

Distribution of killer whales in the eastern North Atlantic

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ABSTRACT

Records since 1950 of killer whale (*Orcinus orca*) sightings and strandings from the eastern North Atlantic south of Scandinavia are listed, mapped and analysed with respect to variation in distribution, group size and presence of young. Estimates of relative abundance are not made because of the absence of measures of searching effort. The available data, published and unpublished, indicate that killer whales occur all along the coasts of North Africa, continental Europe and the British Isles, and in oceanic waters. They also occur, although infrequently, in the Mediterranean and Baltic Seas. The evidence strongly suggests that killer whales are present in oceanic waters in summer but rarely in winter. There is no clear seasonality in coastal distribution, although the occurrence of 90% of the sightings around the British Isles in the seven month period May–November is suggestive of such. Around the British Isles north of 55°N, mean group size (6.4) in April–November was not significantly greater than in November–February (2.4) but was significantly greater than that for the whole year south of 55°N (1.8). All records of young, except one, were from north of 55°N.

INTRODUCTION

The killer whale (*Orcinus orca*) is distributed throughout the world's oceans. There have been many detailed studies of distribution (e.g. Dahlheim *et al.* 1982; Kasamatsu *et al.* in press), abundance (e.g. Hammond 1984), social structure (e.g. Balcomb *et al.* 1982; Bigg 1982; Lyrholm *et al.* 1987; Ellis *et al.* in press), variation in colour pattern (e.g. Evans *et al.* 1982) and vocalisations (e.g. Awbrey *et al.* 1982; Ford and Fisher 1982; Moore *et al.* 1988 – this volume), and catch data (e.g. Jonsgård and Lyshoel 1970; Christensen 1982, 1984; Øien 1988 – this volume) throughout the world. Little has been published on killer whales in the eastern North Atlantic, south of Scandinavia, although there are several review articles which have addressed this (e.g. Sigurjónsson in press; Notarbartolo di Sciara 1987). This paper collates available data from

this area and presents distribution maps and results of analyses where appropriate.

MATERIALS AND METHODS

The area for this study was defined as the waters of the eastern North Atlantic east of 30°W from the equator to the British Isles, including the Mediterranean and Baltic Seas (see Fig. 1). Data obtained for this study came primarily from personal approaches to individuals and organisations, and from searches of the published literature. The data are mostly records of strandings and observations of live animals at sea recorded with date, location and number of animals. Some records included the sex and length of stranded animals and the composition, direction of travel and behaviour of sighted pods.

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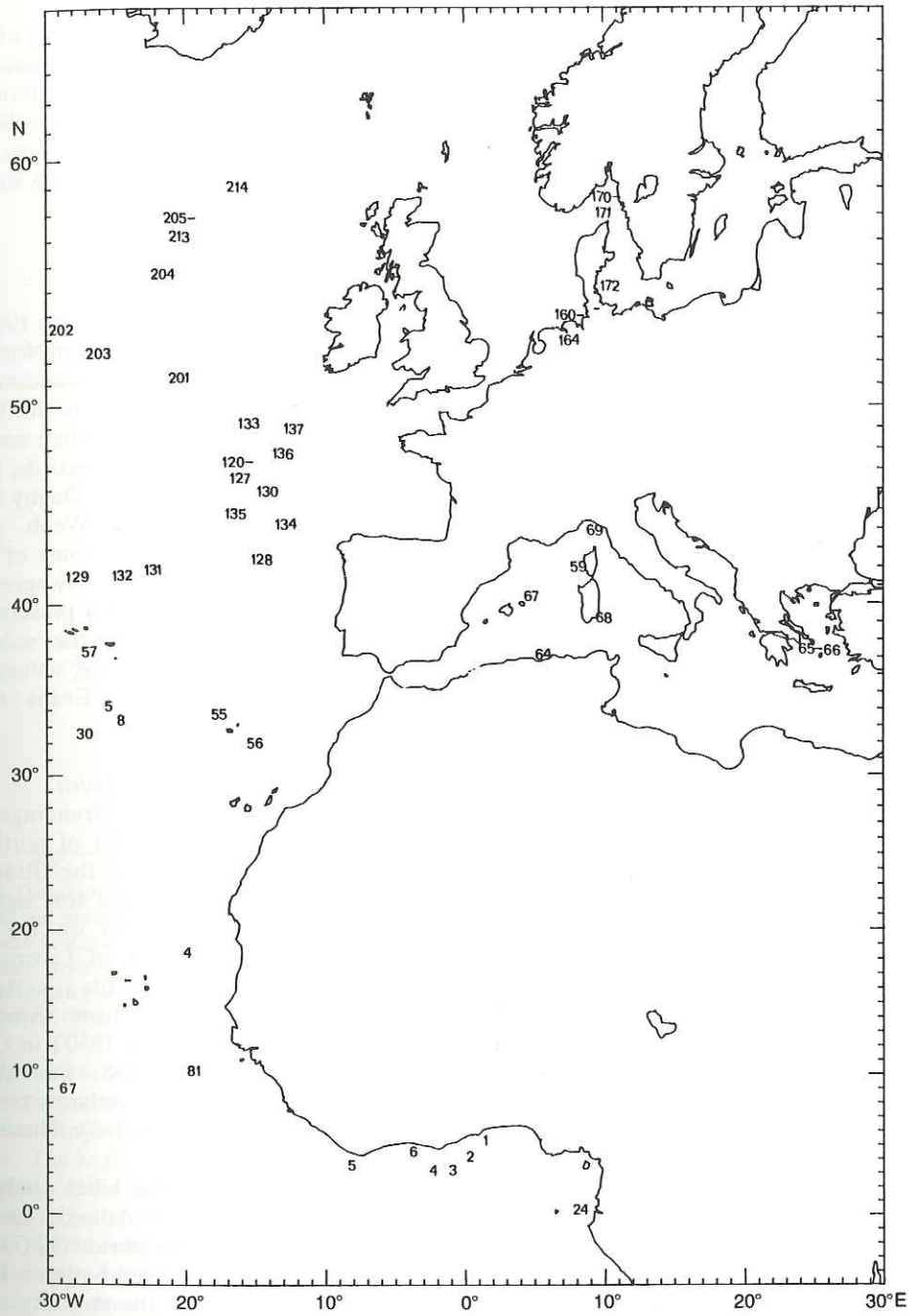


Fig. 1. Distribution of killer whales in oceanic waters of the North Atlantic, east of 30°W from the equator to the British Isles. Numbers refer to records in Appendix 1. Data around the coasts of Senegal and Mauritania are given in Fig. 2, southwest Europe and Bay of Biscay in Fig. 3, and Britain and Ireland in Figs. 4 and 5.

tions collected opportunistically via an extensive project which received reports of cetacean sightings from members of the armed and merchant navies, lightship personnel, fishermen and yachtsmen. They described the details of data collection and addressed the two major problems with data of this kind, i.e. the accuracy of identification to species by non-specialists and the geographic bias inherent in the data because many of these platforms of opportunity follow shipping lanes or are stationary. Almost 40% of our collected records were from this project (McBrearty, pers. comm.), including those data summarised in McBrearty *et al.* (1986). Concerning species identification, we agree with McBrearty *et al.* (1986) that cases of misidentification in these data are few because of the way in which they were collected and interpreted. This especially applies to killer whales which are, perhaps, the easiest cetacean for a non-specialist to recognise. The geographical bias is not a problem for the use to which the data are put in this paper; no attempt has been made to compare relative abundance from area to area.

Most of our data consist of records which were documented by someone other than the person making the original observation and then passed on to us. In this paper, we have cited the source from which we obtained the data, which is not necessarily the original source of the information. This is because many original sources are personal communications and many others are old, unobtainable, in a language we cannot read or for all of these reasons. Readers interested in original sources will in many cases need to follow these up themselves.

We have treated the available data in three ways depending upon their date and detail. Early records, defined as pre-1950, have been referred to only in general terms. Recent (post-1950) records have been used to produce as comprehensive a picture as possible of killer whale distribution. Where possible, such records have been used to show how distribution seems to change seasonally. In general, inference of seasonality from opportunist-

tic data with no measure of searching effort is not possible. However, in some cases, the data strongly suggest a seasonal pattern. The more systematic nature of the data collection around the British Isles has allowed us to investigate seasonal variation in group size and the presence of young animals.

RESULTS AND DISCUSSION

A list of all available records from 1950 onwards of killer whales in the eastern North Atlantic east of 30°W and south of Scandinavia is given in Appendix 1. Over 70% of the 229 records came from four unpublished sources: McBrearty (pers. comm.), 89 records; Maigret (pers. comm.), 37 records; Duguay (pers. comm.), 26 records; and Webb (pers. comm.), 13 records, although some of these data have been summarised elsewhere. Appendix 1 does not include data presented in Reeves and Mitchell (1988 – this volume), Bloch and Lockyer (1988 – this volume) or some of the data presented by Evans (1988 – this volume).

Coastal waters of Northwest Africa

Killer whale sightings and strandings have been reported along the coast of northwest Africa from the equator to the Straits of Gibraltar. There have been a few sightings made by scientific observers on US tuna purse-seiners off the coasts of Liberia, the Ivory Coast and Ghana (records 1–5, Appendix 1), several sightings from American pelagic whalers made in the 1850's in Cintra Bay (Reeves and Mitchell 1988 – this volume) and two sightings from the Atlantic coast of northern Morocco (records 7–8). These data are plotted in Figure 2.

Aloncle (1964) states that killer whales are seen fairly often off the Atlantic coast of Morocco. Bayed and Beaubrun (1987) note that they are sometimes seen between Rabat and Casablanca but that the majority of the sightings have been from around Agadir. Cadenat (1959) reports that although killer whales seem to be fairly common in the waters off the Ivory Coast, there is only one

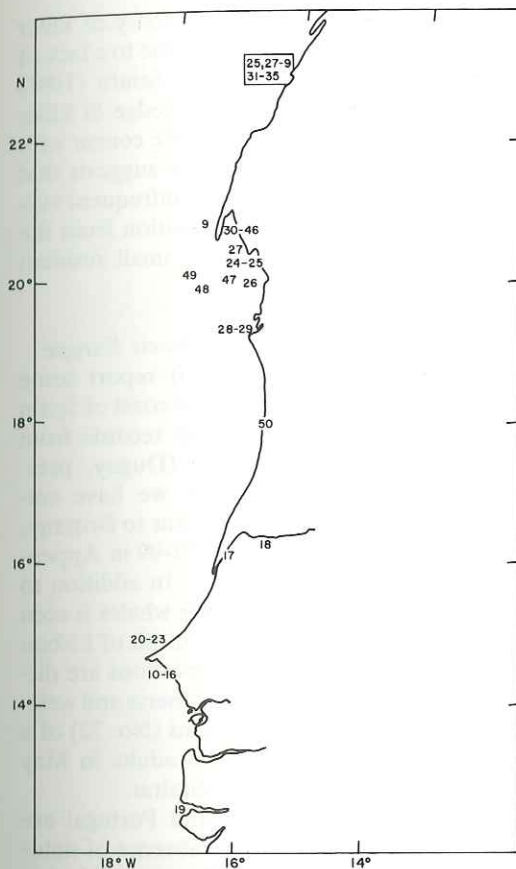


Fig. 2. Distribution of killer whales along the coasts of Senegal and Mauritania. Numbers refer to records in Appendix 1. Records 6-46 are not to be cited without permission from J. Maigret, Musée Oceanographique, Monaco. Numbers in squares refer to records in Reeves and Mitchell (1988 - this volume).

documented record (No. 6). Fisheries departments contacted in Ghana, Ivory Coast and Gambia, however, had no records of killer whales. The logbooks of the eastern Atlantic tuna purse-seine fleet do not, unfortunately, contain records of killer whale sightings (Stretta, pers. comm.).

Most of our information from this area consists of data from Senegal and Mauritania made available to us by J. Maigret. The data from Senegal (records 10-23) are mostly from the Dakar/Kayar area. There are two unusual sightings in the Senegal river on the northern

border of Senegal and a sighting off the coast of Casamance in southern Senegal. Cadenat (1959) reports observations in March off the coast of Guinea (south of Senegal), in May off Dakar and in October off Kayar, and concludes that killer whales are absent from the area in the hot season. It is certainly peculiar that four of the five records near Dakar for which date is given were in May whereas three out of four records near Kayar, only 16.2 naut. miles (30 km) away, were in October. For Senegal as a whole one might reasonably expect the majority of records to come from the Dakar/Kayar area because it is well populated. The records from the south and north suggest, however, that killer whales are present all along the coast.

The records from Mauritania (records 24-50) are mostly from the western coast of the Bay of Levrier, probably because this area is close to the large town of Nouadhibou (Maigret, pers. comm.). The remainder are from one of three areas: along the coast from the eastern Bay of Levrier south to Cape Timiris, on the Arguin Bank, or on the edge of the continental shelf to the west of the Bank. There was a single stranding at Nouakchott, 350 km to the south of Nouadhibou. Reeves and Mitchell's (1988 - this volume) data from this area are all in Cintra Bay (formerly of Spanish Sahara, now disputed territory). Trotignon (1979) includes one sighting just north of Nouadhibou (record 9).

Maigret (pers. comm.) believes that the whales seen in the Bay of Levrier are not a local population but rather, animals that migrate through the area. He suggests that in the summer, when most observations are made, the whales move into the Bay where there is plenty of food, in the form of fish and monk seals at Cape Blanc and bottlenose dolphins in the northeastern part of the Bay. While this may be true, the lack of any information on searching effort dictates that any conclusions drawn from the sightings records alone must be tentative. The sightings of killer whales in Cintra Bay by American pelagic whalers in the 1850's were mostly made from January to March, but there is no information on days

spent in this area by month. The most that we can say is that killer whales occur along and north of the coast of Mauritania throughout the year and that the concentrations found in the Bay of Levrier and Cintra Bay may be seasonal.

Some records include information showing that tuna is a source of food in the area (records 5, 31, 47). There are no records of young animals from northwest Africa.

Mediterranean Sea

Early records are held by the Centre Nationale d'Étude des Mammifère Marins (CNEMM), France, (Duguy, pers. comm.) and have been reported by Casinos and Vericad (1976). Recent observations from the Mediterranean Sea are listed in Appendix 1 as records 59–69 and plotted in Figures 1 and 3. Only two records (both sightings in the Aegean Sea) are east of 10°E. Viale (1985) reports that "several observations of isolated or grouped animals were made by the oceanic vessel 'Korotneff' of the Marine Station of Villefranche-sur-Mer, and by the ship of the Marineland of Antibes, which made a survey of the (northwest) basin in 1972 and 1974." Bayed and Beaubrun (1987) state that there has never been a killer whale reported from the Mediterranean coast of Morocco.

Killer whales are rarely seen in the eastern Mediterranean (Notarbartolo di Sciara 1987). Marchessaux (1980) notes an undocumented report of killer whales off the coast of Israel. None were seen along Italian coasts from 1981–1985 (Cagnolaro *et al.* 1986). However, Di Natale and Mangano (1983) reported four sightings (one of three animals and three singles) and one incidental capture in the Italian Seas in the period July 1978 to September 1982.

Record 69 indicates that other cetaceans form part of the killer whale's diet in the Mediterranean. There are no records of young animals.

The clustering of observations at the western end of the Mediterranean suggests that killer whales are visitors from the North Atlantic. Casinos and Vericad (1976) cite Toschi

(1965) as believing that the scarcity of killer whales in the Mediterranean is due to a lack of suitable prey. Notarbartolo di Sciara (1987) has reviewed the current knowledge of killer whales in the Mediterranean. We concur with him that the available evidence suggests that the animals seen in the Sea are infrequent visitors which are part of a population from the North Atlantic rather than a small resident Mediterranean population.

Atlantic coastal waters of southwest Europe

Casinos and Vericad (1976) report some early records from the northern coast of Spain and the CNEMM holds early records from the western coast of France (Duguy, pers. comm.). The coastal records we have collated from the Straits of Gibraltar to Brittany, France, are listed as records 70–99 in Appendix 1 and plotted in Figure 3. In addition to these records, a group of killer whales is seen regularly in the Sado estuary south of Lisbon (Reiner, pers. comm.). Observations are distributed all round the coast of Iberia and western France. There is one record (No. 72) of a young animal, seen with two adults in May just outside the Straits of Gibraltar.

The records from Spain and Portugal are mostly sightings. The virtual absence of sightings along the west coast of France may be because the edge of the continental shelf is, on average, approximately 100 naut. miles from the coast. There is a concentration of observations from Galicia and Asturias in northwestern Spain. This may represent a greater relative abundance of killer whales along these coastlines or may simply be a result of a greater amount of searching effort.

Observations from these areas are distributed fairly evenly throughout the year. There is some suggestion that killer whales are found along southern coasts earlier in the year than along northern coasts. The small number of records and lack of effort measures again preclude quantification of this.

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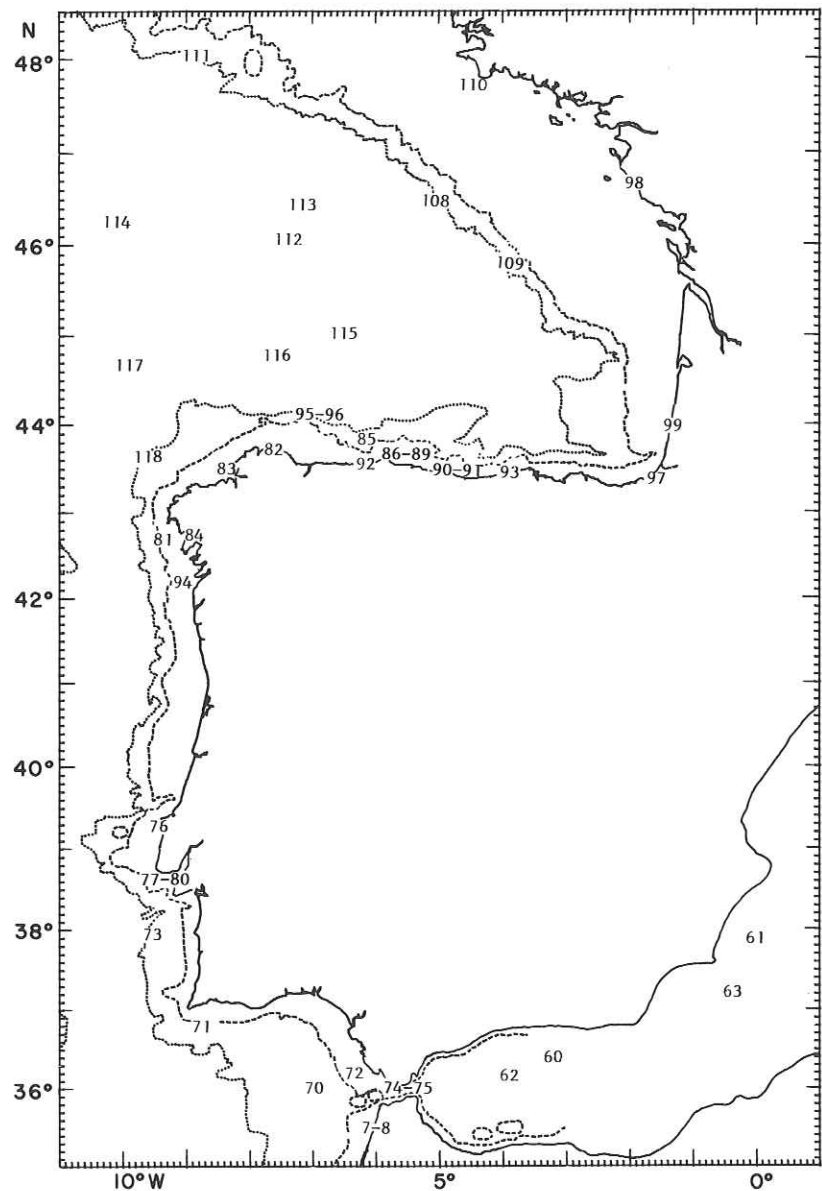
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Fig. 3. Distribution of killer whales along the coasts of southwest Europe and in the Bay of Biscay. Numbers refer to records in Appendix 1. The dashed and dotted lines represent the 100 fathom (183 m) and 1000 fathom (1829 m) depth contours, respectively.



and one sighting each from Madeira and the Azores (records 55-57, Appendix 1), and 18 sightings from the area west of 10°W (records 120-137). Most of these latter records are from the CNEMM (Duguy, pers. comm.). A few additional data are given by Reeves and Mitchell (1988 - this volume). These data are plotted in Figure 1. There are also several

sightings from the Bay of Biscay, which we define as the non-coastal waters south of Brittany, north of Spain and east of 10°W (records 108-118). The Bay of Biscay data are plotted in Figure 3. Record 116 describes a group of 4-6 whales chasing a school of tuna in the Bay of Biscay.

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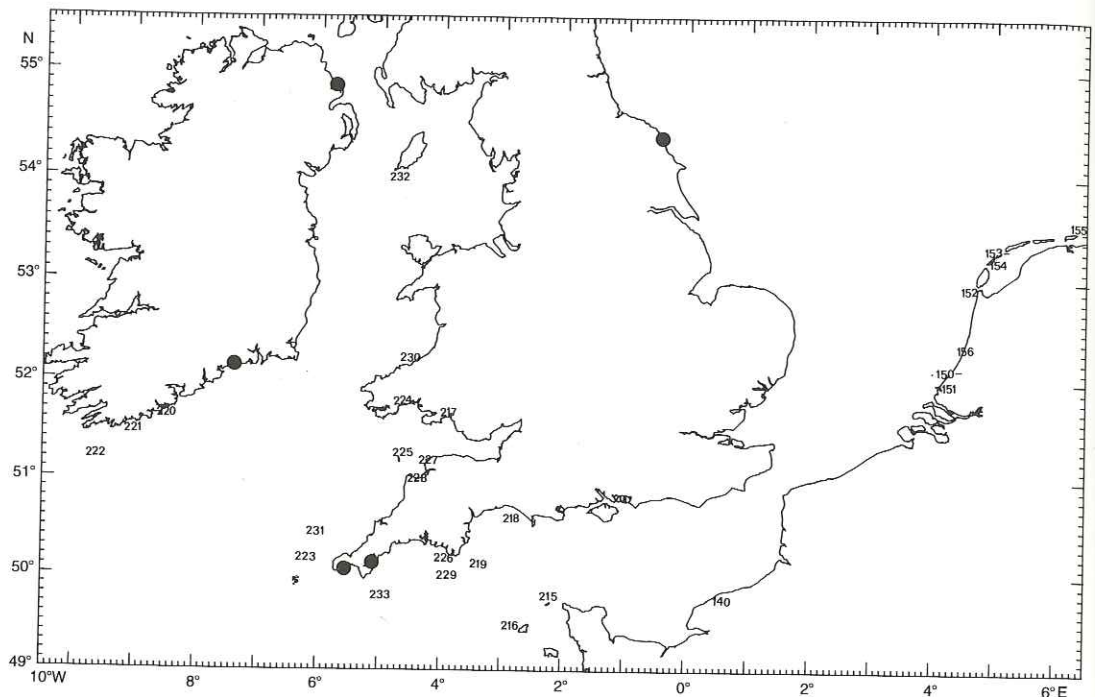


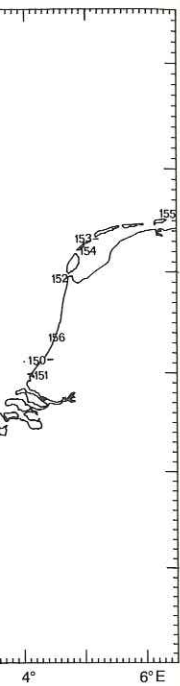
Fig. 4. Distribution of killer whales around Britain and Ireland, south of 55°N. Numbers refer to records in Appendix 1. Black dots are records of strandings from the files of the British Museum (Natural History).

forms where the amount of searching effort is biased towards the summer because of the better weather. This includes records 117, 136 and 137 from the four whale sightings cruises of the R/V *Ballena* (Sanpera, pers. comm.), which were all conducted during the summer. Nevertheless, it is instructive to look at the seasonal distribution of the sightings. Of the 29 records, only three were made outside the period May–August. That is, 90% of the sightings were made during 33% of the year. In Madeira, an ex-whaler stated that killer whales are “common” in that area between May and October (Biscoito, pers. comm.) and an ex-whaler from the Azores said that killer whales are “quite common” there in the summer close to the islands (Martins, pers. comm.). Additional information from the Azores comes from Clarke (1981) who states that killer whales “are common in summer around the islands” based on information from a whaling lookout in 1949 that “many

killers are seen in schools during most days of July and August.” Despite the overall bias in searching effort towards summer, the available evidence strongly suggests that killer whales move into the waters of Madeira and the Azores during warmer months but are rare at other times.

Oceanic waters north of 50°N

Sightings from oceanic waters north of 50°N (records 201–214, Appendix 1) are plotted in Figure 1. The nine records clumped together are from a stationary platform. These data are subject to the problem that searching effort is biased towards the summer months. However, no sightings at all were made outside the period May–August. Analysis of these data show group size to vary between 1–48 animals with a mean of 10.6 (SE = 3.7). Young animals, defined in the data as whales up to 15 feet (4.6m) in length, were present in 21% of sighted groups in May, June and August. In

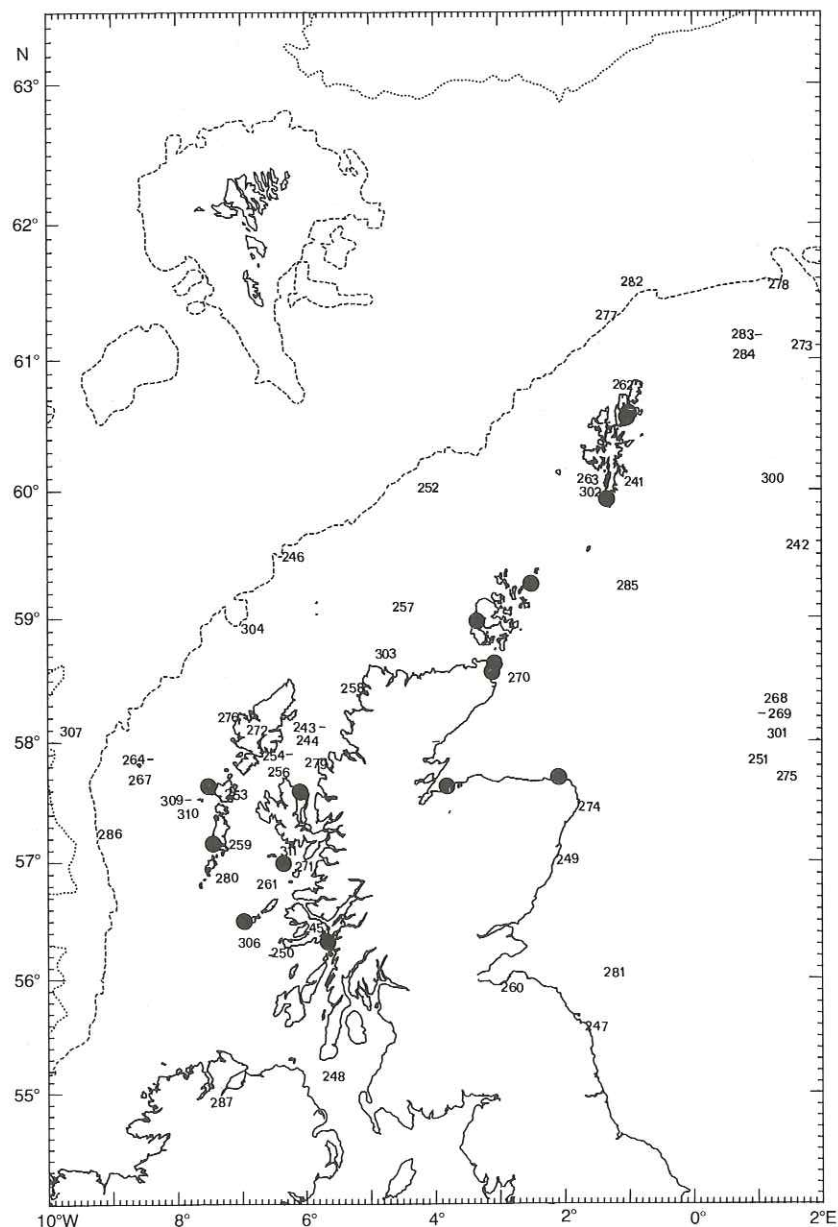


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Fig. 5. Distribution of killer whales around Britain and Ireland, north of 55°N. Numbers refer to records in Appendix 1. The dashed and dotted lines represent the 100 fathom (183 m) and 1000 fathom (1829 m) depth contours, respectively.



groups where young were present, they comprised, on average, 24% of the animals.

Coastal waters of Britain and Ireland

Strandings records from 1913 to 1966 from Britain and Ireland are published in Harmer (1927) and Fraser (1934, 1946, 1953, 1974). In

addition, we received permission from the British Museum (Natural History) to present here as yet unpublished data from 1967 to 1986 (Figs. 4 and 5). Strandings have occurred all around Britain. Fraser (1974) reported a preponderance of males.

Killer whales were taken by Norwegian

catchers around Shetland from 1955 to 1972 (Jonsgård and Lyshoel 1970; Bulletin of International Whaling Statistics 1960–1973; Øien 1988 – this volume). In the period 1955–1964, 278 animals were killed between March and September on the Shetland grounds. From 1965 to 1972, catches from Shetland were combined with those from Iceland, Greenland and Jan Mayen. In this period, 340 whales were taken from these grounds between March and September.

Sightings south of 55°N (records 215–234, Appendix 1) are plotted in Figure 4. Of the 19 observations for which date is given, all but one were made in the period May–November. Group size ranged from 1–4 with a mean of 1.8 (SE = 0.2). Only one calf was recorded. All these sightings were made within 20 naut. miles (37 km) of the coast.

Sightings north of 55°N (records 240–287) are plotted in Figure 5. The data are concentrated around the Hebrides to the west of Scotland and, more diffusely, to the northeast between Scotland and Norway. Most of the sightings were made in the summer. Analysis of the data divided into two periods, April–October (summer) and November–February (winter; there were no sightings in March) reveals a different pattern for summer and winter. Group size in the period April–October ranged from 1–50 with a mean of 6.4 (SE = 1.2). Young animals were present in 13% of sightings, with a peak in July, and comprised 17% of the animals in groups where they were present. In the period November–February, group size varied between 1–8 with a mean of 4.0 (SE = 1.7). No young animals were recorded. The difference between mean group size in April–October and in November–February is not significant at the 5% probability level.

Evans (1988 – this volume), in his analysis of killer whales in British and Irish waters, found no seasonal pattern in group size, but did not stratify his data into northern and southern areas. Evans found a peak of “young” animals (defined in his data as animals from one-third to one-half the length of the associated adult) in July. This coincides

with the evidence from the data analysed here that “young” are found only in the summer months.

There is also a seasonal difference in the distribution of the distance of sightings from the nearest coast. In January/February, all sightings were made close to land. From April to September, the average distance was approximately 25 naut. miles (45 km). From October–December, it increased to approximately 75 naut. miles (140 km). These results for northern Britain differ markedly from those given by Evans (1988 – this volume) whose data are mostly from this area. Evans found average distance from land to be about 80 naut. miles (145 km) during the first half of the year and a little over 20 naut. miles (40 km) during the second half of the year. The major difference in the two data sets is that Evans included in his analysis oceanic sightings up to 500 naut. miles (930 km) west of Ireland. Our data from this area (described above under Oceanic waters north of 50°N) are all in the months May–August.

The Baltic Sea and eastern North Sea

There are four strandings recorded along the north coast of France (Duguy, pers. comm.), of which only one occurred in this century (record 140). Records from the Netherlands are held by the Rijksmuseum van Natuurlijke Historie (Smeenk, pers. comm.). Only six are post-1950 (records 150–155), with none since 1965 despite a continuation of record-keeping to the present day. There is one additional recent sighting (record 156). Recent data are plotted in Figure 4.

Bondensen (1977) presents three strandings on the west coast of Denmark, 12 in the Kattegat and 8 live sightings in Danish waters, all from before 1950. There are three further records from Denmark in the period 1977–1985 (records 170–172) and five strandings along the northwestern coast of Germany since 1950 (records 160–164, see Fig. 1). Aguayo (1978), in his comprehensive review of small cetaceans in the Baltic, Skagerrak and Kattegat, also includes earlier data from East Germany and Sweden. Killer whales have also been

taken in or near the Skagerrak Strait by Norwegian catchers (Øien 1988 – this volume).

Aguayo (1978) cites Lönnberg (1903) as stating that killer whales were very common in the Swedish waters of the Kattegat. In his review of killer whales in European waters, Sigurjónsson (in press) cites Goethe (1983) as indicating that along the northwestern coast of Germany the "species is relatively common." Aguayo (1978) considers, based on the number of strandings in the Baltic and his supposition that "this species is not prone to stranding," that killer whales may be more abundant in these waters than the figures suggest.

Records in the Baltic Sea occur mostly at the western end. This is similar to the pattern seen in the Mediterranean Sea. Certainly, there is no evidence of a local population of killer whales in the Baltic.

CONCLUDING REMARKS

It is clear from the data plotted in Figures 1–5 and from additional information supporting those records that killer whales, although nowhere common, occur in all parts of the ocean and along all the coasts of the eastern North Atlantic east of long. 30°W from the equator to the British Isles. Killer whales also occur, apparently infrequently, in the Mediterranean and the Baltic Seas. However, the lack of measures of effort in programmes providing the available data prevents an assessment of the relative abundance of killer whales in different parts of this area.

Concerning the distribution of killer whales in the waters adjoining our study area, we have no information from south of the equator. For the area west of 30°W, data in Reeves and Mitchell (1988 – this volume) show a pan-Atlantic distribution. North of the British Isles, data from the Faroe Islands (Bloch and Lockyer 1988 – this volume) indi-

cate what seems to be a continuous distribution of killer whales from Shetland to the Faroes. It is likely that there is also a continuous distribution from Shetland to Norway (Evans 1988 – this volume) and from the Faroes and Norway to Iceland and Greenland (Øien 1988 – this volume).

Any temptation to draw conclusions concerning seasonality in the eastern North Atlantic from available data must be tempered by the opportunistic nature of much of the data. South of the British Isles, killer whales are found in coastal waters throughout the year but are very rarely seen in winter months in oceanic waters. How much this results from greater searching effort in the summer is difficult to say, but the evidence strongly suggests there is a seasonal change in distribution in oceanic waters. Around the coasts of Britain and Ireland the situation seems to be rather different. Although sightings do occur throughout the year, 90% were made during the period May–November. The 10% seen in British and Irish waters from December to April is significantly less (at the 5% probability level) than the 30% seen off the coasts of northwest Africa and southern Europe during this period.

Apart from one record from northern Spain in May, all records of young animals are from north of 55°N. All sightings of young animals were between May and October. In British and Irish waters, Evans (1988 – this volume) found young animals to be present from February with a peak in July.

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APPENDIX 1

List of unpublished and published records of killer whales since 1950.

Record: ? = Questionable record. Type: S = Sighting of live animal(s), ST = Stranding, D = Dead at sea, C = Caught deliberately, I = Caught incidentally. Comments: L = Length, W = Weight, SST = Sea Surface Temperature, "young" = Animals estimated to be up to 15 feet (4.6 m) in length. Source: US Nat Mar Fish Serv = U.S. National Marine Fisheries Service (D.A. Bratten, pers. comm.), Cen Nat d'Et Mam Mar = Centre Nationale d'Etude des Mammifères Marins, France (R. Duguay, pers. comm.), Rijksmus van Nat His = Rijksmuseum van Natuurlijke Historie, Netherlands (C. Smeenk, pers. comm.), Seabirds at Sea Team = UK Nature Conservancy Council, Seabirds at Sea Team (A. Webb, pers. comm.)

Record	Location	Date	Type	Whales	Comments	Source
COAST OF CENTRAL WESTERN AFRICA						
? 1	4°34'N 0°53'E	1 Aug 1972	S	1		US Nat Mar Fish Serv
2	4°02'N 0°21'E	6 Aug 1972	S	2	Heading SW	—
? 3	3°17'N 1°58'W	25 Aug 1972	S	1	Feeding	—
? 4	3°26'N 2°33'W	26 Aug 1972	S	1	Heading SW	—
5	4°20'N 8°55'W	16 Oct 1972	S	1	With school of skipjack	—
6	15-20 naut. miles off Abidjan	Jun 1958	C	1	Harpooned	Cadenat (1959)
MOROCCO						
7	Tanger	24 Jul 1984	S	2		Bayed & Beaubrun (1987)
8	Tanger	May/Jun 1980	S	3-4	Two groups of 3-4 animals each seen several times	—
9	La Gwera	19 Nov 1977	S	3		Trotignon (1979)
SENEGAL						
10	Dakar	16 May 1956	S	2		Cadenat (1957)
11	Dakar	1961	C	1		Maigret (pers. comm.)
12	Near Dakar	1964	C	1	Female	—
13	Near Dakar	1 May 1954	S	1		—
14	South of Dakar	May 1976	ST	1	Adult	—
15	Near Dakar	23 Jul 1978	S	1		—
16	Near Dakar	May 1980	S	2		—
17	River Senegal	Jul 1978	S	2		—
18	River Senegal	Jul 1979	S	1	100+ km from sea. Seen dead later	—
19	Casamance (S. Senegal)	28 Jun 1980	S	1		—
20	Kayar	22-23 Oct 1956	S	2	Same pair seen several times Skeleton also found on beach	Cadenat (1957)
21	Kayar	Dec 1958	S	2	Frequent sightings	—
22	North of Dakar	Oct 1976	ST	1	Female	Maigret (pers. comm.)
23	North of Dakar	9 Oct 1977	S	4	Male + 3 others. Depth = 3-4 m	—
MAURITANIA						
24	Cape Arguin	23 Feb 1971	S	2		Maigret (pers. comm.)
25	Alzas	10 Apr 1973	S	1		—
26	Cape Iouik	30 Aug 1973	S	3	Incl. 1 male	—
27	Bay of Autruches	6 Sep 1973	S	5		—
28	Cape Timiris	26 Feb 1975	S	1	Heading NW	—
29	N. of Cape Timiris	3 Aug 1979	ST	1		—
30	W. Bay of Levrier	29 Apr 1958	S	15	Heading N	Cadenat (1959)

Appendix 1 (continued)

Record	Location	Date	Type	Whales	Comments	Source
31	W. Bay of Levrier	9 Jun 1954	I	1	Killed in fishing gear	Maigret (pers. comm.)
32	W. Bay of Levrier	28 Jul 1975	S	1		—
33	W. Bay of Levrier	28 May 1978	S	4	Male + 3 others	—
34	W. Bay of Levrier	7 Dec 1978	S	6	SST = 19.60	—
35	W. Bay of Levrier	23 Sep 1979	S	1	Male	—
36	W. Bay of Levrier	12 Sep 1973	S	1		—
37	W. Bay of Levrier	2 Oct 1980	S	2		—
38	W. Bay of Levrier	Oct 1980	ST	1	L = 4 m	—
39	W. Bay of Levrier	14 Nov 1980	S	4	Incl 1 male	—
40	W. Bay of Levrier	30 Jan 1981	S	2	Male + female. Female stranded 3 days later, L = 3.8 m	—
41	W. Bay of Levrier	13 Jul 1981	S	2		—
42	W. Bay of Levrier	14 Nov 1981	S	"several"		—
43	W. Bay of Levrier	18 Apr 1982	S	1	Male	—
44	W. Bay of Levrier	20 Jun 1982	S	2		—
45	W. Bay of Levrier	10,11 Jul 1982	S	"several"		—
46	E. Bay of Levrier	15 May 1980	S	1	Seen for several days	—
47	N. Arguin Bank	5 Jan 1981	S	1	V. large male heading South. Depth = 14 m. With 4-10 Kg albacore. "group". Depth = 300m. SST = 24.5°	—
48	20°00'N 17°15'W	15 Aug 1978	S			—
49	W. of Arguin Bank	5-18 Nov 1981	S		Number of groups heading North	—
50	Nouakchott	15 Apr 1982	ST	1	Female, L = 5.28 m.	—
MADEIRA AND AZORES						
55	Madeira	1952-1956	C	7	Total caught in 5 years	Biscoito (pers. comm.)
56	Madeira/Desertas	20 Aug 1977	S	2	Male & female	Reiner (pers. comm.)
57	Azores	1968	S	1		Martins (pers. comm.)
MEDITERRANEAN						
59	nr Ajaccio, Corsica	15 Feb 1974	D	1		Cen Nat d'Et Mam Mar
60	36°25'N 3°15'W	6 May 1979	S	6		McBrearty (pers. comm.)
61	37°56'N 0°14'W	16 Sep 1981	S	10	Heading SE	—
62	36°07'N 4°02'W	17 Jun 1983	S	2	Heading SW	—
63	37°18'N 0°33'W	9 Mar 1983	S	1	Heading S	—
64	37°00'N 6°50'E	29 May 1979	S	2	Heading SE	—
65	38°00'N 25°00'E	12 Sep 1982	S	1	Heading E	—
66	37°57'N 24°45'E	2 Feb 1986	S	3		—
67	nr Mao, Minorca	about 1966	ST	1	Length about 6 m	Casinos (1981)
68	39°00'N 9°42'E	27 Jun 1984	S	3	No juveniles	Raga <i>et al.</i> (1985)
69	43°33'N 8°30'E	16 Aug 1985	S	2	1 male. Other seen 14 Aug and 1 Oct 43°52'N 8°24'E, feeding on beaked whale	Notarbartolo (1987)
COASTS OF SOUTHERN SPAIN AND PORTUGAL						
70	36°02'N 7°02'W	22 Apr 1984	S	6		McBrearty (pers. comm.)
71	36°45'N 8°52'W	22 Feb 1985	S	1		—
72	36°08'N 6°22'W	17 May 1982	S	3	2 adults, 1 "young"	—
73	37°58'N 9°31'W	13 Mar 1983	S	1		—
74	35°52'N 5°41'W	3 Sep 1985	S	3	Heading E	—
75	35°54'N 5°41'W	2 Jun 1984	S	3-4	1 male with damaged dorsal	Smeenk (pers. comm.)

Appendix 1 (continued)

Record	Location	Date	Type	Whales	Comments	Source
76	Peniche	May 1975	S	1	Adult male	Teixiera (1979)
77	Lisbon	about 1968	S	2		—
78	Lisbon	about 1971	S	2		—
79	Lisbon	10 Jan 1978	S	1	Adult, probably male	—
80	38°40'N 9°20'W	12/14 Jun 1978	S			Cen Nat d'Et Mam Mar
COAST OF NORTHERN SPAIN						
81	42°40'N 9°20'W	15 Aug 1982	S	3	No juveniles	Raga <i>et al.</i> (1985)
82	Cape Estaca de Bares	23 Aug 1984	S	6	Mass stranding of striped dolphins 30-50 mins later	Nores & Perez (pers. comm.)
83	La Coruna, Galicia	Jan 1985	S	2-3	No adult males	Nores (pers. comm.)
84	Rio de Muros, Galicia	2 May 1986	ST	1	Female, L = 4.93 m	Duran Neira (pers. comm.)
85	20 m NW Cap Penas, Gal	20 Aug 1978	S	15-20		Nores & Perez (1983)
86	Gijon, Asturias	1 Mar 1981	S	2	Male & female	—
? 87	Gijon, Asturias	22 Aug 1981	S			—
88	Gijon, Asturias	13 Aug 1985	S	2	Male & female	Perez & Nores (in press)
89	Candas, Asturias	21 Sep 1986	S	2	Male & female	Nores (pers. comm.)
90	Llanes, Asturias	14 Feb 1986	S	8-10	Heading westwards	—
91	Llanes, Asturias	4 Feb 1983	S	2	Heading W. Seen 5 Feb Gijon, several days later Santander	Perez & Nores (1983)
92	Ria San Esteban, Ast	16 Jun 1983	S	1		—
93	Santander	Mar 1970	ST	1		Cendrero (1976)
94	42°06'N 9°05'W	8 Oct 1982	S	16	Heading NE	McBrearty (pers. comm.)
95	44°00'N 7°00'W	5 Oct 1972	S			Cen Nat d'Et Mam Mar
96	44°00'N 7°00'W	10 Jun 1973	S			—
COAST OF WESTERN FRANCE						
97	Guethary, Pyr Atlant	24 Dec 1973	ST	1	L = 3 m	Cen Nat d'Et Mam Mar
98	St Gilles, Vendee	22 Jul 1956	ST	1	Juvenile, L = 3-4 m	—
99	44°06'N 1°25'W	12 Mar 1983	S			—
BAY OF BISCAY						
108	46°30'N 5°00'W	15 Jul 1973	S			Cen Nat d'Et Mam Mar
109	45°50'N 3°50'W	18-20 Mar 1973	S			—
110	47°40'N 4°40'W	12 Aug 1981	S			—
111	48°01'N 8°54'W	7 May 1984	S	2	Heading NE	McBrearty (pers. comm.)
112	46°00'N 7°30'W	12 Aug 1979	S	20	Heading NE	—
113	46°25'N 7°05'W	2 Jul 1979	S	1	Heading N	—
114	46°17'N 9°59'W	2 Jul 1983	S	1		—
115	45°00'N 6°20'W	14 Aug 1984	S	2		Nores (pers. comm.)
116	44°40'N 7°30'W	28 Aug 1985	S	4-6	Pursuing school of tuna	—
117	44°39'N 9°51'W	7 Sep 1981	S	3	Adult male + 2 others	Sanpera (pers. comm.)
118	43°32'N 9°45'W	13 Aug 1979	S	1	Heading SW	McBrearty (pers. comm.)
OCEANIC NORTH ATLANTIC, SOUTH OF 50°N						
120	47°00'N 17°00'W	28 Jun 1972	S			Cen Nat d'Et Mam Mar
121	47°00'N 17°00'W	18 May 1973	S			—
122	47°00'N 17°00'W	29 May 1974	S			—
123	47°00'N 17°00'W	2 Mar 1976	S			—
124	47°00'N 17°08'W	6 May 1977	S			—
125	47°00'N 17°00'W	22 May 1979	S			—
126	47°00'N 17°00'W	17 Aug 1980	S			—

Appendix 1 (continued)

Record	Location	Date	Type	Whales	Comments	Source
BRITISH ISLES AND IRELAND						
215	North of Alderney	11 Jan 1974	S	2		
216	NW of Guernsey	Nov 1977	S	1		Societe Jersiaise
217	Swansea docks	Jun 1979	S	1	Adult male	—
218	50°39'N 2°55'W	3 Sep 1978	S	2		Waters (pers. comm.)
219	50°13'N 3°18'W	1 Jun 1979	S	3		McBrearty (pers. comm.)
220	51°27'N 8°50'W	15 Jul 1979	S	1	Heading W	—
221	51°27'N 9°20'W	25 Jul 1979	S	2	Heading W	—
222	51°11'N 9°44'W	26 Jul 1979	S	1		—
223	50°16'N 6°17'W	13 Aug 1979	S	1		—
224	51°39'N 4°34'W	20 Nov 1979	S	2	Heading S	—
225	51°13'N 4°43'W	3 Sep 1980	S	1	Heading N	—
226	50°02'N 3°58'W	7 Sep 1980	S	4	Heading W	—
227	51°13'N 4°15'W	23 Nov 1980	S	2		—
228	51°00'N 4°21'W	5 Sep 1981	S	3	Heading S	—
229	50°03'N 3°58'W	7 Sep 1981	S	1	Heading W	—
230	52°15'N 4°23'W	16 Sep 1982	S	3	Heading W. SST = 20.0°	—
231	50°27'N 6°01'W	10 Aug 1982	S	1	Heading E. SST = 18.0°	—
232	53°56'N 4°59'W	29 Sep 1986	S	1		—
233	49°40'N 5°00'W	20 Aug 1975	S			—
241	60°37'N 0°36'W	27 Jun 1980	S	3		Cen Nat d'Et Mam Mar
242	59°35'N 1°30'E	19 Jun 1979	S	50	Heading ESE	McBrearty (pers. comm.)
243	58°00'N 6°00'W	Aug 1978	S	2		—
244	58°00'N 6°00'W	Jan 1979	S	2		—
245	56°30'N 6°15'W	16 May 1979	S	2		—
246	59°34'N 5°35'W	12 Jun 1979	S	4		—
247	55°38'N 1°30'W	29 Jun 1979	S	10		—
248	55°10'N 5°45'W	5 Jul 1979	S	2	Heading SE	—
249	56°50'N 2°07'W	31 Jul 1979	S	4	Incl 1 "young". Heading S.	—
250	56°20'N 6°30'W	8 Aug 1979	S	4		—
251	57°54'N 0°25'E	13 Nov 1983	S	8	Heading S. SST = 12.0°	—
252	59°52'N 3°43'W	1 Jun 1983	S	6		—
253	57°45'N 7°09'W	1 Sep 1979	S	3		—
254	57°35'N 6°40'W	6 Jun 1980	S	3	Heading N	—
255	57°37'N 6°39'W	6 Jun 1980	S	4	Heading N	—
256	57°36'N 6°51'W	22 Jul 1985	S	2	Heading NE	—
257	59°15'N 4°25'W	28 Jun 1980	S	5		—
? 258	58°23'N 5°14'W	16 Jan 1981	S	1	Calf. Heading W	—
259	57°05'N 7°12'W	29 Jun 1981	S	6	Heading S	—
260	56°01'N 3°14'W	3 Sep 1981	S	20	Heading N	—
261	56°45'N 6°55'W	12 Jul 1982	S	10	Incl 2 "young"	—
262	60°45'N 1°17'W	12 Feb 1983	S	2	Heading WSW	—
263	60°05'N 2°00'W	2 Aug 1982	S	8		—
264	57°48'N 8°33'W	19 Jun 1983	S	5		—
265	57°47'N 8°31'W	28 Jun 1983	S	4		—
266	57°49'N 8°34'W	9 Aug 1979	S	6		—
267	57°49'N 8°34'W	13 Aug 1979	S	4	Heading N	—
270	58°39'N 3°32'W	18 Feb 1984	S	2	Heading N	—
271	57°00'N 6°12'W	5 Sep 1985	S	2		—
272	57°43'N 6°51'W	22 Jul 1985	S	2	Heading NE	—
273	61°10'N 1°30'E	31 Dec 1985	S	3	SST = 7.0°	—
274	57°30'N 1°44'W	10 Jul 1983	S	2	Heading S	—

Appendix 1 (continued)

Source	Record	Location	Date	Type	Whales	Comments	Source
	275	57°43'N 0°55'E	19 Oct 1983	S	21	Incl 1 "young". Heading NW	McBrearty (pers. comm.)
	276	58°00'N 7°15'W	20 Jul 1984	S	8	Incl 2 "young". SST = 13.0°	—
Societe Jersiaise	277	61°10'N 1°56'W	7 Jun 1984	S	6		—
	278	61°36'N 1°18'E	29 Sep 1984	S	6	Incl 1 "young". Heading SSE	—
aters (pers. comm.)	279	57°47'N 6°23'W	26 Aug 1984	S	4		—
Brearty (pers. comm.)	280	56°53'N 7°21'W	6 Feb 1985	S	2		—
	281	56°02'N 1°12'W	18 May 1985	S	1	SST = 10.0°	—
	282	61°36'N 1°17'W	29 May 1985	S	20	Incl 4 "young". Heading NE. SST = 8.7°	—
	283	61°09'N 0°30'E	14 Jul 1985	S	5	SST = 12.0°	—
	284	61°08'N 0°31'E	24 Sep 1985	S	6	Incl 2 "young". SST = 12.0°	—
	285	59°17'N 0°56'W	14 Jun 1980	S	12		—
	286	57°20'N 9°20'W	27 Aug 1979	S			Cen Nat d'Et Mam Mar
	287	River Foyle	6-15 Nov 1977	S	1	Male, L = 18-20 feet	Sheldrick & Hadoke (1977)
	300	60°11'N 0°49'E	5 May 1981	S	5	Heading SW	Seabirds at Sea Team
	301	58°18'N 0°57'E	24/25 Nov 1983	S	2		—
	302	60°02'N 2°00'W	19 Jul 1985	S	1		—
	303	58°39'N 4°45'W	25 Jan 1986	S	20		—
	304	58°50'N 7°01'W	12 Apr 1986	S	4	Male + 3 others	—
	305	57°57'N 5°29'W	15 Aug 1986	S	3	Male + 2 others	—
	306	56°21'N 7°16'W	10 Oct 1986	S	1	Heading NE	—
en Nat d'Et Mam Mar	307	58°07'N 9°43'W	4 Apr 1987	S	1	Heading SW	—
Brearty (pers. comm.)	308	58°03'N 5°31'W	26 May 1987	S	3		—
	309	57°52'N 8°35'W	14 Jun 1987	S	1		—
	310	57°49'N 8°33'W	19 Jun 1987	S	6	Heading N	—
	311	57°06'N 6°20'W	4 Dec 1987	S	1	Male	—