bottlenose Whales was sufficiently greater off Labrador than in the old catching grounds off Spitsbergen and north of Iceland to make it economically profitable for those whalers with large enough boats to travel the extra distance. These authors did not comment on why Bottlenose Whales were more "available" off Labrador than on the Northeast Atlantic catching grounds. One possibility is that the stock(s) between Europe and Greenland had become depleted after 80 or more years of whaling, while the whales off Labrador remained relatively undisturbed by whaling before the 1960s and were behaviorally naive as well as densely distributed in areas of prime habitat.

Jonsgård (1977b) discussed how market factors and meat prices affected the catching of Bottlenose Whales. Although the average value of a Bottlenose Whale exceeded that of a Minke Whale during 1946-59, the values were essentially equivalent during 1960-65. After 1965, the value of a Bottlenose Whale remained less than that of a Minke Whale. Jonsgård suggested that this trend may have been caused by the increasing size of the average Minke Whale taken. He explained the elimination of odontocetes from the catch after 1972 as due at least partially to the British ban on importation of whale meat for pet food and to the availability of less expensive substitutes for feeding fur-farm animals.

The status of Bottlenose Whales in the Labrador Sea is of particular interest to Canada. Christensen et al. (1977) noted a decline in the average number of whales taken per catcher there over the short period 1969-71: 46.2 (5 vessels) in 1969, 37.4 (9 vessels) in 1970, and 37.8 (4 vessels) in 1971. They concluded that these data indicated a "reduced but not depleted stock off Labrador after 1972."

Canadian catches in The Gully declined from 1964 to 1967 (Table 1), but this may have been due partly to the increasing importance of Fin Whales, *Balaenoptera physalus*, and Sei Whales, *Balaenoptera borealis*, in this fishery (Mitchell 1974) rather than to a major decline in availability of Bottlenose Whales.

Mitchell (1975b) listed *Hyperoodon ampullatus* as a species that was heavily exploited and for which there was urgent need of population assessment. At the time, he considered the Northern Bottlenose Whale "vulnerable" according to the definition of Goodwin and Holloway (1972). It was formally assigned the status of "vulnerable" by the International Union for Conservation of Nature and Natural Resources (IUCN; now World Conservation Union) in the Red Data Book in 1976 (Mitchell 1976). The species recently was removed from IUCN's "vulnerable" category and is now listed as "insufficiently known" (Klinowska 1991). Considering that the Northern Bottlenose Whale has not been exploited commercially since 1973 and that it is currently protected by the IWC, we conclude that it does not require a COSEWIC status designation at this time. However, Whitehead (1990) expressed concern about the vulnerability of the Bottlenose Whales using The Gully because of plans to develop nearby offshore oil and gas fields. The Gully is one of the few places in the world where a ziphiid population can be closely studied. Any plans for offshore development involving ship traffic or other industrial activities on or near The Gully should be evaluated for their potential impact on Bottlenose Whales.

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Literature Cited

[Note for whaling manuscript sources that are listed alphabetically by vessel name: PAC=Public Archives of Canada, Ottawa; SC = Stefansson Collection,

Dartmouth College Library, Hanover, New Hampshire, USA (microfilm)]

Allen, J.H., and S.A.M. Conover. 1977. Report on primary data collected for dt 1977 Davis Strait biological programme and analyzed prior to December, 1977 for Imperial Oil Ltd., Aquitaine Co. of Canada Ltd. and Canada Cities Services Ltd., Arctic Petroleum Operators Association project no. 138, December, 1977. MacLaren Atlantic Limited, Dartmouth - Fredericton - Moncton. (unpublished).

Anonymous. 1990a. Denmark. Progress report on cetacean research, June 1988 to May 1989. Report of the International Whaling Commission 40: 190-194.

Anonymous. 1990b. Iceland. Progress report on cetacean research, June 1988 to May 1989. Report of the International Whaling Commission 40: 195-198.

Beaugé, Commander. 1942. Sur l'apparition et l'échouage d'un *Hyperoodon rostratus* à Sainte-Anne-de-la-Pocatière. Provancher Society of Natural History of Canada, Annual Report for 1941, pp. 23-30.

Benjaminsen, T. 1972. On the biology of the Bottlenose Whale, *Hyperoodon ampullatus* (Forster). Norwegian Journal of Zoology 20:233-241.

Benjaminsen, T., and I. Christensen. 1979. The natural history of the Bottlenose Whale, *Hyperoodon ampullatus* (Forster). Pages 143-164 *in* Behavior of marine animals, Volume 3. *Edited by* H.E. Winn and B.L. Olla, Plenum Press, New York.

Birula, A.A. von 1934. Über die seesäugetiere des Weissen Meeres. Zool. Anzieger 107:10-22.

Bloch, D., and G. Desportes. 1991. Denmark. Progress report on cetacean research, 1989. Part 2. Faroe Islands. Report of the International Whaling Commission 41: 233-234.

Boles, B.K. 1980. Data report listing sightings of cetaceans in the Labrador Sea. Offshore Labrador Biological Studies, 1979. Prepared by Atlantic Biological Services, Ltd., St. John's, Newfoundland, for Total Eastcan

Exploration Ltd., Calgary, Alberta. (unpublished).

Case, G.R., and H. Densmore. 1970. Report of a beached Bottlenosed Whale on the shores of Cobequid Bay, Nova Scotia. Underwater Naturalist 6(3):18-20.

Cetacean and Turtle Assessment Program 1982. A characterization of marine mammals and turtles in the mid- and north-Atlantic areas of the U.S. outer continental shelf. Annual report for 1980 for the Cetacean and Turtle Assessment Program, University of Rhode Island, Kingston, R.I. 02881. Prepared for U.S. Department of the Interior, Bureau of Land Management, Washington, D.C. 20240. Contract AA551-CT8-48. (unpublished)

Christensen, I. 1973. Age determination, age distribution and growth of Bottlenose Whales, *Hyperoodon ampullatus* (Forster), in the Labrador Sea. Norwegian Journal of Zoology 21:331-340.

Christensen, I. 1975. Preliminary report on the Norwegian fishery for small whales: Expansion of Norwegian whaling to Arctic and Northwest Atlantic waters, and Norwegian investigations of the biology of small whales. Journal of the Fisheries Research Board of Canada 32:1083-1094.

Christensen, I. 1976. The history of exploitation and the initial status of the Northeast Atlantic Bottlenose Whale (Hyperoodon ampullatus). Food and Agriculture Organization of the United Nations, Advisory Committee on Marine Resources Research, Scientific Consultation on Marine Mammals, Bergen, Norway, 31 August-9 September. ACMRR/MM/SC/22. (unpublished)

Christensen, I. 1977. Observations of whales in the North Atlantic. Report of the International Whaling Commission 27:388-399.

Christensen, I., Å. Jonsgård, and C.J. Rørvik. 1977. Some notes concerning the Bottlenose fishery in the North Atlantic after the Second World War, with particular reference to the westward expansion. Report of the International Whaling Commission 27:226-227.

Clarke, M.R. 1980. Squids and whales. Natural Environment Research Council (U.K.) News Journal 9:4-6.

Clarke, M.R. 1986. Cephalopods in the diet of odontocetes. Pages 281-321 *in*

Research on dolphins. *Edited by* M.J. Bryden and R.J. Harrison. Oxford University Press, Oxford, U.K.

Clarke, M.R., and T.K. Kristensen. 1980. Cephalopod beaks from the stomachs of two Northern Bottlenose Whales (Hyperoodon ampullatus). Journal of the Marine Biological Association of the U.K., 60: 151-156.

Conover, S.A.M., C.D. Orr, and J.L. Parsons. 1979. Report on aerial surveys of birds and marine mammals in the southern Davis Strait between April & December. 1978 for Esso Resources Canada Ltd., Aquitaine co. of Canada Ltd. and Canada Cities Services Ltd., Arctic Petroleum Operators Association, Project no. 146, vol. 3, marine mammals. Prepared by MacLaren Marex Inc., St. John's-Dartmouth-Fredericton. (unpublished).

Conover, S.A.M., J. Parsons, and C. Orr. 1979. Report on aerial surveys of marine mammals & birds in southern Davis Strait & eastern Hudson Strait in March, 1978. Unpublished report for Esso Resources Canada Ltd., Aquitaine Co. of Canada Ltd., and Canada Cities Services Ltd., Arctic Petroleum Operators Association, Project no. 146, prepared by MacLaren Marex Inc., St. John's-Dartmouth-Fredericton. (unpublished).

Conover, S.A.M., and D.P. Stone. 1979. Report on cruise 78-1, Environmental studies in the pack ice zone of Davis Strait for Esso Resources Ltd., Aquitaine Co. of Canada Ltd. and Canada Cities Services Ltd., Arctic Petroleum Operators Association project no. 146, January, 1979. Prepared by MacLaren Marex Inc., St. John's-Dartmouth-Fredericton-Ottawa-Calgary. (unpublished)

Diana. 1899. Logbook of *Diana*, Dundee to Davis Strait, 24 April to 4 October, William Adams, Jr., Master. [PAC]

Eclipse. 1893. Logbook of *Eclipse*, Dundee to Davis Strait, 19 March to 30 October, William F. Milne, Master. [PAC]

Eclipse. 1894. Logbook of *Eclipse*, Dundee to Davis Strait, 20 March to 6 October, William F. Milne, Master. [PAC]

Eclipse. 1899. Logbook of *Eclipse*, Dundee to Davis Strait, 28 April to 14 November, William F. Milne, Master. [PAC]

Eclipse. 1903. Logbook of *Eclipse*, Dundee to Davis Strait, 9 April to 15 November, William F. Milne, Master. [PAC]

Eclipse. 1906. Logbook of *Eclipse*, Dundee to Davis Strait, 15 April to 8 November, William F. Milne, Master. [PAC]

Erme. 1913. Logbook of *Erme*, London to Baffin Island, 25 March to 3 November. [SC]

Esquimaux. 1885. Logbook of *Esquimaux*, Dundee to Davis Strait, 29 January to 18 October, William F. Milne, Master. [PAC]

Esquimaux. 1887. Logbook of *Esquimaux*, Dundee to Davis Strait, 10 February to 6 November, William F. Milne, Master. [PAC]

Esquimaux. 1888. Logbook of *Esquimaux*, Dundee to Davis Strait, 22 May to 1 November, William F. Milne, Master [PAC]

Foote, D.C. 1975. Investigation of small whale hunting in northern Norway, 1964. Journal of the Fisheries Research Board of Canada 32:1163-1189.

Fraser, F.C. 1945. On a specimen of the Southern Bottlenosed Whale, *Hyperoodon planifrons*. Discovery Reports 23:19-36.

Fraser, F.C. 1953. Report on Cetacea stranded on the British coasts from 1938 to 1947. No. 13. British Museum (Natural History), London.

Golenchenko, A.P. 1967. Gosti iz Arktiki [Guests from the Arctic]. Priroda 56(4):68-69.

Goodwin, H.A., and C.W. Holloway. 1972. Red data book. Volume 1: Mammalia. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Gray, D. 1882. Notes on the characters and habits of the Bottlenose Whale (Hyperoodon rostratus). Proceedings of the Zoological Society of London 1882:726-731.

Gray, R. 1887. Notes on a voyage to the Greenland seas in 1886. Zoologist, 3rd series, 11(122):48-57.

Gray, R.W. 1933. Peterhead sealers and whalers: A contribution to the history

of the whaling industry. Scottish Naturalist 199:1-10.

Gray, R.W. 1941. The Bottlenose Whale. Naturalist 786:129-132.

Gunnlaugsson, T., and J. Sigurjónsson. 1990. NASS-87: Estimation of whale abundance based on observations made onboard Icelandic and Faroese survey vessels. Report of the International Whaling Commission 40:571-80.

Herald, E.S., R.L. Brownell, Jr., F.L. Frye, E.J. Morris, W.E. Evans, and A.B. Scott. 1969. Blind river dolphin: First side-swimming cetacean. Science 166:1408-10.

Ivashin, M.V. 1988. USSR. Progress report on cetacean research, June 1986 to May 1987. Report of the International Whaling Commission 38:224-231.

Jonsgård, Å. 1968a. A note on the attacking behaviour of the Killer Whale (Orcinus orca). Norsk Hvalfangsttidende 57(4):84-85.

Jonsgård, Å. 1968b. Another note on the attacking behaviour of Killer Whale (Orcinus orca). Norsk Hvalfangsttidende 57(6):175-176.

Jonsgård, Å. 1977a. Norwegian and international regulations in the Norwegian whaling for Minke Whales, *Balaenoptera acutorostrata*, and small whales. Report of the International Whaling Commission 27:400-401.

Jonsgård, Å. 1977b. A note on the value of Bottlenose Whales in relation to Minke Whales in postwar seasons, and the influence of the market situation and the prices on Norwegian whaling activity. Report of the International Whaling Commission 27:502-504.

Jonsgård, Å., and P. ϕynes. 1952. Om Bottlenosen (Hyperoodon rostratus) og Spekkhoggeren (Orcinus orca). Fauna (Oslo) 1:1-18.

Kastelein, R.A., and N.M. Gerrits. 1991. Swimming, diving and respiration patterns of a Northern Bottlenose Whale Hyperoodon ampullatus (Forster, 1770). Aquatic Mammals 17(1): 20-30.

Katona, S.K. 1986. Biogeography of the Humpback Whale, *Megaptera novaeangliae*, in the North Atlantic. Pages 166-171.

Klinowska, M. 1991. Dolphins, porpoises and whales of the world. The IUCN red data book. IUCN, World Conservation Union, Gland, Switzerland and Cambridge, U.K.

Lindsay, D.M. 1911. A voyage to the Arctic in the whaler Aurora. Dana Estes and Co., Boston. 223 pp.

Lubbock, B. 1937. The arctic whalers. Brown, Son & Ferguson, Glasgow. xi + 483 pp.

MacLaren Atlantic Limited. 1977. Report on Cruise 77-1, February 1977. environmental aspects of the cruise to Davis Strait and the Labrador coast for Imperial Oil Ltd., Aquitaine Co. of Canada Ltd. and Canada Cities Services Ltd., May, 1977. MacLaren Atlantic Ltd., Dartmouth-Fredericton-Moncton. (unpublished)

Maud. 1891. Logbook of *Maud*, Dundee to Davis Strait, 19 March to 3 October, William F. Milne, Master. [PAC]

Maud. 1892. Logbook of *Maud*, dundee to Davis Strait, 28 March to 7 October, William F. Milne, Master. [PAC]

Mead, J.G. 1989. Bottlenose Whales *Hyperoodon ampullatus* (Forster, 1770) and *Hyperoodon planifrons* Flower, 1882. Pages 321-48 *in* Handbook of marine mammals. Volume 4. River dolphins and the larger toothed whales. *Edited by* S.H. Ridgway and R. Harrison. Academic Press, London.

Mitchell, E. 1974. Present status of Northwest Atlantic Fin and other whale stocks. Pages 108-169 *in* The Whale problem. A status report. *Edited by* W.E. Schevill. Harvard University Press, Cambridge, Massachusetts.

Mitchell, E. *Editor*, 1975a. Review of biology and fisheries for smaller cetaceans. Report and papers from a meeting of the Subcommittee on Smaller Cetaceans, International Whaling Commisssion, in Montreal, April 1-11, 1974. Journal of the Fisheries Research Board of Canada 32:887-983.

Mitchell, E. 1975b. Porpoise, dolphin and small whale fisheries of the world. IUCN Monograph No. 3. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Mitchell, E.D. 1976. Northern Bottlenose Whale *Hyperoodon ampullatus* (Forster, 1770). *In* Red data book. Volume I: Mammalia. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Mitchell, E. 1977a. Canadian progress report on whale research - June 1975 to May 1976. Report of the International Whaling Commission 27:73-85.

Mitchell, E. 1977b. Evidence that the Northern Bottlenose Whale is depleted. Report of the International Whaling Commission 27:195-203.

Mitchell, E. and V.M. Kozicki. 1975. Autumn stranding of a Northern Bottlenose Whale (Hyperoodon ampullatus) in the Bay of Fundy, Nova Scotia. Journal of the Fisheries Research Board of Canada 32:1019-1040.

Murray, J., and J. Hjort. 1912. The depths of the ocean. A general account of the modern science of oceanography based largely on the scientific researches of the Norwegian steamer *Michael Sars* in the North Atlantic. MacMillan and Co., London.

Nansen, F. 1925. Hunting and adventure in the Arctic. Duffield and Co., New York.

Norris, K.S. 1964. Some problems of echolocation in cetaceans. Pages 317-336 *in* Marine bio-acoustics - Proceedings of a symposium held at Bimini, Bahamas, April 1963. *Edited by* W.N. Tavolga. Pergamon Press, Oxford.

Ohlin, A. 1893. Some remarks on the Bottlenose-Whale (Hyperoodon). Lunds Univ. Årsskr. 29:1-13 + 1 plate.

Olafsson, Â. 1990. Faroese whale - and whaling - policy. Pages 130-137 *in* Whaling communities. *Edited by* E. Vestergaard. North Atlantic Studies 2(1-2).

Perseverance. 1879. Logbook of *Perseverance*, Peterhead to Greenland, 7 March to 4 June. [SC].

Polynia. 1890. Logbook of *Polynia*, Dundee to Davis Strait, 25 May to 14 November, William F. Milne, Master. [PAC]

Reeves, R., E. Mitchell, A. Mansfield, and M. McLaughlin. 1983. Distribution and migration of the Bowhead Whale, *Balaena mysticetus*, in the eastern North American Arctic. Arctic 36:5-64.

Risting, S. 1922. Av hvalfangstens historie. Publikation nr. 2 fra Kommandor Chr. Christensens Hvalfangstmuseum i Sandefjord. J.W. Cappelens Forlag, Kristiania.

Sergeant, D.E. 1961. Whales and dolphins of the Canadian east coast.

Fisheries Research Board of Canada Arctic Unit, Montreal, Circular No.

Sergeant, D.E. and H.D. Fisher. 1957. The smaller Cetacea of eastern Canadian waters. Journal of the Fisheries Research Board of Canada 14:83-115.

Sigurjónsson, J., and T. Gunnlaugsson. 1990. Recent trends in abundance of Blue (Balaenoptera musculus) and Humpback Whales (Megaptera novaeangliae) off west and southwest Iceland, with a note on occurrence of other cetacean species. Report of the International Whaling Commission 40:537-51.

Smith, T.G., M.H. Hammill, D.W. Doidge, T. Cartier, and G.A. Sleno. 1979. Marine mammal studies in southeastern Baffin Island. Canadian Manuscript Report of Fisheries and Aquatic Sciences 1552:1-70.

Southwell, T. 1860-1908. Southwell papers. Notes, correspondence, and newspaper clippings relating to cetaceans and pinnipeds and to the British and Newfoundland whaling and sealing industries, including notes for several publications by Southwell. Covers period of approximately 1860-1908. 2 boxes. Scott Polar Research Institute, Cambridge, U.K. Accession no. MS635;BJ.

Southwell, T. 1884. Notes on the seal and whale fishery of 1883. Zoologist, 3rd series, 8(92):295-300.

Southwell, T. 1885. Notes on the seal and whale fishery of 1884. Zoologist, 3rd series, 9(99):81-88.

Southwell, T. 1893. Notes on the seal and whale fishery, 1892. Zoologist, 3rd series, 17(195):81-89

Thetis. 1881. Logbook of *Thetis*, dundee to Newfoundland and Davis Strait, 11 February to 6 August. [SC]

Tomilin, A.G. 1967. Mammals of the U.S.S.R. and adjacent countries. Volume 9: Cetacea. Israel Program for Scientific Translations, Jerusalem. [originally published in Russian in 1957.]

Turner, W. 1886. On the occurrence of the Bottle-nosed or Beaked Whale (Hyperoodon rostratus) in the Scottish seas, with observations on its external characters. Proceedings of the Royal Physical Society of Edinburgh 9:25-47.

Watkins, W.A., K.E. Moore, and P. Tyack. 1985. Sperm Whale acoustic behaviours in the southeast Caribbean. Cetology 49:1-15.

Whitehead, H. 1990. Day of the ziphiids. Sonar 4:10-11.

Whitehead, H., and A. Faucher. 1990. The bottlenose Whales of "The Gully." Progress report for 1989-90 to World Wildlife fund (Canada), Toronto, Ontario.

Winn, H.E., P.J. Perkins, and L. Winn. 1970. Sounds and behavior of the Northern Bottle-nosed Whale. 7th Annual Conference on Biological Sonar and Diving Mammals, Stanford Research Institute, Menlo Park, California, pp. 53-59.

ϕien, N. 1990. Sightings surveys in the Northeast Atlantic in July 1988: Distribution and abundance of cetaceans. Report of the International Whaling Commission 40: 499-511.

FIGURE LEGENDS

Figure 1. *Copies of nineteenth-century lithographs of Northern Bottlenose Whales, published in 1893 by Swedish naturalist Axel Ohlin, showing general features of an adult male (upper), the head shape of an adult female (lower left), and the head shape of an adult male (lower right). (Drawings by G. Ferrand)*

Figure 2. *Positions of catches and sightings of Northern Bottlenose Whales, from Tables 2 and 3, by Record Number. The 200 and 2000 m contours are shown with dashed lines. Records are plotted roughly by season: a. Winter (February-April), b. Spring (May), c. Summer (June-August), d. Autumn (September-October). Stars are positions for sightings listed in Table 4.*

Figure 3. *Catch positions of Northern Bottlenose Whales taken by catcher boats from Blandford, Nova Scotia, 1964-1967. Data from Table 1. The 100 and 1000 fathom contours are shown with solid lines.*

Figure 4. *Trends in prices paid for Bottlenose Whale oil, 1881 to 1903. Data from Southwell Papers. Closed circles are exact: open circles are midpoints of a range.*

Figure 5. *A large male Northern Bottlenose Whale aboard a Norwegian whaling vessel, June 1971 off Labrador (61-63°N, 60-61°W). (Photograph by Ivar Christensen)*

Table 1. Bottlenose Whale catches in Nova Scotia, 1964 to 1967. Data from International Whaling Statistics forms completed by whaling-station personnel.

Date	Length (ft)	Sex	Females			Stomach Contents	Position
			Preg.	Fetus Length	Fetus Sex		
3 Jun 1964	25	M				-	43°N,58°W*
4 Jun 1964	24	M				-	43°50'N, 58°45'W
6 Jun 1964	23	F	X	2ft	M	-	44°00'N, 59°00'W
6 Jun 1964	24	F				-	44°00'N, 59°00'W
7 Jun 1964	24	M				-	43°40'N, 58°50'W
7 Jun 1964	23	M				-	43°40'N, 58°50'W
7 Jun 1964	24	F				-	43°40'N, 59°W
8 Jun 1964	25	F				-	43°30'N, 58°40'W
9 Jun 1964	21	M				-	43°40'N, 59°W
29 Jun 1964	23	F				-	43°40'N, 59°W
1 Jul 1964	25	F				-	43°40'N, 59°W
19 Sep 1964	26	F				-	43°48'N, 58°54'W
20 Sep 1964	25	F				-	43°48'N, 58°54'W
29 Oct 1964	25	F				-	43°48'N, 58°54'W
16 Jun 1965	25	M				-	43°50'N, 58°50'W
16 Jun 1965	26	F				-	43°50'N, 58°50'W
16 Jun 1965	21	F				-	43°50'N, 58°50'W
16 Jun 1965	25	F				-	43°50,N, 58°50'W
13 Jul 1965	26	F				-	43°35'N, 59°03'W
14 Jul 1965	20	F				-	43°35'N, 59°10'W
8 Jun 1967	22	M				Squid	43°50'N, 58°52'W
8 Jun 1967	24	M				Squid	43°49'N, 58°51'W
9 Jun 1967	23	M				Squid	43°49'N, 58°51'W
9 Jun 1967	25	F				Squid	43°49'N, 58°51'W
9 Jun 1967	23	M				Squid	43°49'N, 58°51'W

* Not plotted on Figure 3

Table 2. Bottlenose Whale catches and observations by Scottish whalers. Records from Davis Strait are plotted on Figure 2. (= not plotted on Figure 2)*

Rec. No.	Date	Bottlenose Whales			Location	Source
		Seen	Secured	Struck/Lost		
1	11 Mar 1862	3			63°55'N, 01°00'E*	Active, Lubbock (1937:458)
2	18 May 1874	3			79°N, 00°03'E*	Hope, Gray (1933:9)
3	11 Mar 1879	Some			64°32'N, 03°46'E*	Perseverance (1879)
4	25 Apr 1879	Some (chased)			70°44'N, 01°15'E*	Perseverance (1879)
5	26 Apr 1879	Some (chased)			-*	Perseverance (1879)
6	28 Apr 1879	Some (chased)			71°43'N, 00°45'E*	Perseverance (1879)
7	13-14 May 1879		5		66°53'N, 09°20'W*	Perseverance (1879)
8	15 May 1879	Some			-*	Perseverance (1879)
9	17 May 1879		2	1	67°18'N, 10°15'W*	Perseverance (1879)
10	18 May 1879	Some (chased)			64°06'N, 11°05'W*	Perseverance (1879)
11	29 May 1879	Some (chased)			68°15'N, 8°26'W*	Perseverance (1879)
12	10 Jul 1881		3 (while sealing)		68°15'N, 20°W*	Thetis (1881)
13	15 Jul 1881		5		70°44'N, 13°W*	Thetis (1881)
14	16 Jul 1881		3	2	30 mi NNW of Jan Mayen*	Thetis (1881)
15	30 Jul 1881	Some		1	68°58'N, 13°54'W*	Thetis (1881)
16	31 Jul 1881	Some		2	68°31'N, 14°46'W*	Thetis (1881)
17	2 May 1885	Some			48°21'N, 47°16'W	Esquimaux (1885)
18	8 May 1885	"Several"			ca 56°N, 56°30'W	Esquimaux (1885)
19	10 May 1885		2	1	ca 56°30'N, 57°W	Esquimaux (1885)

Table 2. Continued.

Rec. No.	Date	Bottlenose Whales: Seen	Secured	Struck/Lost	Location	Source
20	11 May 1885	"Several"			57°19'N, 59°03'W	Esquimaux (1885)
21	12 May 1885		2		58°48'N, 59°29'W	Esquimaux (1885)
22	18 May 1885		2		62°17'N, 59°42'W	Esquimaux (1885)
23	19 May 1885	Some			ca 62°30'N, 59°W	Esquimaux (1885)
24	4 Oct 1885	"Several"			63°57'N, 53°43'W, within sight of Greenland coast	Esquimaux (1885)
25	23 Apr 1886	"Several schools"			ca 100 mi N of Lambness ("feeding")*	Gray (1887:48)
26	24 May 1887	Some (chased)			56°58'N, 58°05'W	Esquimaux (1887)
27	25 May 1887	Some			58°37'N, 60°21'W	Esquimaux (1887)
28	26 May 1887		5		60°17'N, ca 60°30'W	Esquimaux (1887)
29	27 May 1887		8	1	ca 60°N, 60°30'W	Esquimaux (1887)
30	28 May 1887		1	1	60°12'N, 60°38'W	Esquimaux (1887)
31	26 May 1888	"A few"			63°29'N, 59°25'W	Esquimaux (1888)
32	1888		12		-*	Esquimaux (1888)
33	3 Jun 1890	"A few"			59°22'N, 44°17'W	Polynia (1890)
34	5 Jun 1890	Many			63°04'N, 52°15'W	Polynia (1890)
35	19 Apr 1891	"Several" (chased)			63°12'N, 53°45'W	Maud (1891)
36	20 Apr 1891	3			63°25'N, ca 53°30'W	Maud (1891)
37	16 Sep 1891	"A few"			62°09'N, 54°01'W	Maud (1891)
38	16 Apr 1892	"A few"			59°N, 39°09'W*- whales going N	Maud (1892)
39	26 Mar 1893	"A few"			59°26'N, 24°15'W*- whales going S	Eclipse (1893)
40	12 Apr 1893	Some (chased)			ca 57-60°N, 57°W	Eclipse (1893)

Table 2. Continued.

Rec. No.	Date	Bottlenose Whales: Seen	Secured	Struck/Lost	Location	Source
41	16 Apr 1893	Some			61°53'N, 59°43'W	Eclipse (1893)
42	18 Apr 1893	"A few"			ca 62°N, 59°W	Eclipse (1893)
43	19 Apr 1893	3			ca 62°N, 58°W	Eclipse (1893)
44	22 Apr 1893	"A few" (killer whales also present)			64°N, 54°44'W	Eclipse (1893)
45	12 Apr 1894			1	58°55'N, 57°06'W	Eclipse (1894)
46	1894		3		-*	Eclipse (1894)
47	6 May 1899	"A few schools"			59°29'N, 58°42'W	Diana (1899)
48	8 May 1899	"A few"			60°51'N, 61°10'W	Diana (1899)
49	9 May 1899	Some (chased)			61°57'N, 60°27'W	Diana (1899)
50	4 Nov 1899	"Several"			58°29'N, 33°32'W*	Eclipse (1899)
51	4 May 1903	"Several"			62°05'N, 52°39'W	Eclipse (1903)
52	7 Aug 1906	Some (chased)			67°04'N, 58°25'W, in sight of Baffin Island	Eclipse (1906)
53	9 Jun 1913	Some			64°02'N, 53°04'W	Erme (1913)

Table 3. Reported sightings of Northern Bottlenose Whales off Labrador and Baffin Island, 1977to 79.

Rec. No.	Date	Position	No. of whales	Comments	Source
54	10 Feb 1977	62°30'N, 60°19'W	2-3	Open water	MacLaren Atlantic Ltd. (1977: fig. 4-30); Allen and Conover (1977: table 7)
55	18 Feb 1977	60°11'N, 60°31'W	2	$^{8}/_{10}$ pack ice	MacLaren Atlantic Ltd. (1977: fig. 4-30); Allen and Conover (1977: table 7)
56	19 Feb 1977	59°49'N, 60°21'W	5-6	$^{2}/_{10}$ pack ice	MacLaren Atlantic Ltd. (1977: fig. 4-30); Allen and Conover (1977: table 7)
57	21 Feb 1977	57°39'N, 59°07'W	3	$^{5}/_{10}$ pack ice	MacLaren Atlantic Ltd. (1977: fig. 4-30); Allen and Conover (1977: table 7)
58	21 Feb 1977	57°03'N, 58°30'W	2-3	Light pack ice	MacLaren Atlantic Ltd. (1977: fig. 4-30); Allen and Conover (1977: table 7)
59	26 Feb 1977	54°51'N, 53°03'W	5-6	Open water	Allen and Conover (1977; table 7)
60	28 Apr 1977	60°01'N, 60°36'W	8-9	$^{5}/_{10}$ pack ice	Allen and Conover (1977; table 16)
61	28 Apr 1977	59°55'N, 60°38'W	8-12	$^{6}/_{10}$ pack ice	Allen and Conover (1977; table 16)
62	30 Apr 1977	60°55'N, 60°50'W	3	Ice edge	Allen and Conover (1977; table 16)
63	11 May 1977	64°00'N, 58°46'W	2	Open water	Allen and Conover (1977; table 16)
64	10 Jun 1977	61°03'N, 62°09'W	2	Open water	Allen and Conover (1977; table 22)
65	17 Jun 1977	64°30'N, 58°50'W	1	Ice edge	Allen and Conover (1977; table 22)
66	23 Jun 1977	66°55'N, 57°40'W	3	$^{8}/_{10}$ pack ice	Allen and Conover (1977; table 22)
67	30 Jul 1977	55°35'N, 57°33'W	5	Open water	Allen and Conover (1977; table 30)
68	31 Jul 1977	58°55'N, 61°17'W	1	Open water	Allen and Conover (1977; table 30)
69	21 Sep 1977	63°59'N, 59°00'W	2	Open water	Allen and Conover (1977; table 36)
70	19 Mar 1978	62°00'N, 59°14'W	2	Ice edge	Conover, Parsons, and Orr. (1979, fig. 5-35, table 7-8)
71	20 Mar 1978	63°00'N, 58°16'W	4	Ice edge	Conover, Parsons, and Orr.(1979: fig. 5-35, table 7-8)
72	22 Mar 1978	60°00'N, 59°25'W	2	Ice edge	Conover, Parsons, and Orr 1979: fig. 5-35, table 7-8)

Table 3. Continued 1977 to 79.

Rec. No.	Date	Position	No. of whales	Comments	Source
73	22 Apr 1978	61°28'N, 60°16'W	3		Conover and Stone (1979: fig. 4-99, app. table 13)
74	25 Apr 1978	62°56'N, 58°03'W	3		Conover and Stone (1979: fig. 4-99, app. table 13)
z 75	25 Apr 1978	62°55'N, 57°54'W	2		Conover and Stone (1979: fig. 4-99, app. table 13)
76	26 Apr 1978	62°58'N, 58°34'W	2		Conover and Stone (1979: fig. 4-99, app. table 13)
77	6 May 1978	63°01'N, 58°02'W	4		Conover and Stone (1979: fig. 4-104, app. table 16)
78	6 May 1978	62°57'N, 59°06'W	5-7	In pods of 2-3	Conover and Stone (1979: fig. 4-104, app. table 16)
79	7 May 1978	62°49'N, 59°01'W	2		Conover and Stone (1979: fig. 4-104, app. table 16)
80	7 May 1978	62°40'N, 59°27'W	1		Conover and Stone (1979: fig. 4-104, app. table 16)
81	10 May 1978	-	1		Conover and Stone (1979: app. table 16)
82	14 May 1978	62°01'N, 60°12'W	2		Conover, Orr, and Parsons (1979: table 5-8-2)
83	15 May 1978	60°30'N, 60°55'W	2		Conover, Orr, and Parsons (1979: table 5-8-2)
84	15 May 1978	59°08'N, 60°27'W	4		Conover and Stone (1979: fig. 4-107, app. table 16)
85	15 May 1978	60°01'N, 60°03'W	2		Conover and Stone (1979: fig. 4-104, app. table 16)
86	16 May 1978	60°33'N, 60°55'W	2		Conover and Stone (1979: fig. 4-104, app. table 16)
87	18 May 1978	58°18'N, 58°08'W	10		Conover and Stone (1979: fig. 4-107, app. table 16)
88	19 May 1978	56°33'N, 57°13'W	5		Conover and Stone (1979, fig. 4-107, app. table 16
89	28 May 1978	61°00'N, 60°49'W	2		Conover, Orr, and Parsons (1979: table 5-8-2)
90	26 Jun 1978	59°30'N, 60°12'W	7		Conover, Orr, and Parsons (1979: table 5-8-3)
91	23 Jul 1978	63°44'N, 64°04'W	[1]	Identification uncertain	Conover, Orr, and Parsons (1979: table 5-8-4)

Table 3. Continued 1977 to 79.

Rec. No.	Date	Position	No. of whales	Comments	Source
92	1 Aug 1978	58°43'N, 62°09'W	1		Conover, Orr, and Parsons (1979: table 5-8-5)
93	1 Aug 1978	59°14'N, 62°38'W	2		Conover, Orr, and Parsons (1979: table 5-8-5)
94	1 Aug 1978	59°11'N, 63°19'W	2		Conover, Orr, and Parsons (1979: table 5-8-5)
95	1 Aug 1978	59°21'N, 63°31'W	1		Conover, Orr, and Parsons (1979: table 5-8-5)
96	1 Aug 1978	59°09'N, 63°18'W	1	At mouth of fiord, 2 mi. from shore	Conover, Orr, and Parsons (1979: table 5-8-5)
97	1 Aug 1978	59°13'N, 62°58'W	2		Conover, Orr, and Parsons (1979: table 5-8-5)
98	1 Aug 1978	59°21'N, 62°53'W	3		Conover, Orr, and Parsons (1979: table 5-8-5)
99	1 Aug 1978	59°22'N, 62°52'W	3-5		Conover, Orr, and Parsons (1979: table 5-8-5)
100	2 Aug 1978	60°50'N, 64°35'W	1		Conover, Orr, and Parsons (1979: table 5-8-5)
101	22 Aug 1978	59°40'N, 64°10'W	10		Conover, Orr, and Parsons (1979: table 5-8-5)
102	7 Sep 1978	63°00'N, 62°24'W	1		Conover, Orr, and Parsons (1979: table 5-8-6)
103	7 Sep 1978	63°15'N, 63°20'W	1		Conover, Orr and Parsons (1979: table 5-8-6)
104	12 Sep 1978	63°13'N, 63°48'W	1		Conover, Orr and Parsons (1979: table 5-8-6)
105	18 Sep 1978	59°29'N, 62°26'W	1		Conover, Orr and Parsns (1979: table 5-8-6)
106	4 Oct 1978	59°30'N, 61°00'W	1		Conover, Orr and Parsons (1979: table 5-8-7)
107	16 Jun 1979	56°00'N, 57°20'W	6		Boles (1980: table 2)
108	18 Jul 1979	53°37'N, 55°41'W	2		Boles (1980: table 2
109	18 Jul 1979	53°40'N, 55°40'W	1		Boles (1980: table 2)
110	18 Jul 1979	53°52'N, 55°20'W	1		Boles (1980: table 2)
111	13 Aug 1979	58°30'N, 61°31'W	1		Boles (1980: table 2)
112	17 Aug 1979	59°17'N, 62°49'W	2		Boles (1980: table 2)
113	17 Aug 1979	59°20'N, 62°42'W	3		Boles (1980: table 2)

Table 4. Sightings of Bottlenose Whales along the outer coast of Hall Peninsula, southeast Baffin Island (Smith et al. 1979).

16 Jul 78	*63°28'N, 64°30'W in Winton Bay*	*1*	
30 Aug 78	*63°18'N, 64°31'W in Amor Smith Inlet*	*1*	
6 Sep 78	*63°31'N, 64°08'W*	*2*	*(one "large", one "small")*
12 Sep 78	*63°23'N, 64°28'W*	*1*	
13 Sep 78	*63°23'N, 64°35'W*	*1*	*("possible sighting only")*
17 Sep 78	*63°48'N, 64°17'W*	*1*	

Table 5. Bottlenose Whale catches by Scottish vessels, 1877 to 1891, as recorded on annual lists prepared by David Bruce and Co. of Dundee. From" Southwell Papers (1860 - 1908) and other sources as noted.

Year	Vessel	Grounds	Whales	Oil (Tons)
1877	Jan Mayen	Cumberland Sd	10	-
1878	Jan Mayen	Greenl.	9	-
1879	Jan Mayen	Greenl.	1	-
	Perseverance	Greenl.	7	6
1880	?	?	32	-
1881	Intrepid	Greenl.	17	19
	Eclipse	Greenl.	39	40
	Hope	Greenl.	4	4
	Perseverance	Greenl.	30	30
	Windward	Greenl.	21	25
1882	Intrepid	Greenl.	23	25
	Polar Star	Greenl.	67	76
	Thetis	Greenl.	8	9
	Alert	Greenl.	9	8
	Eclipse	Greenl.	203	230
	Superior	Cumberland Sd.	ca39	39
	Windward	Greenl.	103	114
1883	Active	Greenl.	3	3
	Aurora	Greenl.	9	?
	Intrepid	Greenl.	1	-
	Polar Star	Greenl.	61	63
	Star	Greenl.	40	41
1883	Alert	Greenl.	25	27
	Catherine	Cumberland Sd	43	?
	Eclipse	Greenl.	157	150
	Erik	Greenl.	92	90
	Perseverance	Greenl.	24	24
	Windward	Greenl.	80	76

Table 5. Continued.

Year	Vessel	Grounds	Whales	Oil (Tons)
1884	Active	Greenl.	11	10
	Arctic	Davis Str.	17	17
	Aurora	Davis Str.	3	3
	Esquimaux	Davis Straits	24	22
	Intrepid	Greenl.	8	7
	Maud	Greenl.	56	58
	Nova Zembla	Davis Str.	7	6
	Polar Star	Greenl.	10	10
	Resolute	Greenl.	3	3
	Star	Greenl.	45	42
	Alert	Greenl.	24	24
	Catherine	Greenl.	22	21
	Erik	Greenl.	14	15
	Earl of Mar	Greenl.	12	12
	Germania	Greenl.	21	20
	Perseverance	Greenl.	26	26
	Windward	Greenl.	14	13
	Earl of Mar	Greenl.	3	2
	Esquimaux	Davis Str.	6	6
	Intrepid	Greenl.	3	-
	Maud	Davis Str.	8	8
	Polynia	Davis Str.	3	2
	Polar Star	Greenl.	4	4
	Star	Greenl.	27	24
	Alert	Greenl.	4	4
	Catherine	Greenl.	5	6
	Germania	Greenl.	14	13
1886	Chieftain	Davis Str.	13	12
	Maud	Davis Str.	6	6

Table 5. Continued.

Year	Vessel	Grounds	Whales	Oil (Tons)
	Polynia	Davis Str.	4	4
1887	Chieftain	Davis Str.	6	7
	Esquimaux	Davis Str.	14	16
1888	Esquimaux	Davis Str.	12	17
	Nova Zembla	Davis Str.	10	10
1889	Chieftain	Davis Str.	2	3
	Nova Zembla	Davis Str.	4	4
	Eclipse	Greenl.	10	10
	Hope	Greenl.	3	2
1890	Polar Star	Greenl.	4	4
	Eclipse	Greenl.	18	13
1891	Polynia	Davis Str.	3	3
1892	Aurora	Davis Str.	1	-
1893	Aurora	Davis Str.	1	-

[1] 39 tons of Bottlenose oil brought to Scotland from "Fishing Station" in Cumberland Sound.

[2] Catches made between Resolution Island and Frobisher Bay (Lindsay 1911).

[3] Ship was lost on homeward passage.

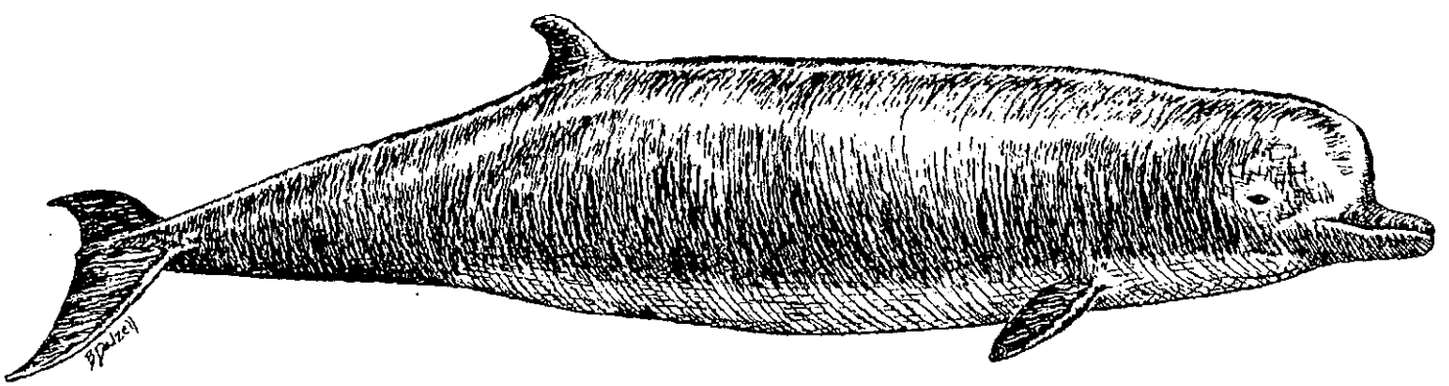
[4] Ship was lost on 11 July.

[5] Although no Bottlenose catch is given on Bruce's list, Southwell (1893) indicated that one was taken at the Southwest Fishing.

[6] Journal kept by James A. Allan, surgeon aboard the Aurora. Property of Glasgow Univ. Library; microfilm copy in Old Dartmouth Historical Society.

Table 6. Catch of Bottlenose Whales by the Eclipse in the Greenland Sea, 1881 [from a letter, D. Gray to T.Southwell, Peterhead, 6 January 1882, in Southwell (1860-1908)].

Date	Whales	Sex
19 April	1	F
24 April	1	?
25 April	1	?
26 April	3	?
27 April	2	1F;1?
28 April	3	?
29 April	3	1F;2?
2 May	7	1F;6?
3 May	1	?
7 May	2	?
8 May	2	2F
9 May	1	F
13 May	2	1M;1F
14 May	1	M
16 May	1	M
17 May	7	4M;3F
20 May	1	M



2M

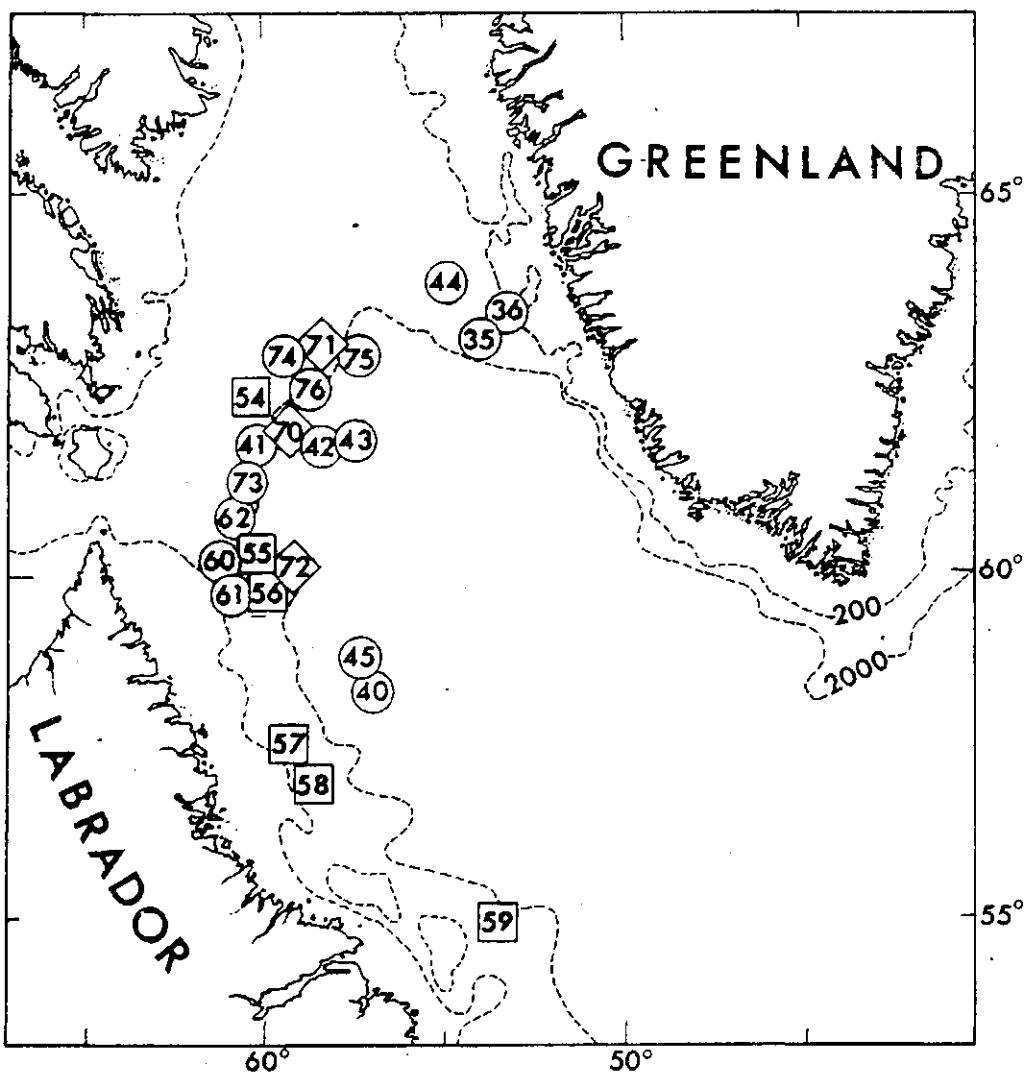

GREENLAND
LABRADOR
65°
60°
55°
60°
50°
200
2000
44
36
35
74
71
75
76
54
70
41
42
43
73
62
60
55
72
61
56
45
40
57
58
59
Feb
Mar
Apr
Soundings in meters

FIGURE 2a

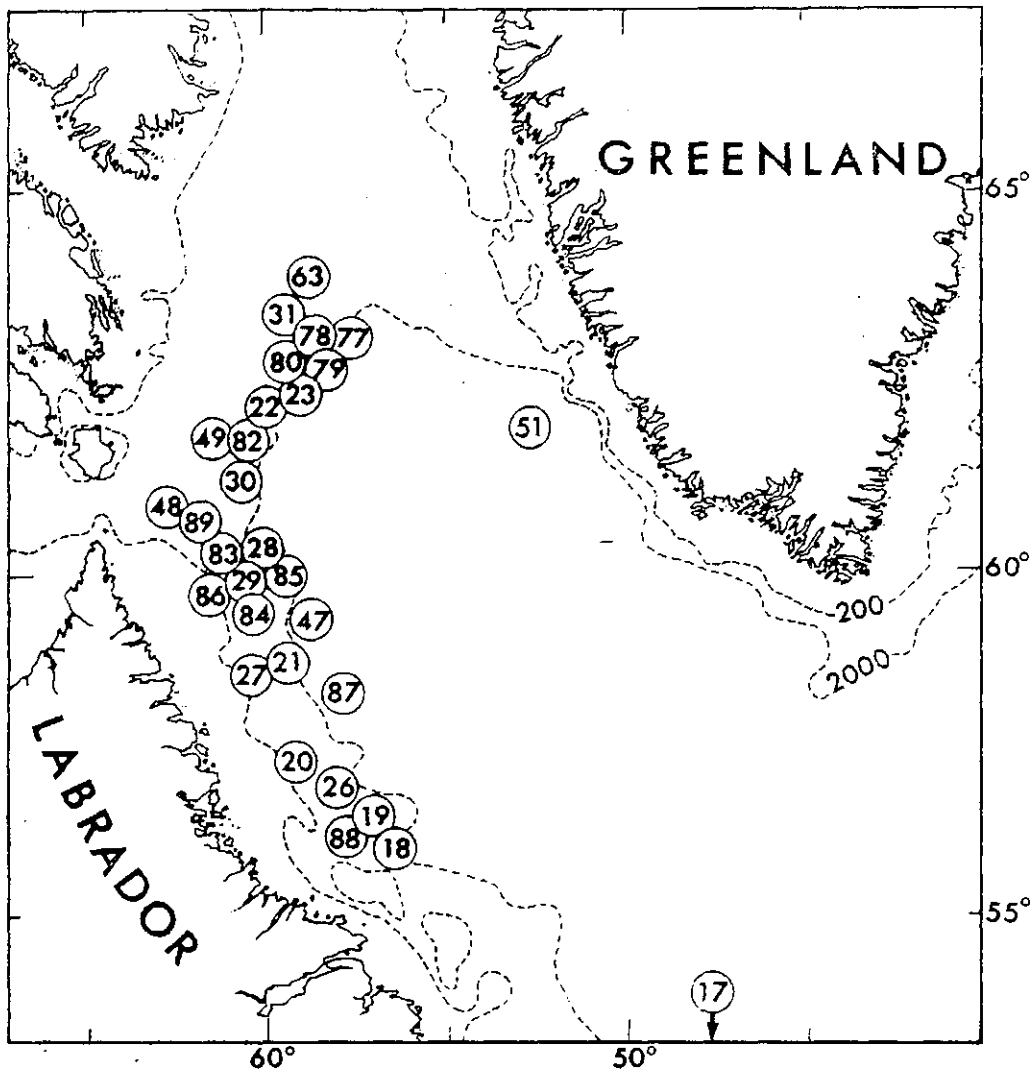

GREENLAND
LABRADOR
65°
60°
55°
60°
50°
200
2000
63
31
78
77
80
79
22
23
49
82
30
48
89
83
28
86
29
85
84
47
27
21
87
20
26
19
88
18
51
17
May ○
Soundings in meters

FIGURE 24

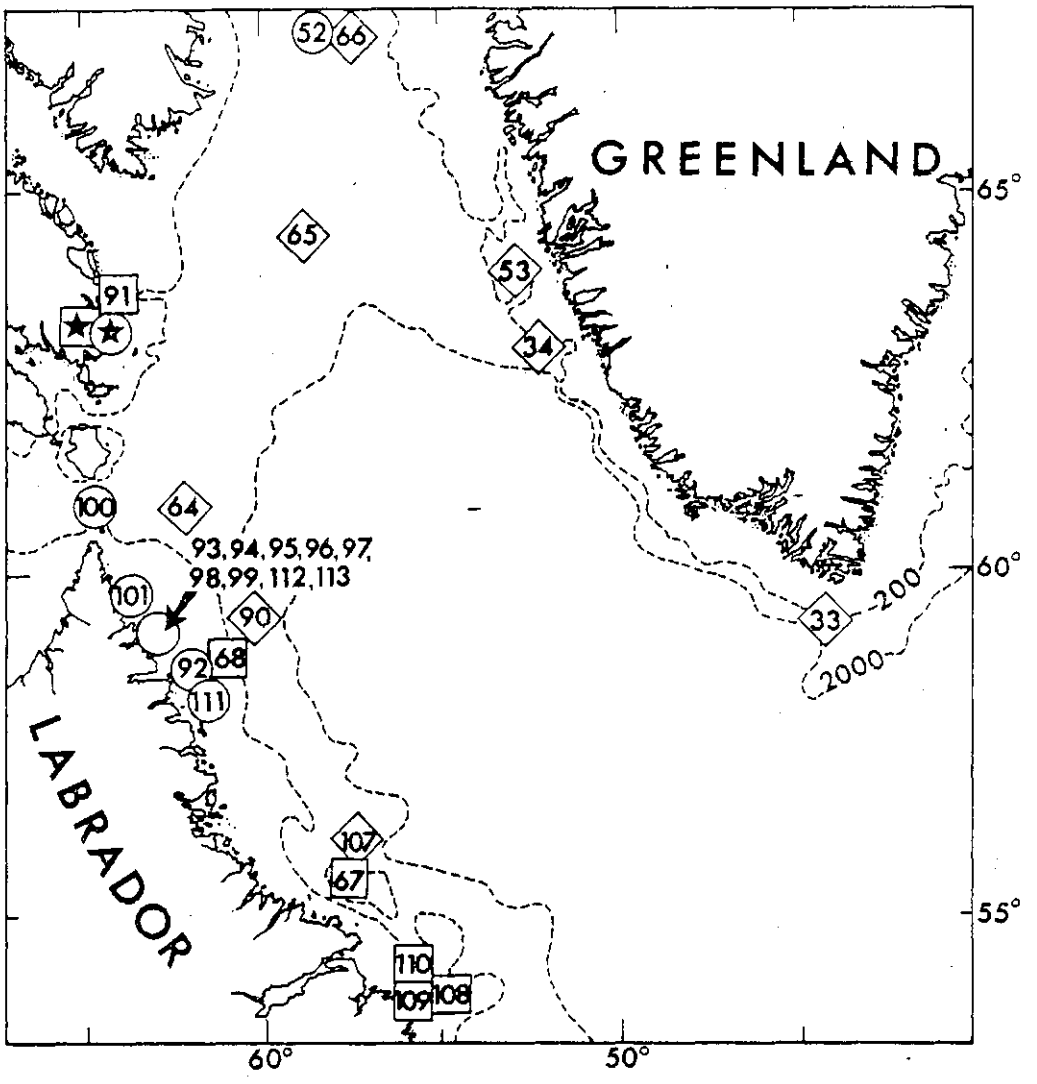

GREENLAND
LABRADOR
52
66
65
53
91
34
100
64
93,94,95,96,97,
98,99,112,113
101
90
33
92
68
111
107
67
110
109
108
65°
60°
55°
60°
50°
200
2000

FIGURE 2c

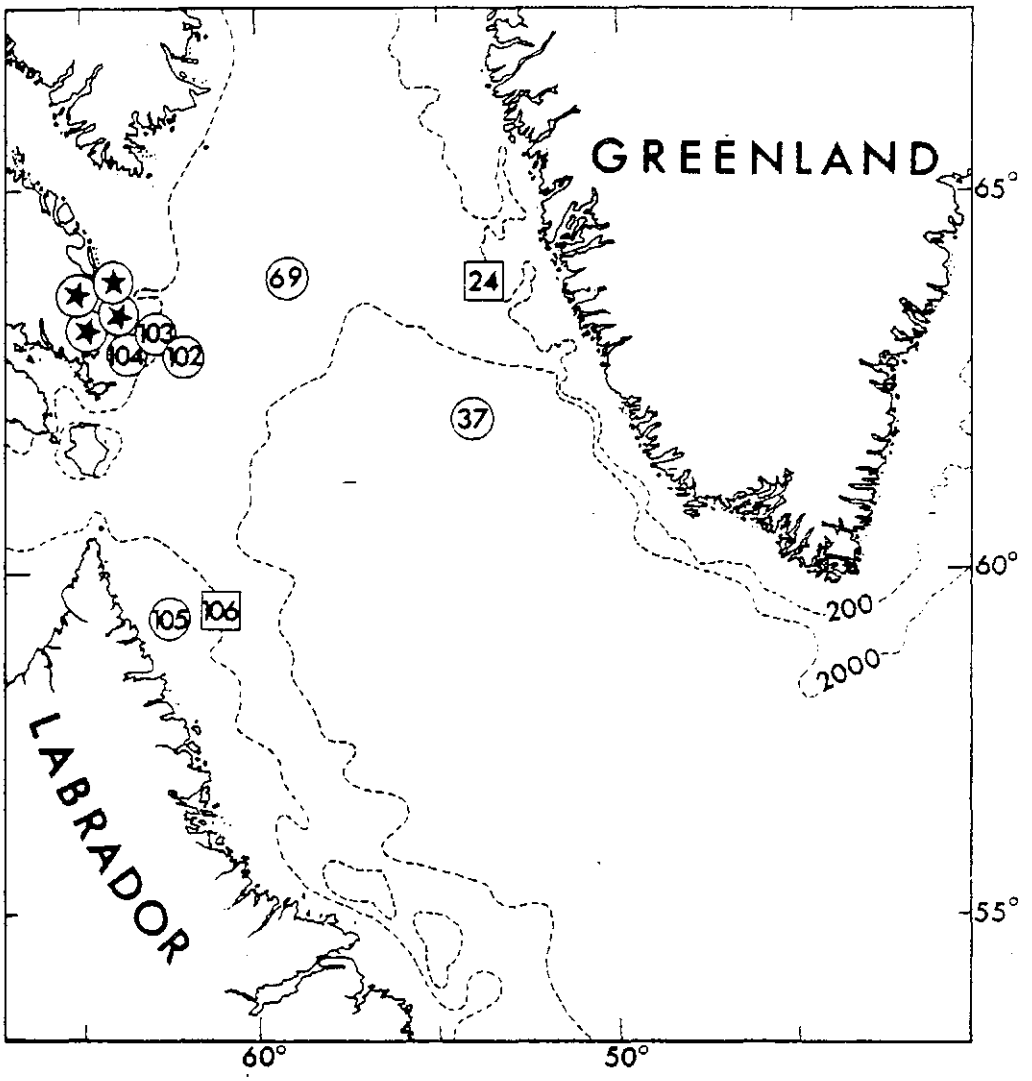


FIGURE 2d

Sept ○
Oct □
Soundings = meters

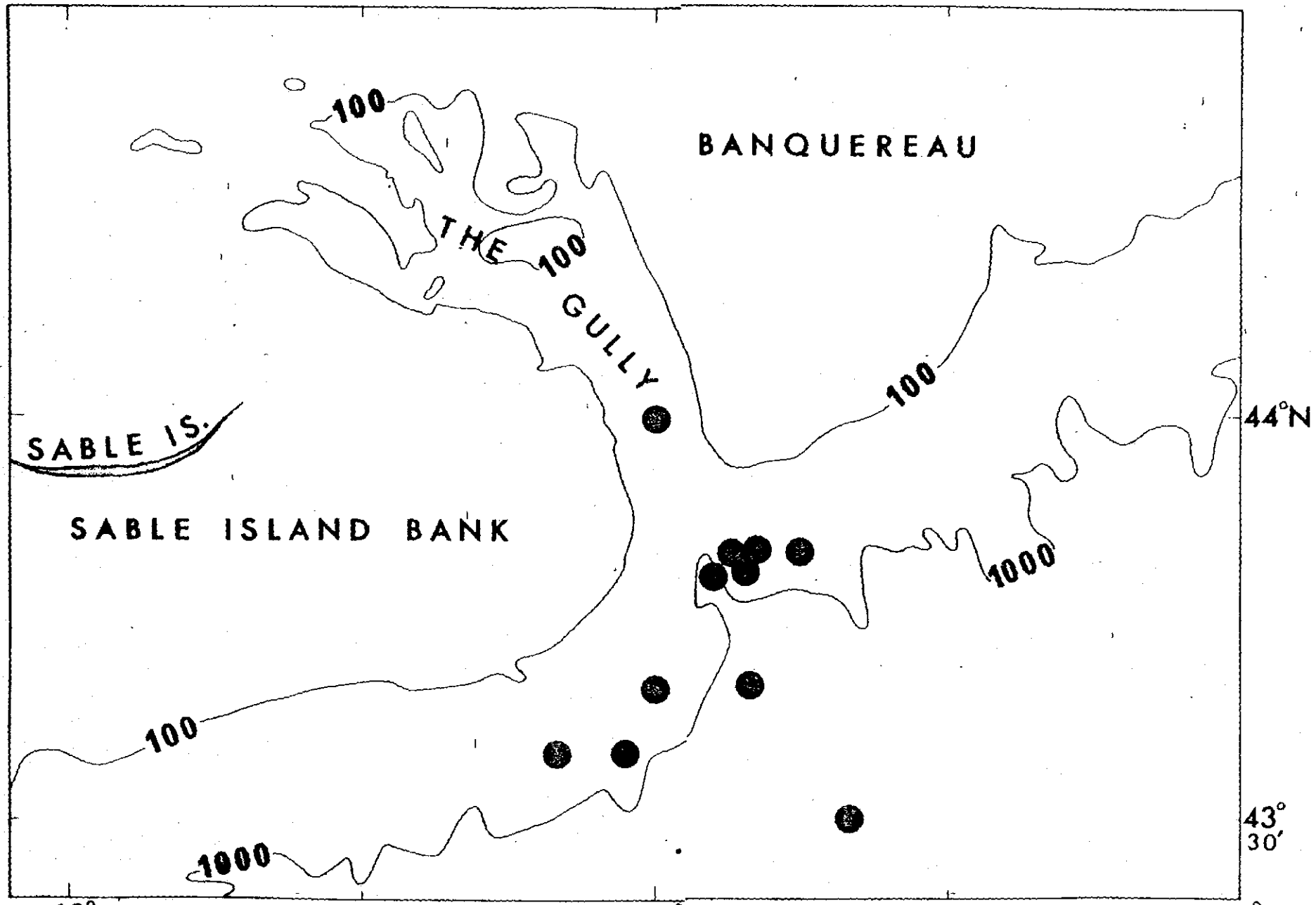
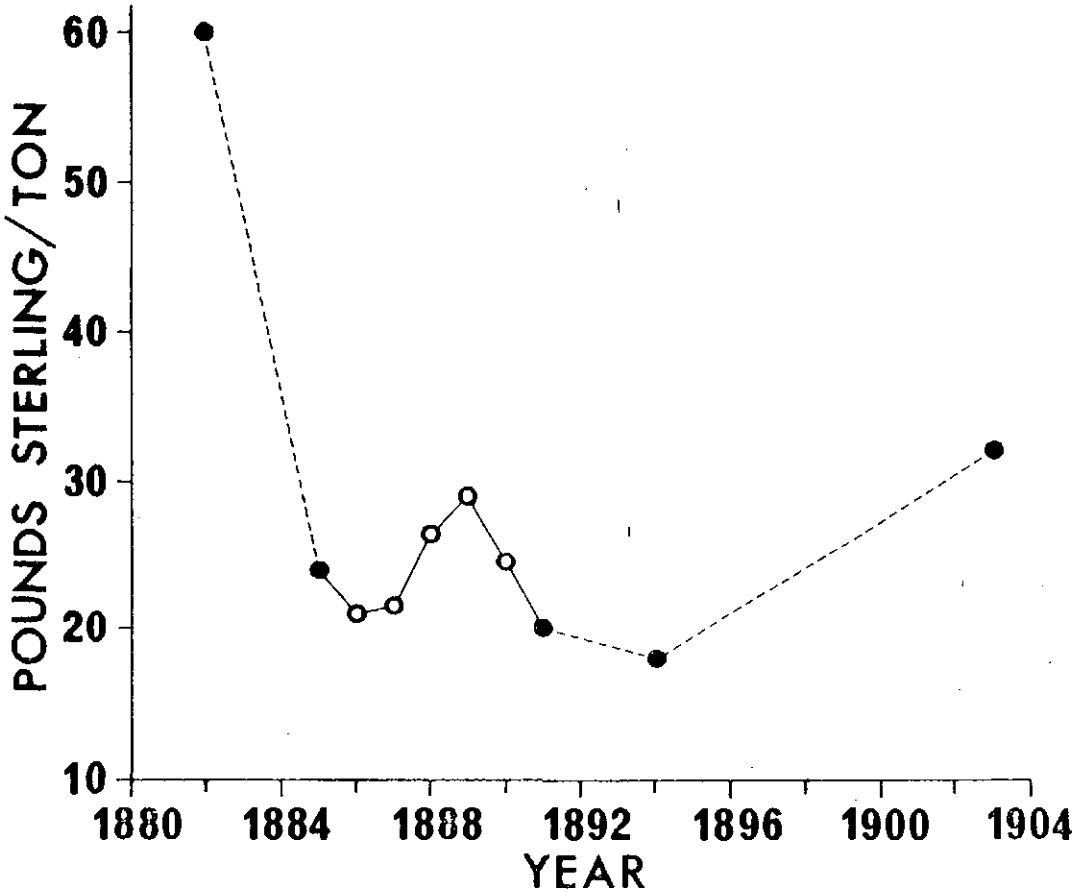

100
BANQUEREAU
THE GULLY
100
100
SABLE IS.
SABLE ISLAND BANK
44°N
1000
100
1000
43°
30'
60°
59°
58°W

FIGURE 3


POUNDS STERLING/TON
60
50
40
30
20
10
1880
1884
1888
1892
1896
1900
1904
YEAR