



SEA678 Data Report for Offshore Cetacean Populations.



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1. Introduction

The following report aims to summarise the availability, type and quality of the available data generated by all parties involved in research concerning the seasonal distribution of offshore cetacean populations of SEA areas 6, 7 and 8 (Figure 2.1). The boundaries of this data report were extended into the waters of the Irish designated area (IDA) considering the potential for large-scale cetacean migration through the region in space and time.

2. Study Area

The combined region of the four areas depicted in Figure 2.1 encompasses three broad oceanographic habitats: shallow shelf waters (<200m), deep oceanic waters (>1000m) and the sloped region (>200m & <1000m) that divides the other two habitats. The shelf waters extends from the Minch and the Hebrides Shelf of SEA 7, the Irish Sea, Cardigan Bay, the North Channel and the eastern section of St. George Channel of SEA 6, the Dover Strait, Bristol Channel and the English Channel in SEA 8, through to the Celtic Sea, the Irish Shelf, Malin Shelf and Porcupine Bank of the IDA. An offshore shallow water region is located over the Hatton-Rockall region in SEA 7 and the IDA.

The sloped habitats are located along the edge of the Hatton and Rockall Banks and the continental shelf edge to the west of the Hebrides Shelf, Malin Shelf and Irish Shelf, the Goban Spur (GS) and the Porcupine Bank and Porcupine Seabight, and the waters associated with offshore bathymetric features such as the George Bligh Bank (GBB), Rosemary Bank (RB), Anton Dohrn Seamount (ADS) and Hebrides Terrace Seamount. The oceanic deepwater habitat to the west of the continental shelf is characterised by the Rockall Trough, the Hatton-Rockall Basin, the North and South Feni Ridges and the western edge of the Iceland Basin. Figure 2.2 highlights some of the oceanographic and bathymetric features located within the study area, which may directly or indirectly influence cetacean distribution.

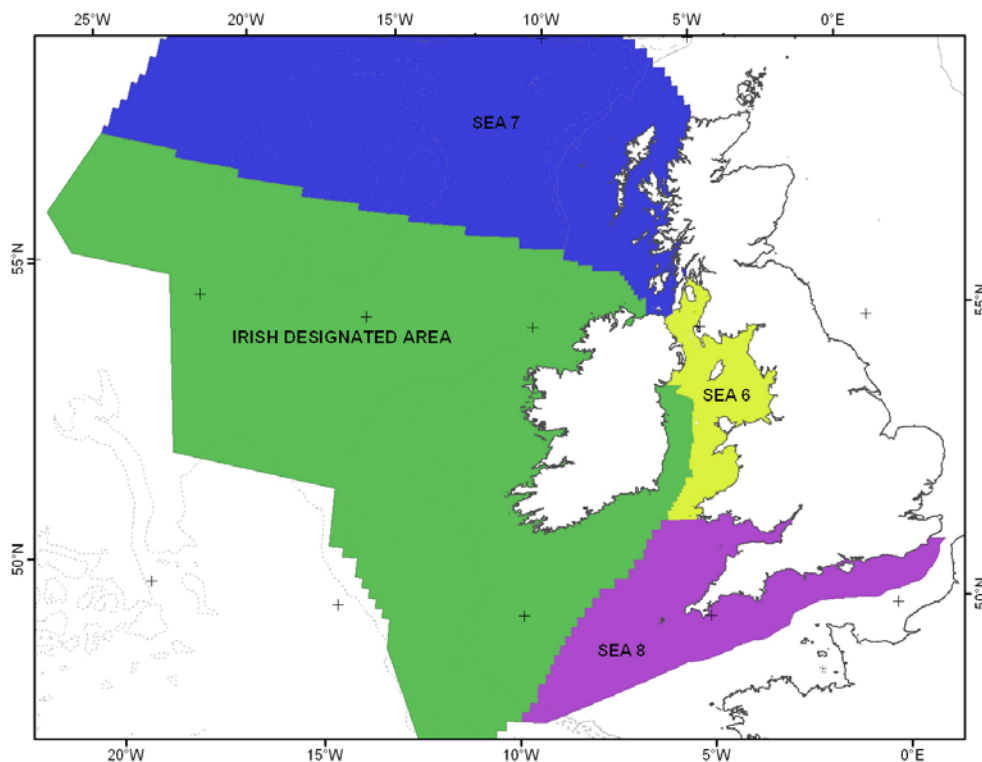


Figure 2.1. Regional boundaries of SEA areas 6, 7 & 8 and the Irish designated area (IDA).

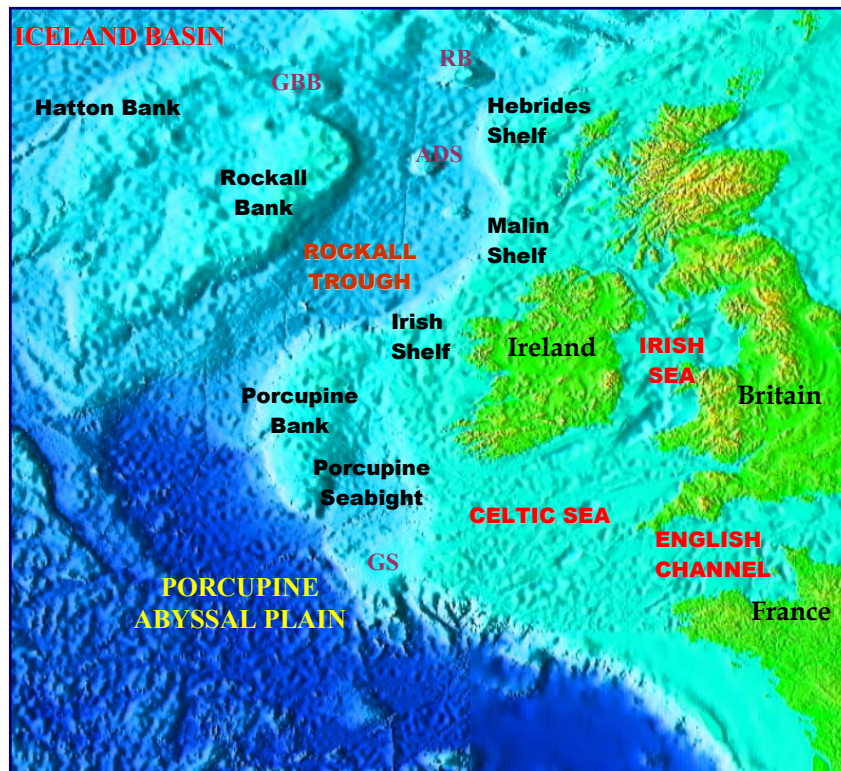


Figure 2.2. Oceanographic & bathymetric features located within the study area (GBB – George Bligh Bank, RB – Rosemary Bank, ADS – Anton Dohrn Seamount, GS – Goban Spur).

3. Previous Research

The following section briefly highlights the publications relating to the offshore cetacean populations that routinely inhabit the waters of SEA areas 6, 7 & 8 and the IDA. The books, reports, papers and notes listed have been produced by a variety of institutions employing an array of survey methods ranging from a series of casual observations to multi-year research programmes.

There is substantial background evidence promoting the waters surrounding Britain and Ireland as an area of high species richness for cetaceans (Evans, 1980; Evans, 1990; Murray & Simmonds, 1998; Harwood & Wilson, 2001). Stranding records from 1901-95 indicate that 21 species may inhabit western Irish waters (Berrow & Rogan, 1997) with perhaps as many as 23 species (Rogan & Berrow, 1995), based on whaling records (Fairley, 1981) and rare stranding reports (Berrow & Rogan, 1997).

3.1 European Seabirds at Sea (ESAS)

The data collected by those European institutions involved in offshore seabird and cetacean research during standard ship-based and aerial surveys contribute to the European Seabirds at Sea (ESAS) database, which is maintained and updated by the Joint Nature Conservation Committee (JNCC) in Aberdeen, Scotland. Much of the early research that has focused on the seasonal distributions of those cetacean populations utilising the offshore waters of SEA areas 6, 7 & 8 and the IDA was

conducted by the JNCC. Subsequently, Irish (Coastal & Marine Resource Centre (CMRC)) and Dutch institutions (Royal Netherlands Institute for Sea Research (NIOZ), Instituut Bos en NatuurOnderzoek (now merged into Alterra)) have expanded on these pioneering studies to also make significant contributions to the current level of understanding of this diverse and inadequately studied group of marine mammals (e.g. Leopold *et al.*, 1992; Leopold & Couperus, 1995; Ó Cadhla *et al.*, 2004).

The effort-related and cetacean distribution maps depicted in the current report were generated from the ship-based survey records stored within the ESAS database. As such, the most relevant publications to the current study, which are summarised below, are those that have contributed or have drawn from the ESAS database.

Pollock *et al.* (1997) looked at the seasonal distribution and abundance of cetacean and seabird populations in the waters around Ireland and the waters north and west of Scotland respectively. Pollock *et al.* (2000) and Weir *et al.* (2001) concentrated their efforts on the Atlantic Frontier, north and west of Scotland. Evans (1981) published the results of a cetacean and seabird survey of waters to the west of British and Irish waters. Reid *et al.* (2003) combined effort related data from the ESAS, Sea Watch Foundation and the SCANS (Small Cetacean Abundance in the North Sea) databases to produce the first comprehensive atlas of offshore cetacean populations in northwest European waters. Macleod *et al.* (*in press*) analysed data from the ESAS database to investigate the distribution and habitat preferences of beaked whale populations on the Atlantic Frontier. Between 1999 and 2003, Cronin & Mackey's (2002), Mackey's (2003), Mackey *et al.*'s (2003) and Ó Cadhla *et al.*'s (2004) research expanded upon the results of Pollock *et al.* (1997), by targeting the cetacean and seabird offshore populations of Ireland's Atlantic Margin out to the Porcupine-Rockall-Hatton region. Carolyn Stone published the results of a number of studies conducted in European waters between 1996 and 2000, which looked at the distribution of cetaceans during seismic surveys (Stone, 1997; Stone, 1998; Stone, 2000; Stone, 2001; Stone, 2003a; Stone 2003b).

Other reports investigating offshore distribution (Bloor *et al.*, 1996; Taylor & Reid, 2001; Skov *et al.*, 2003) and the dispersion and vulnerability (Skov *et al.*, 2002) of seabird and cetacean populations, concentrated their survey effort on locations outside the SEA region (i.e. Faroese and Shetland waters). However, some of the data are relevant to the northeast section of SEA area 7.

3.2 Non-ESAS Publications

The following references are examples of reports and papers that used alternative methods to examine offshore and inshore cetacean distribution, abundance, at-sea movements and behaviour within the study area. Although essential to the overall understanding of resident and migrant cetacean populations, the data from such studies have not contributed to the ESAS database and as such, have no relevance to the maps produced in this report:

Independent observer surveys: see Hiby & Hammond, 1989; Murray & Simmonds (1998); SCANS - Hammond *et al.* (2002); SIAR - Ó Cadhla *et al.* (2004);

Aerial surveys: Hammond *et al.* (2002); Hammond (1995); Hammond *et al.* (1995);

Non-effort related sightings: Bourne (1986); Evans (1988); Baines *et al.* (1997); Rogan & Berrow (1996);

Land-based seawatches: Evans (1988); Rogan & Berrow (1996); Baines *et al.* (1997); Ingram (2000); Rogan *et al.* (2003);

Inshore and coastal small boat-based transect surveys: Berrow *et al.* (1996); Ingram (2000); Ingram *et al.* (2001); Ingram & Rogan (2003); Ingram *et al.* (2003a); Ó Cadhla *et al.* (2003); Rogan *et al.* (2003);

Photo-identification: Berrow *et al.* (1996); Atkinson *et al.* (1997); Ingram (2000); Ingram *et al.* (2001); Ingram *et al.* (2003a);

Species reviews: Evans (1988); Evans (1992); Rogan & Berrow (1996); Rogan *et al.* (1997); MacLeod (2000); Rogan (2001);

Acoustic surveys using hydrophones: Clark & Charif (1998); Gordan *et al.* (1999); Charif *et al.* (2001); Aguilar de Soto *et al.* (2004);

Acoustic detections using PODs: Baines *et al.* (1999); Ingram *et al.* (2003b); Ó Cadhla *et al.* (2003);

Fisheries interactions: Berrow *et al.* (1994); Couperus (1997); Hassani *et al.* (1997); Tregenza *et al.* (1997a); Tregenza *et al.* (1997b); Berrow *et al.* (1998); Morizur *et al.* (1999); Rogan & Mackey (1999); Stenson (2003);

Stranding records: Fraser (1974); Berrow & Rogan (1997); Rogan *et al.* (1997); Rogan *et al.* (2001); Goold *et al.* (2002); Mackey *et al.* (2003); MacLeod *et al.* (2004);

Historic whaling records: Burfield (1912); Thompson (1928); Reeves & Smith (2002); &

Population structure & stock identification: *see* Donovan & Bjørge, 1995; Lockyer, 2003.

3.2 Non-ESAS Data Sources

Non-ESAS related data on offshore cetacean distribution and abundance are also maintained at the following locations:

- a) **Sea Mammal Research Unit;**
- b) **Sea Watch Foundation; &**
- c) **Irish Whale & Dolphin Group.**

The addresses and relevant contacts for the organisations listed above are outlined in Section 9. The origins of data sources a) and b) are summarised in Reid *et al.* (2003), while data source c) is outlined in Berrow *et al.* (2002). Any queries relating to data availability and costs should be directed to the associated contact listed in Section 9.

4. Methods

The ESAS dataset (Version 3.1), covering the period 1979-2003, was used to generate the effort-related and the sightings/distribution maps in Sections 5 and 6. The ESAS database is maintained and updated by the Joint Nature Conservation Committee (JNCC) in Aberdeen. Although other studies have utilized ESAS aerial survey data (Pollock *et al.*, 1997; Pollock *et al.*, 2000), the current study has drawn from data generated solely from ship-based visual surveys using 200m and 300m transect strip-widths. The primary ship-based survey method is outlined by Tasker *et al.* (1984) and Webb & Durinck (1992). Originally designed as a standard method for counting seabirds at sea, the survey technique has been expanded to include cetacean sighting records, since cetaceans are regularly seen in the field by observers conducting ship-based seabird surveys.

The method generally consists of a strip-transect survey (Buckland *et al.*, 2001) conducted by a single experienced scientific observer from various European institutions (e.g. JNCC, CMRC, NIOZ). The observer records survey effort, environmental conditions (e.g. glare, water depth, wind strength, swell height), positional data, in addition to all cetacean sighting records encountered in a 90° arc to one side of the vessel's trackline. Surveys were conducted year-round on "vessels of opportunity" (e.g. international research vessels, naval vessels, fishing vessels), which were scheduled to be at sea in the study area for a period of days or weeks, and whose hosts were able to provide a spare berth for one or more observers.

The effort-related and cetacean sighting data gathered during full surveys form the basis of the respective survey effort and cetacean distribution plots generated using ArcGIS (Version 8.1). These are displayed as ¼ International Council for the Exploration of the Sea (ICES) area units, each measuring 15' latitude x 30' longitude. These area blocks are the units of coverage used by the JNCC and other international research groups as a standard means of displaying survey effort and cetacean distribution and relative abundance, thereby allowing the direct comparison of international research results.

4.1 Effort Maps

Full survey effort area (km surveyed) for each ¼ ICES square depicted in Figures 5.1 and 5.2 was calculated by totalling the total number of kilometres surveyed during the standard full surveys using 200m and 300m transect strip-widths.

4.2 Cetacean Distribution/Sighting Maps

Due to an observed reduction in the detectability of cetaceans when conducting the single-observer full survey method, it was considered that true cetacean abundance per ¼ ICES block could not be accurately represented here via an analysis of "on-effort" sightings. As a result, the data collected for cetaceans are considered most appropriate with the presentation of seasonal and total distribution plots (Figures 6.1-6.21), which represents all animals recorded within the 90° survey arc irrespective of sea conditions. Cetaceans recorded outside of the 90° arc, incidentally and during multi-observer surveys are not represented in this report. The underlying grey shaded region on each distribution map represents the combined SEA/IDA region depicted in Figure 2.1.

4.3 Seasonal Definition

The seasons were defined based on seasonal daylight levels and average sea surface temperatures for the west of Ireland (Bowyer & Ward, 1995; Boelens *et al.*, 1999). Table 4.1 outlines the three months designated to each season.

Table 4.1. Months designated for each season.

Season	Months
Winter	January, February, March
Spring	April, May, June
Summer	July, August, September
Autumn	October, November, December

4.4. Bathymetric Contours

Bathymetric contours in all associated survey effort maps and sighting/distribution maps are represented in the following manner:

_____ 200m isobath	___ _ _ 500m isobath
___ _ _ _ _ 1000m isobath	----- 4000m isobath

5. Survey Effort

Full surveys were conducted in the study area between July 1980 and August 2003. Approximately 83% of all the survey effort conducted was achieved by the JNCC, 11% by the CMRC based in Cork, and the remaining 6% was driven by various Dutch institutions (e.g. NIOZ & Instituut Bos en NatuurOnderzoek).

Figure 5.1 outlines the full transect survey effort achieved for SEA areas 6, 7 and 8 and the waters of the Irish designated area (IDA). The map represents a total of 584,032km of trackline surveyed, approximately 65% of which were surveyed during the spring and summer months (April - September) (Figures 5.2b & 5.2c). The limited level of survey effort achieved during autumn and winter months (October - March) (Figures 4.2a & 4.2d), was largely due to reduced sea-going opportunities, poor climatic conditions and the relative low number of available daylight hours.

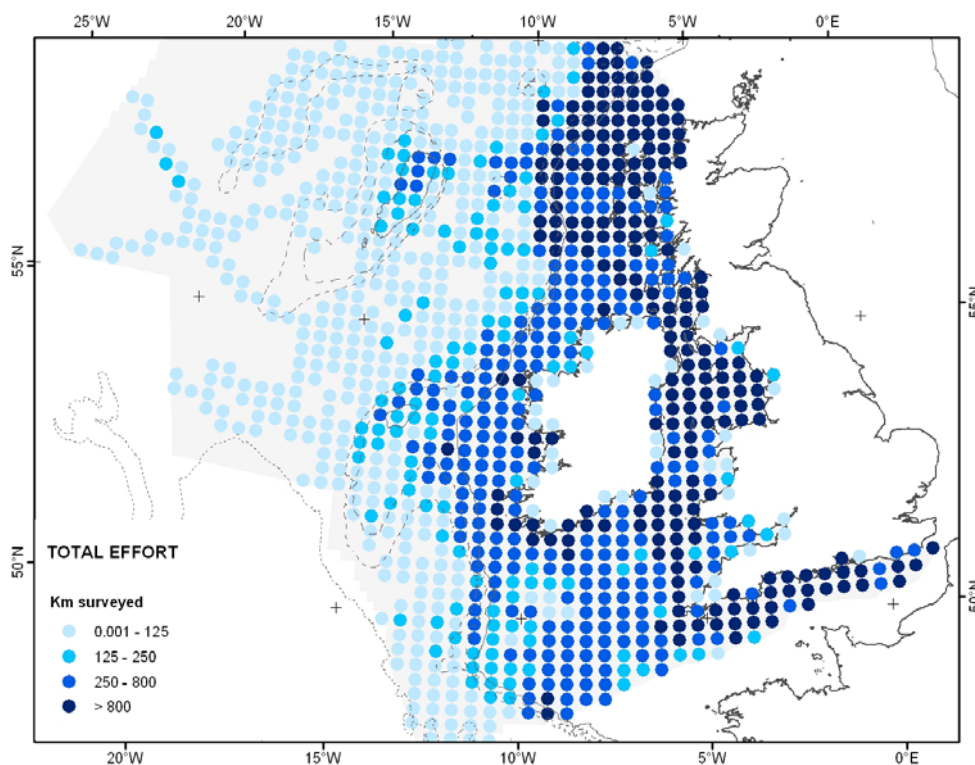


Figure 5.1. Total full survey effort (km surveyed) conducted in SEA areas 6, 7 & 8 and the Irish designated area (IDA), 1980-2003.

The coastal and shelf habitats associated with Hebrides Shelf, the Western Isles, through the North Channel, Irish Sea, St George's Channel and the Bristol Channel, and across the northern sector of the Celtic Sea and the English Channel have received substantial levels of survey effort (i.e. $>80\text{km}^2$) during the 23-year study period. More recently, surveys have concentrated on investigating the offshore seabird populations of Irish Atlantic Margin. As a result, moderately high levels of survey effort (i.e. $>30\text{km}^2$) have been achieved over the Irish Shelf, Malin Shelf, the southern sector of the Celtic Shelf out to the Goban Spur and the north of the Porcupine Seabight, and across the northern sector of the Rockall Trough and the Anton Dohrn Seamount to Rockall and across the Rockall Bank. Low to moderate (i.e. $<30\text{km}^2$) levels of survey effort were also achieved over the Lousy Bank, Rosemary Bank, George Bligh Bank, Hatton Bank, Hatton-Rockall Basin, the

southern and central sectors of the Rockall Trough and the Porcupine Bank, the Porcupine Seabight down to the slope-related waters of the Goban Spur.

With the aims of the various studies in mind, it is not surprising to note that the waters associated with many of the important seabird colonies to the west of Britain and, to a lesser extent, around the Irish coast have received high levels of survey effort. These include the many island and coastal colonies to the west and northwest of Scotland (e.g. St Kilda, Flannan Isles, Ailsa Craig, Rhum, Handa, North Rona, Sula Sgeir), in and along the Irish Sea (e.g. the Calf of Man, Bardsey), off southwest Wales (e.g. Skokholm, Skomer and Grassholm) and off southwest England (e.g. Lundy, Isles of Scilly). Greater than 80km² was also achieved in close proximity to important breeding colonies along Ireland's east coast (e.g. Lambay Island, Rockabill and Lady's Island Lake, the Saltees), west coast (e.g. the Cow & Bull Rocks, the Skelligs, the Blasket Islands, the Cliffs of Moher, the Stags of Broadhaven) and north coast (e.g. Horn Head, Rathlin Island, Copeland Islands).

Figure 5.2 also highlights seasonal differences in the spatial coverage. The most spatially extensive surveys were achieved during spring (April-June) and summer (July-September), where the effort extended from the English Channel, over the Porcupine Bank, Porcupine Seabight and the Goban Spur, the Irish and Celtic Seas, north to the Western Isles, west to the Rockall and Hatton Banks, and the southern sector of the Rockall-Hatton region beyond the eastern shelf of the Iceland Basin (Figures 5.2b & 5.2c). A greater level of effort was achieved during summer, particularly in the Irish Sea and along the Irish shelf and the Malin Shelf (Figure 5.2c).

Autumn and winter surveys were generally restricted to shelf water habitats. Offshore autumn surveys in slope and deepwater habitats were confined to the general area northwest and west of the Hebrides Shelf, with lower levels of effort attained in the Porcupine Seabight-Goban Spur region and west of Co. Donegal (Figure 5.2d). In addition to the area covered during autumn surveys, winter effort extended to the Porcupine Bank and across the northern sector of the Rockall Trough to the Rockall Bank and George Bligh Bank (Figure 5.2a). Surveys along the Larne-Fleetwood, Dublin-Hollyhead and Rosslare-Pembroke Dock ferry routes were conducted during all seasons (Figures 5.2a-d).

Although a vast amount of survey coverage has been achieved within SEA area 6, 7 & 8 and the IDA, there is a need for an ongoing survey programme to ensure that any long-term trends and short-term fluctuations in offshore cetacean distribution and abundance may be detected and assessed. Emphasis when planning future surveys should be placed on those regions where spatial and temporal gaps exist in survey effort (*see* Figure 5.2).

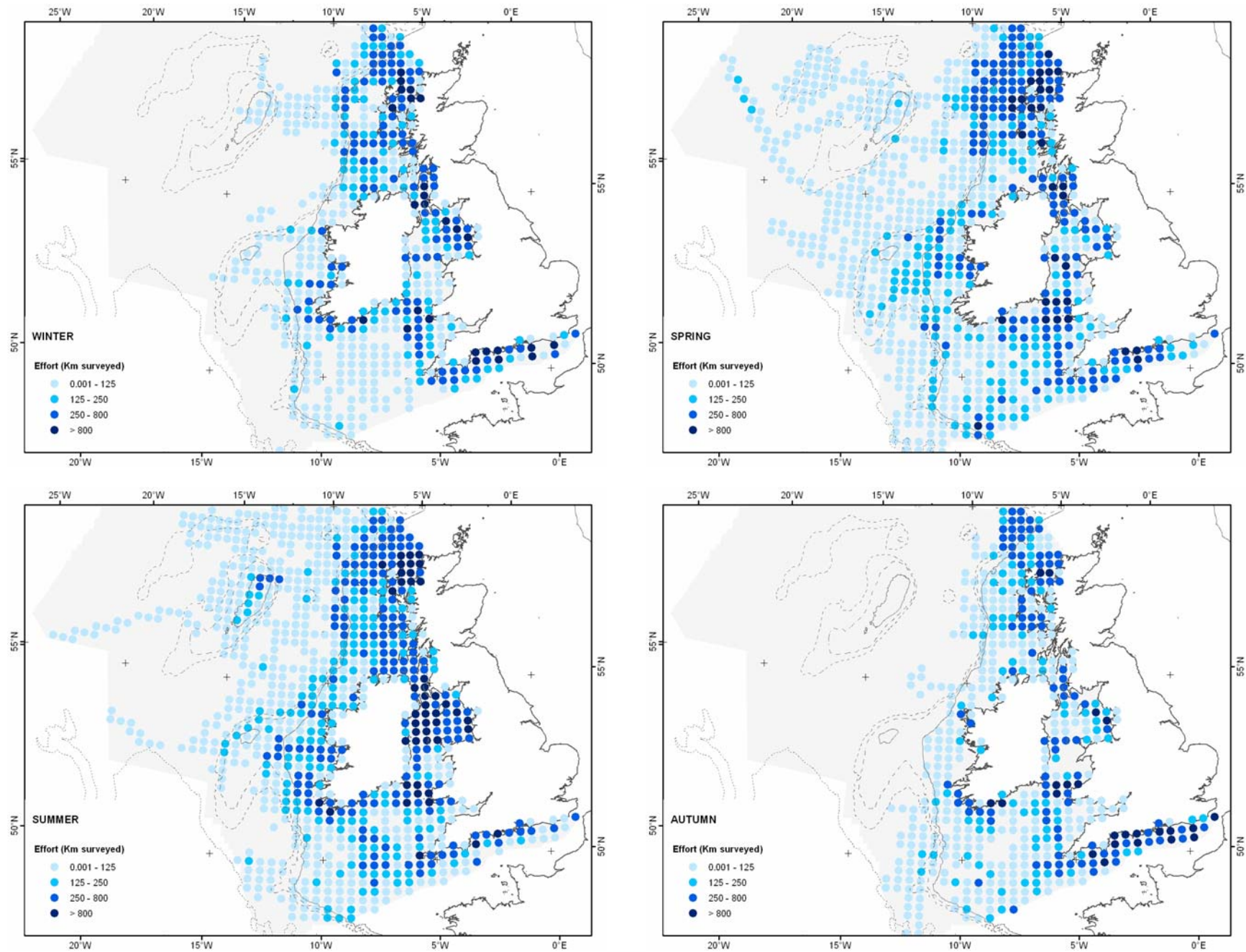


Figure 5.2. Seasonal full survey effort (km surveyed) for cetacean distribution assessment within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

6. Seasonal Distribution

This section summarises the seasonal distribution of the 21 cetacean species recorded during standard single-observer surveys of the coastal and offshore regions of SEA areas 6, 7 and 8 and the IDA between July 1980 and August 2003. To avoid repetition, all general comments regarding the following distribution maps have not been specifically referenced. Unless stated otherwise, greater detail regarding the maps and the related descriptive comments is discussed in one of the following reports: Pollock *et al.* (1997); Pollock *et al.* (2000); Weir *et al.* (2001); Mackey (2003); Mackey *et al.* (2003); Reid *et al.* (2003); Ó Cadhla *et al.* (2004). The total numbers of each species recorded in SEA areas 6, 7 and 8 and the IDA between 1980 and 2003 are listed in the Appendix (Section 10).

Northern Right Whale *Eubalaena glacialis*

A single Northern Right Whale was recorded during late May 2000, along the 1000m contour of the western slope of the Hatton Bank (Figure 6.1). This rarely encountered species was observed in excellent sighting conditions during a seismic investigation of the Rockall-Hatton Bank (Ó Cadhla *et al.*, 2004). Although sightings like this suggest that small remnants of the eastern Atlantic stock might still exist, it is more likely that such animals are vagrants from the remaining western Atlantic stock (Harwood & Wilson, 2001).

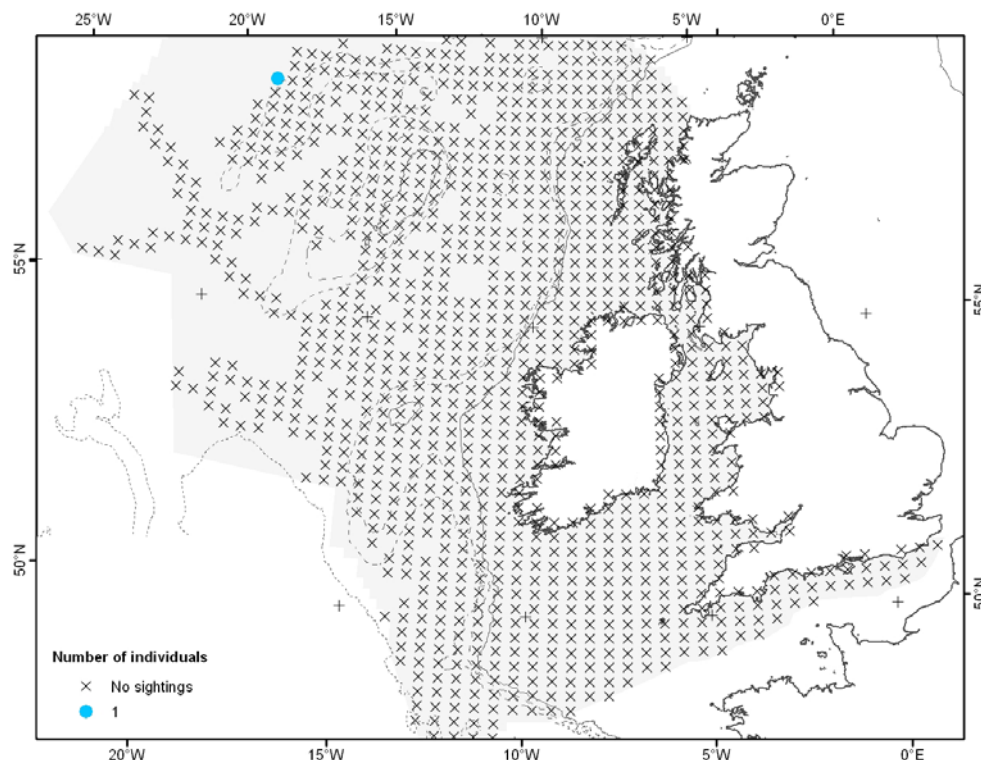


Figure 6.1. Sighting location of the Northern Right Whale recorded in SEA area 7, May 2000.

Humpback Whale *Megaptera novaeangliae*

Humpback Whale records were restricted to the spring and summer months, where single animals were observed during standard single-observer surveys west of the Hebrides, and west of the Hebrides and Irish Shelves (Figure 6.2). Berrow *et al.* (2002) also reported a summer peak in Humpback Whale sightings, the majority of which occur along the Cork coast. A single animal was observed during an independent-observer survey west of the Malin Shelf during August 2001 (Ó Cadhla *et al.*, 2004).

Fin Whale *Balaenoptera physalus*

The majority of the 38 Fin Whales recorded during standard single-observer surveys were encountered during summer along the continental slope, over the deep waters of the Rockall Trough and Porcupine Seabight, and over the Rockall-Hatton region (Figure 6.3). Two encounters involving solitary animals were also reported from the deepwater region southwest of the Rockall and Hatton Banks. The spring and summer records of this large baleen species observed over the shelf waters south of Co. Cork, support the observations frequently recorded by Berrow *et al.* (2002). During the dedicated cetacean survey conducted west of the Irish coast (August 2000), Ó Cadhla *et al.* (2004) recorded Fin Whales during five separate encounters over the Porcupine Bank, and over the Rockall Trough, west of the Malin Shelf, and northwest of the Porcupine Bank.

Minke Whale *Balaenoptera acutorostrata*

The Minke Whale was easily the most numerous and frequently encountered of the baleen (i.e. filter-feeding) whale species recorded during the 23-year study period (*see* Appendix). The vast majority of the 220 individuals were recorded during the spring-summer period (Figure 6.4). The Minke Whale was more abundant over the relatively shallow waters of the continental shelf, particularly around the Western Isles. They were also recorded in varying numbers through the Irish Sea, the Celtic Sea, over the Hebrides Shelf, the Malin Shelf and off the Irish southwest coast to the Porcupine Bank. Interesting offshore sightings were recorded over the Rockall Trough, the George Bligh Bank, in the southern sector of the Hatton-Rockall Basin and in close proximity to the isle of Rockall, where a relatively large concentration of animals were reported in May 2002 (Mackey *et al.*, 2003). Although Minke Whales were widespread over slope and shelf habitats during autumn, no animals were recorded during standard single-observer surveys in winter.

Blue Whale *Balaenoptera musculus*

A single Blue Whale was recorded in the deep waters of the Rockall Trough, north of the Porcupine Bank, during late May 2001 (Figure 6.5). The adult animal was observed surfacing on two occasions several minutes apart, as it headed in a northward direction across the path of the survey vessel (Ó Cadhla *et al.*, 2004). This sighting represents the first visual record of this endangered species in Irish Atlantic Margin waters since the cessation of whaling operations in the region. An additional three Blue Whales were also recorded heading north over the eastern edge of the Iceland Basin, west of the IDA during May 2002 (Mackey *et al.*, 2003).

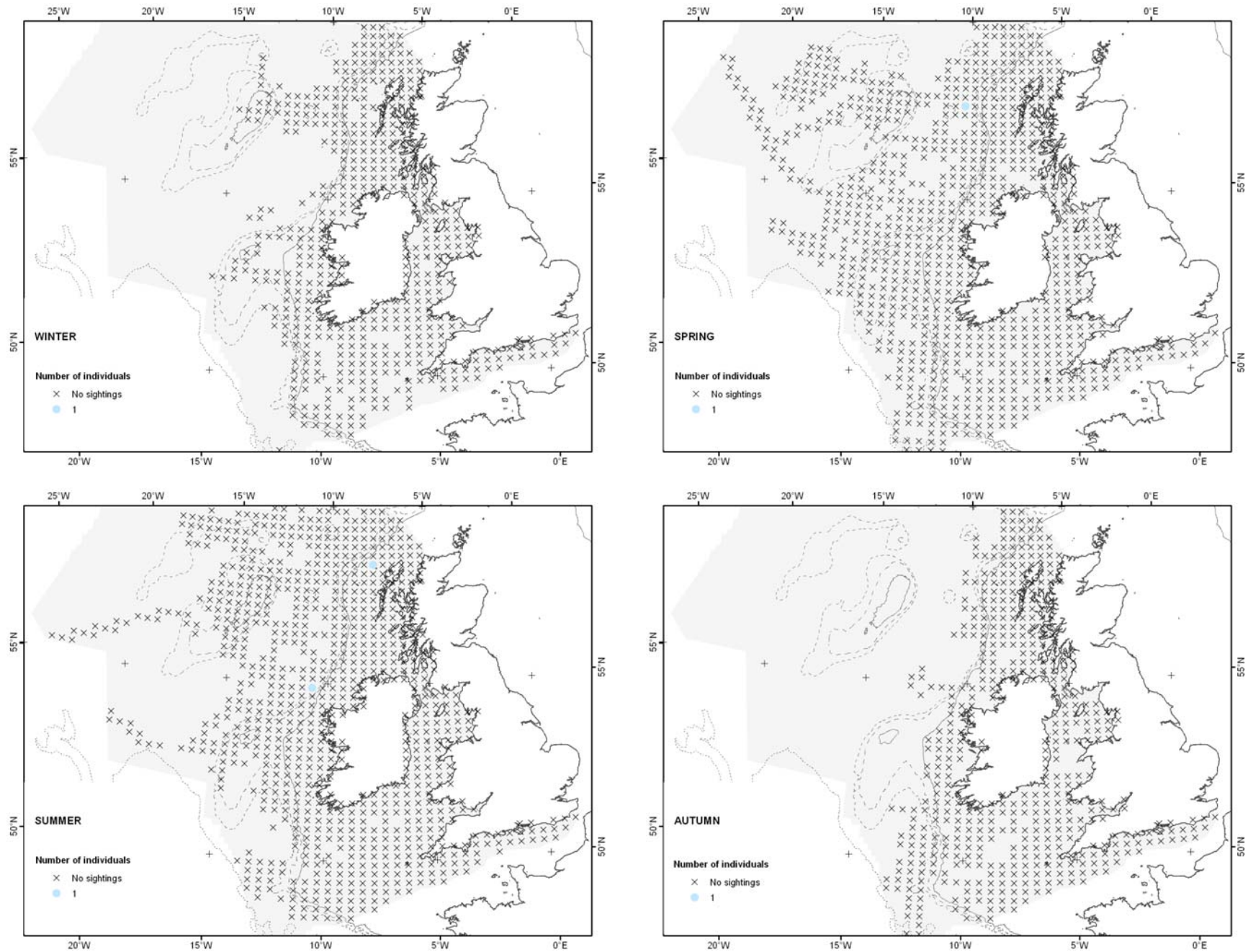


Figure 6.2. Seasonal distribution of the Humpback Whale recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

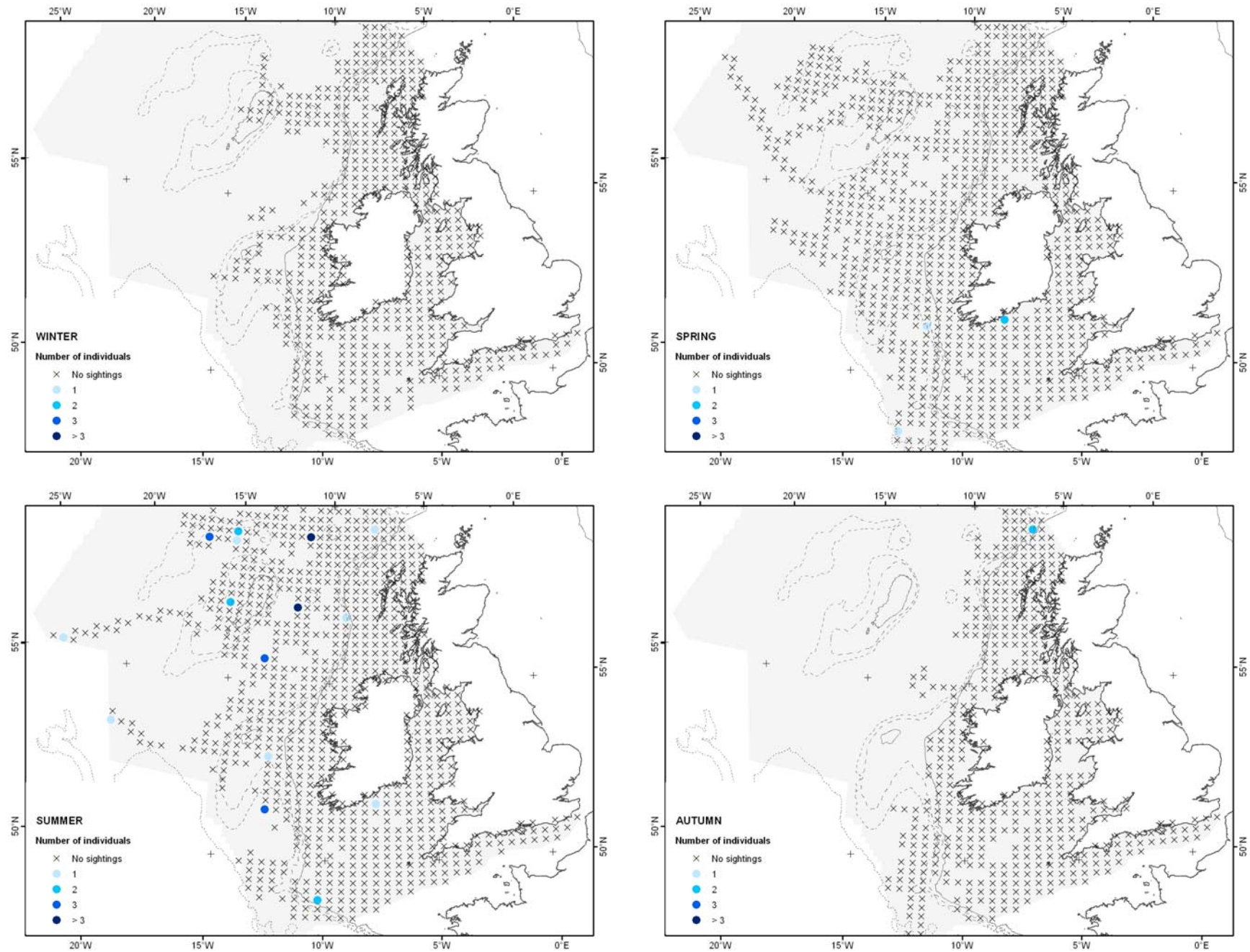


Figure 6.3. Seasonal distribution of the Fin Whale recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

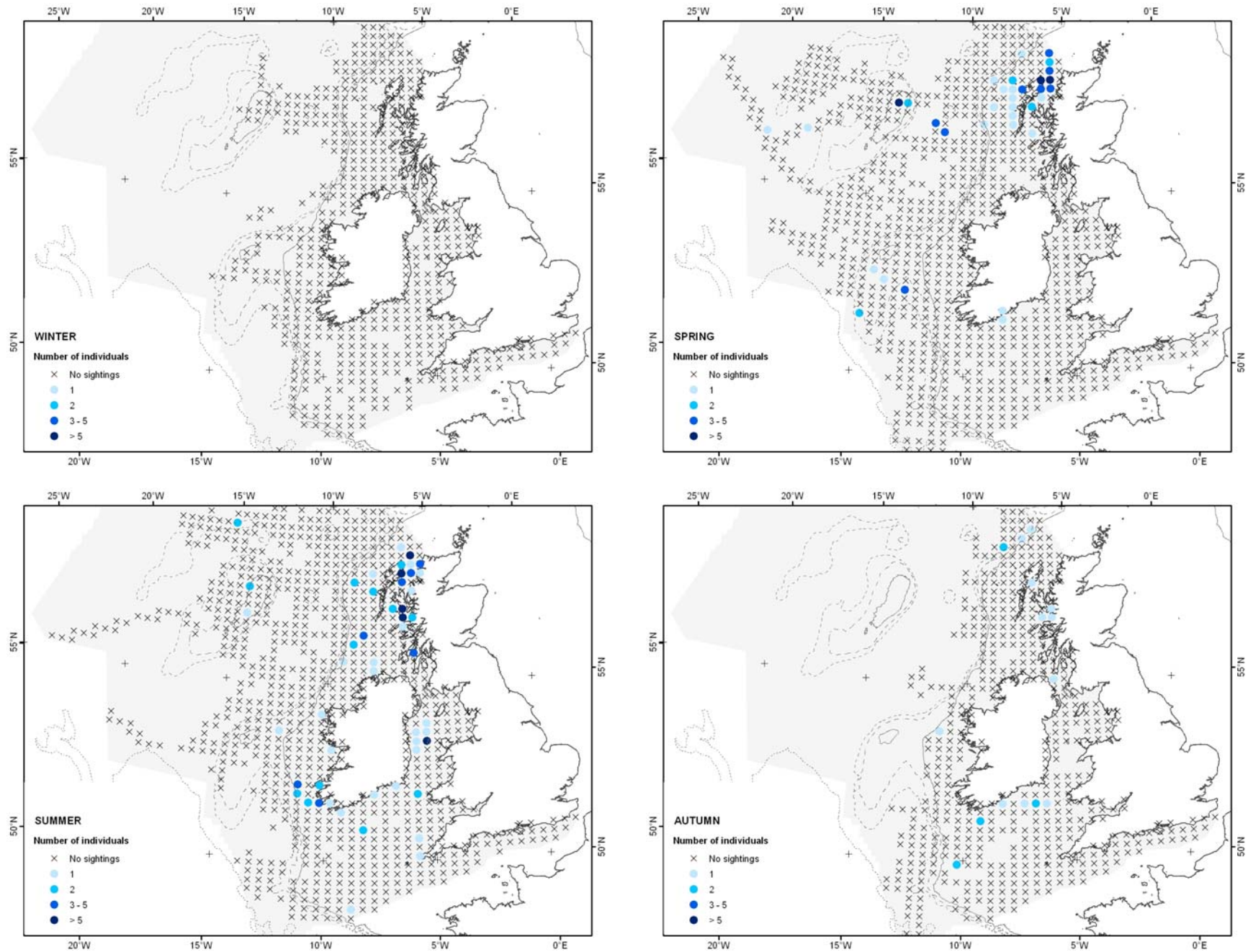


Figure 6.4. Seasonal distribution of the Minke Whale recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

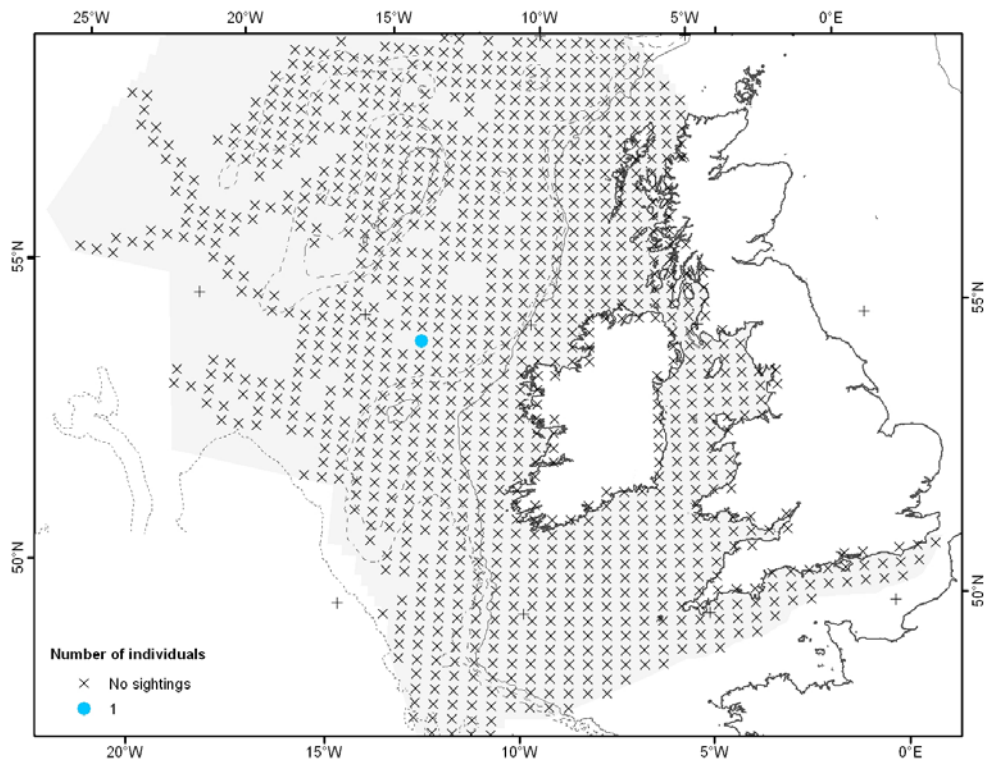


Figure 6.5. Sighting location of the Blue Whale recorded in the IDA, May 2001.

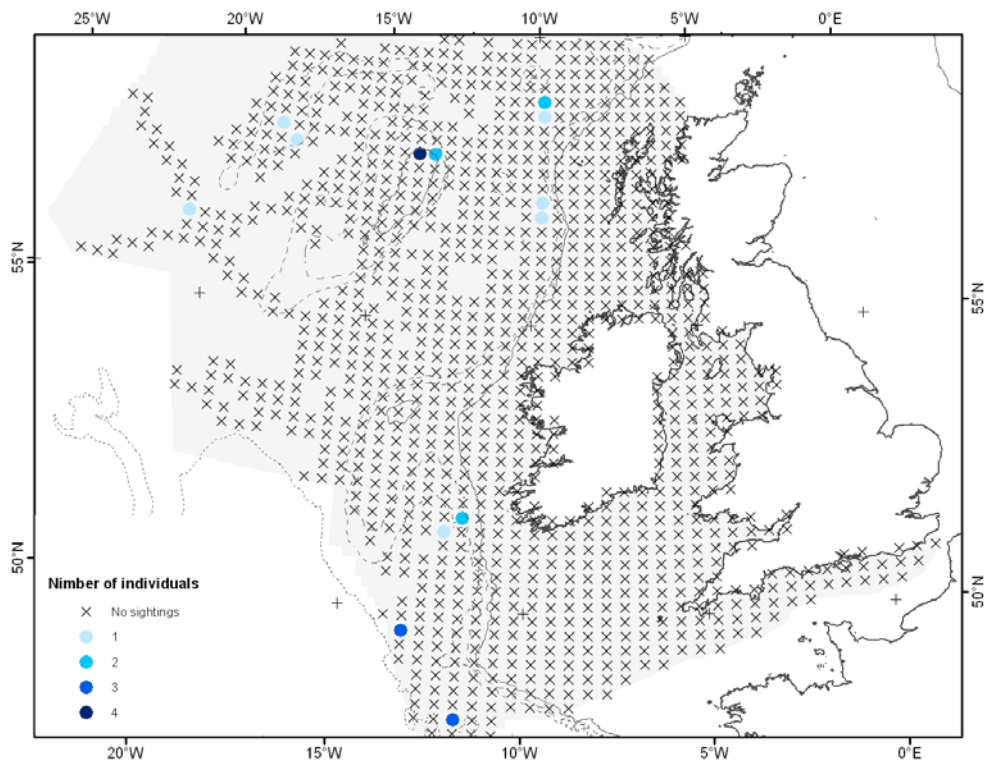


Figure 6.6. Sighting locations of Sei Whales recorded in SEA areas 6, 7 & 8 and the IDA, 1980-2003.

Sei Whale *Balaenoptera borealis*

Generally considered to be a deepwater pelagic species, the 23 Sei Whales noted during standard single-observer surveys were widely distributed in deepwater and slope habitats (Figure 6.6). Most encounters were located west of Scotland, where they were recorded off the Hebrides Shelf and over the Rockall-Hatton region. Southern records were restricted to the northeast slope of the Porcupine Seabight and west and southwest of the Goban Spur. Additional incidental sightings during the spring-summer period were reported by Ó Cadhla *et al.* (2004) over the western slopes of the Porcupine Bank and Porcupine Seabight, and over the Hatton Bank, while Reid *et al.* (2003) and Pollock *et al.* (2000) reported frequent sightings north of the study area, along the Faroe-Shetland Channel.

Sperm Whale *Physeter macrocephalus*

Sperm Whale records were generally restricted to slope and deepwater habitats between spring and autumn (Figure 6.7). They were encountered in varying numbers during this period off the Hebrides Shelf, over the Rosemary Bank, through the Rockall Trough, over the Rockall-Hatton region, towards the Iceland Basin, over the porcupine Basin and to the west and southwest of the Goban Spur. A dedicated independent-observer cetacean survey also recorded this large toothed whale across the northern sector of the Rockall Trough during August 2000 (Ó Cadhla *et al.*, 2004). Winter records of Sperm Whales are limited to two animals reported from the northern slope region of the Hebrides Shelf.

Northern Bottlenose Whale *Hyperoodon ampullatus*

The Northern Bottlenose Whale was the most frequently encountered beaked whale species recorded in the current study area. The 23 animals recorded during standard single-observer surveys were all observed over a wide area west of the continental shelf (Figure 6.8). Low numbers of this curious beaked whale species were encountered along the northern, northwestern and western slopes of the Porcupine Bank, Hebrides Shelf and Rockall Bank respectively. Additional sightings were made north of the Rosemary Bank, west of the Hatton Bank and south of the Rockall-Hatton region. An independent observer survey conducted west of Ireland in August 2000, recorded Northern Bottlenose Whales over the continental shelf, west of Co. Mayo, and over the deep waters of the Rockall Trough (Ó Cadhla *et al.*, 2004).

Cuvier's Beaked Whale *Ziphius cavirostris*

A single Cuvier's Beaked Whale was recorded in August bow-riding over the 500m contour of the Porcupine Bank, east of the Porcupine Seabight (Figure 6.9). Two separate encounters of Cuvier's Beaked Whales were also recorded in August over the Rockall Trough, west of the Irish Shelf (Ó Cadhla *et al.*, 2004). The sightings reported here, together with other limited incidental records, support Reid *et al.*'s (2003) suggestion that the Cuvier's Beaked Whale may move into UK waters during summer.

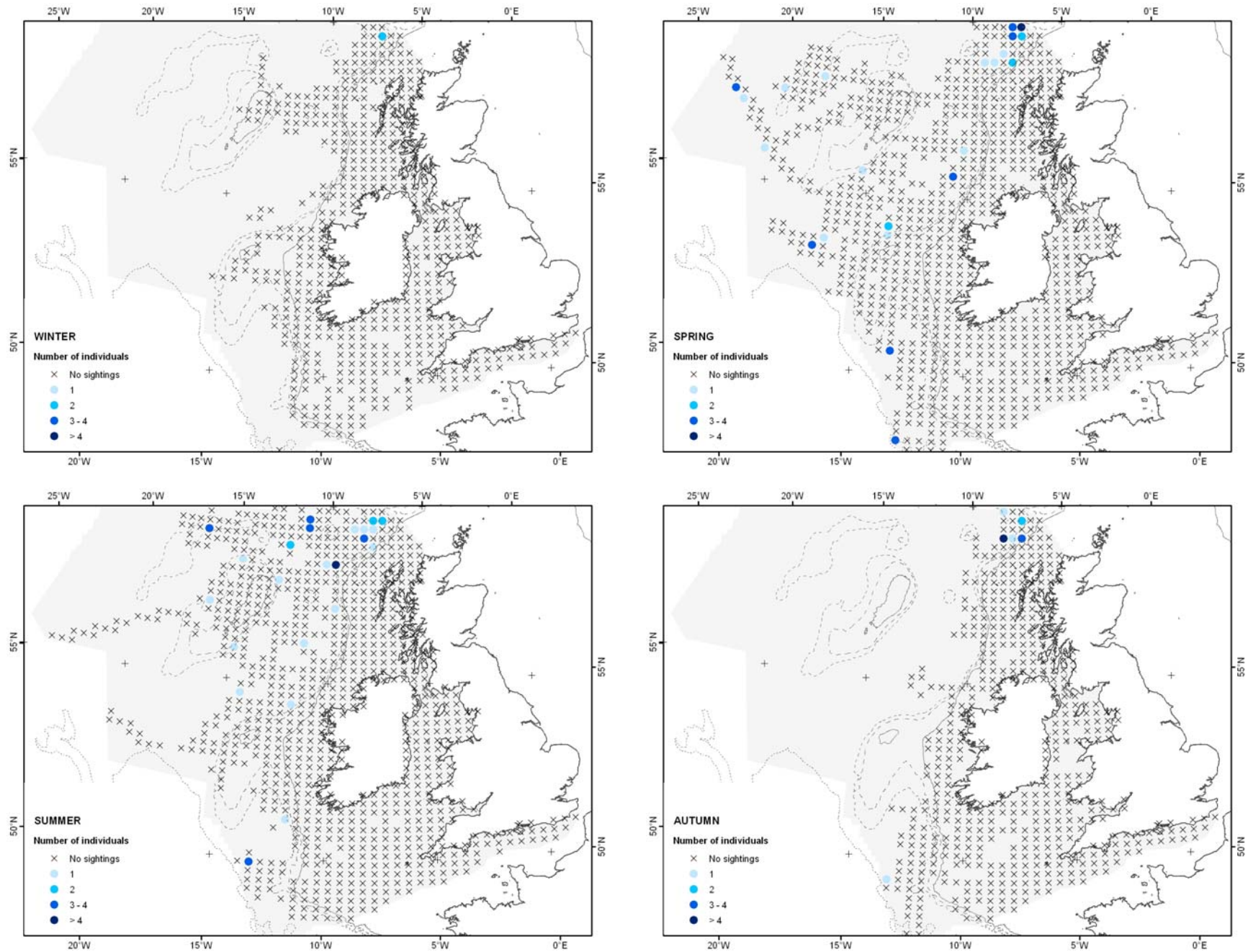


Figure 6.7. Seasonal distribution of the Sperm Whale recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

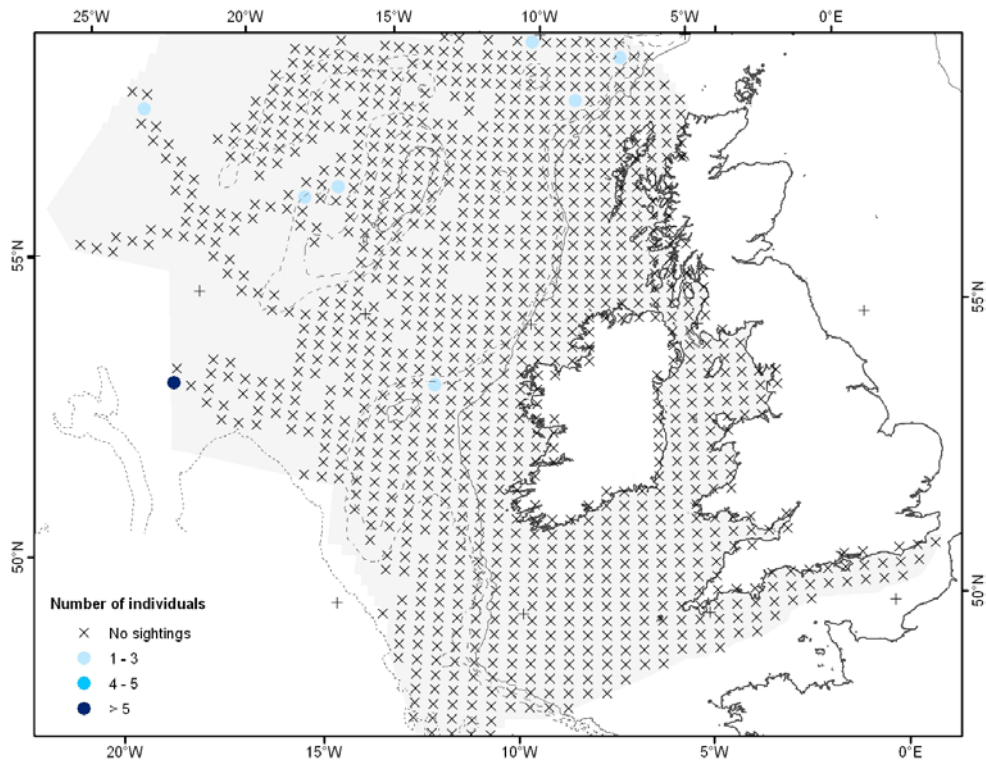


Figure 6.8. Sighting locations of Northern Bottlenose Whales recorded in SEA area 7 and the IDA, 1980-2003.

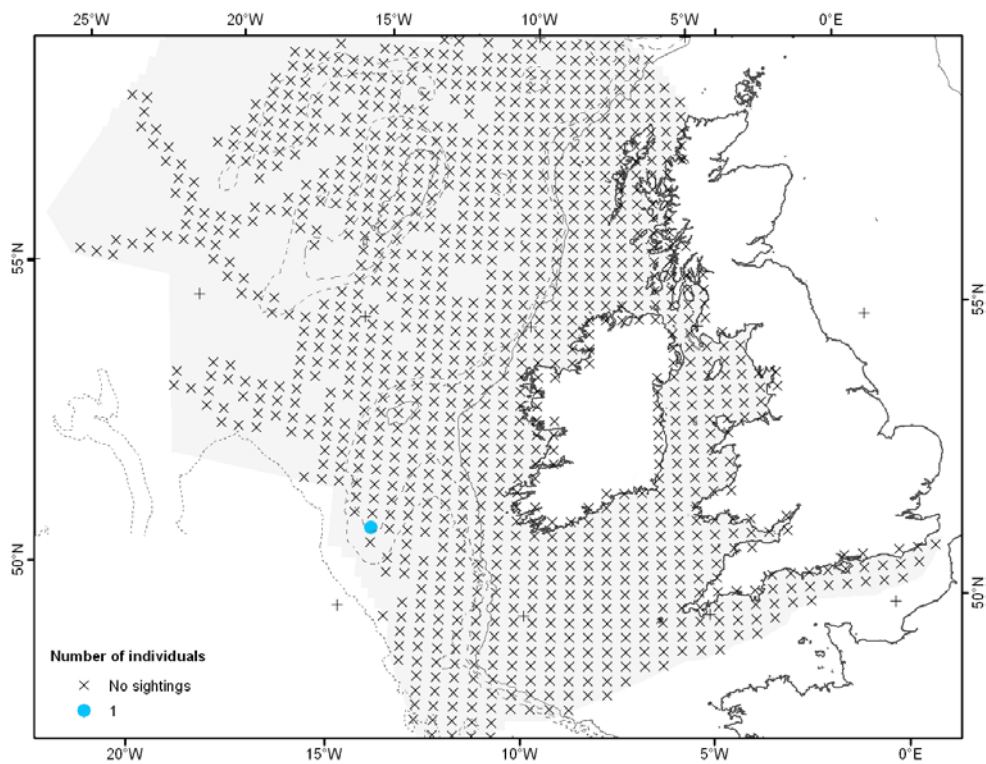


Figure 6.9. Sighting location of the Cuvier's Beaked Whale recorded on survey in the IDA, August 2001.

Sowerby's Beaked Whale *Mesoplodon bidens*

A total of nine Sowerby's Beaked Whales were recorded during three separate encounters during standard single-observer surveys. A single animal was recorded west of the Hebrides Bank, while the remaining eight animals were observed near a seamount located southwest of the Hatton Bank (Figure 6.10). The eight individuals were observed during two encounters, recorded within the space of 50 minutes. Although Sowerby's beaked whales are considered to be shy animals that avoid all forms of shipping traffic, both groups appeared to actively approach the vessel in an investigative manner. The second group comprising five animals (four adults and one immature) approached the vessel to within 120m (Mackey *et al.*, 2003). An independent observer survey conducted west of Ireland in August 2000, recorded a group of five Sowerby's Beaked Whales over the deep waters of the Rockall Trough, northeast of the Porcupine Bank (Ó Cadhla *et al.*, 2004).

True's Beaked Whale *Mesoplodon mirus*

A single group of True's Beaked Whales were recorded over the southern sector of the Rockall Trough, northwest of the Porcupine Bank during late May 2001 (Figure 6.11). The five animals of varying length (~3-6m) were observed performing a series of breaches within 500-800m of the survey vessel (Ó Cadhla *et al.*, 2004). The encounter represented the first recorded live sighting of this rarely observed species in Irish waters.

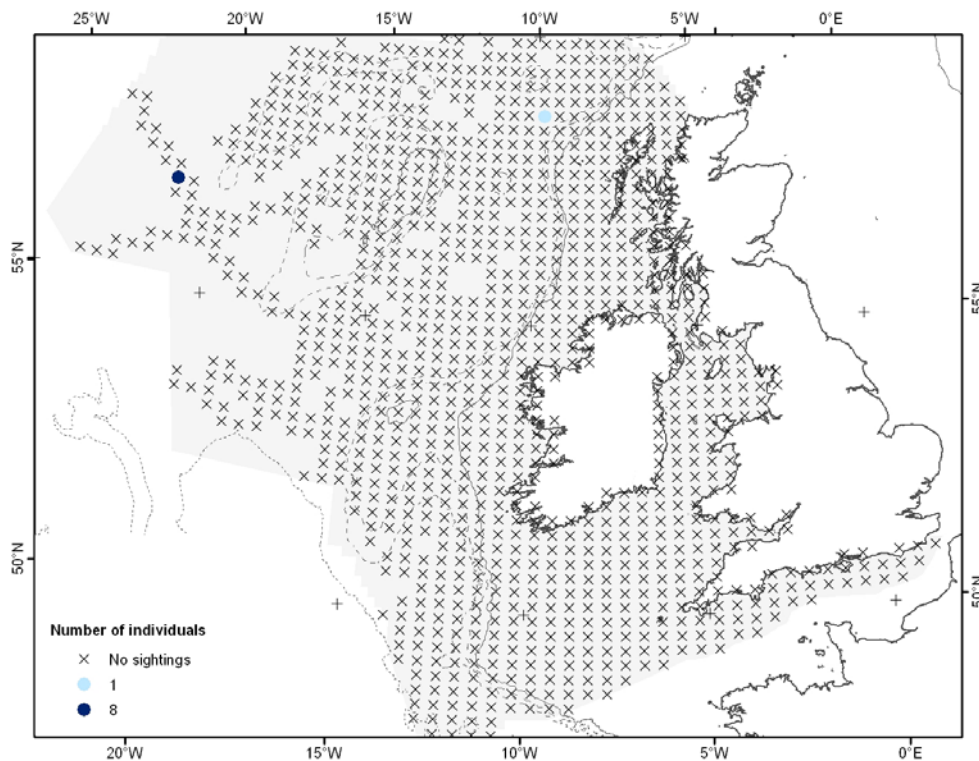


Figure 6.10. Sighting locations of Sowerby's Beaked Whales recorded in SEA area 7 and the IDA, 1980-2003.

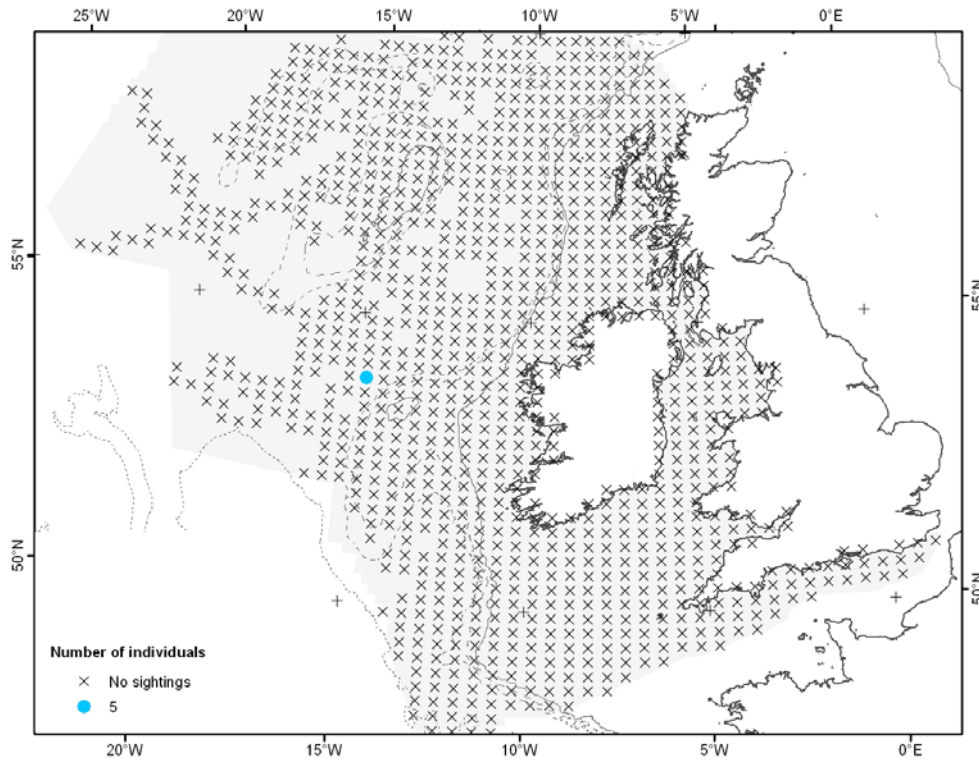


Figure 6.11. Sighting location of the True's Beaked Whale recorded on survey in the IDA, May 2001.

Long-finned Pilot Whale *Globicephala melas*

The Long-finned Pilot Whale was the most numerous and most frequently encountered toothed whale species recorded throughout the study period (see Appendix). Although this gregarious whale was occasionally recorded over shelf habitats, it was generally observed closely associated with the continental shelf and offshore deepwater habitats (Figure 6.12). The majority of the 1,754 animals were recorded during the spring-summer period, where most encounters occurred in the northern and northwestern sections of the study area (i.e. off the Hebrides Shelf across the northern sector of the Rockall Trough, over the Rosemary Bank, the George Bligh Bank and north of the Rockall-Hatton region). They were also frequently encountered further south along the Rockall Trough and the Hatton-Rockall Basin, and along a northwest-southeast transect south of the Rockall-Hatton region, over the northern slope of the Porcupine Bank and about the general region of the Goban Spur. Varying numbers were also observed off the Hebrides Shelf during the autumn-winter period, together with occasional sightings over the Rockall Trough, the eastern slope of the Porcupine Seabight, in the vicinity of the Goban Spur and over the relatively shallow waters of the English Channel.

Killer Whale *Orcinus orca*

Most of the 40 Killer Whales recorded west of Britain and Ireland between 1980 and 2003 were observed during the summer months (Figure 6.13). The highest numbers were recorded over and along the slopes of the Hebrides Shelf and the Irish Shelf, along the western Scottish coast and inside Cork Harbour. Lower numbers were recorded west of the Hebrides Shelf and north of the Goban Spur, in the St George's Channel, over the north slope of the Hatton Bank. Outside of this period, the only

sighting recorded during standard single-observer surveys occurred west of the Treshnish Islands during autumn.

False Killer Whale *Pseudorca crassidens*

The majority of the 26 False Killer Whales recorded in the study area were observed in the vicinity of the Porcupine Seabight. The southernmost sighting occurred in November 2000, approximately 150 km northwest of the Goban Spur. Noteworthy northern encounters were recorded south of the Hatton-Rockall Basin and north of the Rockall Bank. Incidental sightings of False Killer Whales were also recorded over the northern margins of the Hatton Bank during June 2000 (Ó Cadhla *et al.*, 2004).

Risso's Dolphin *Grampus griseus*

Although predominately observed in summer, the Risso's Dolphin was recorded in coastal and shelf water habitats during all seasons (Figure 6.15). They were also observed along the slope water regions of the Hebrides Shelf, Malin Shelf, the Porcupine Seabight, the Porcupine Bank and southeast of the Goban Spur. In the UK there appears to be an area of concentration for the species around the Outer Hebrides, where local groups may even be resident (Atkinson *et al.*, 1997).

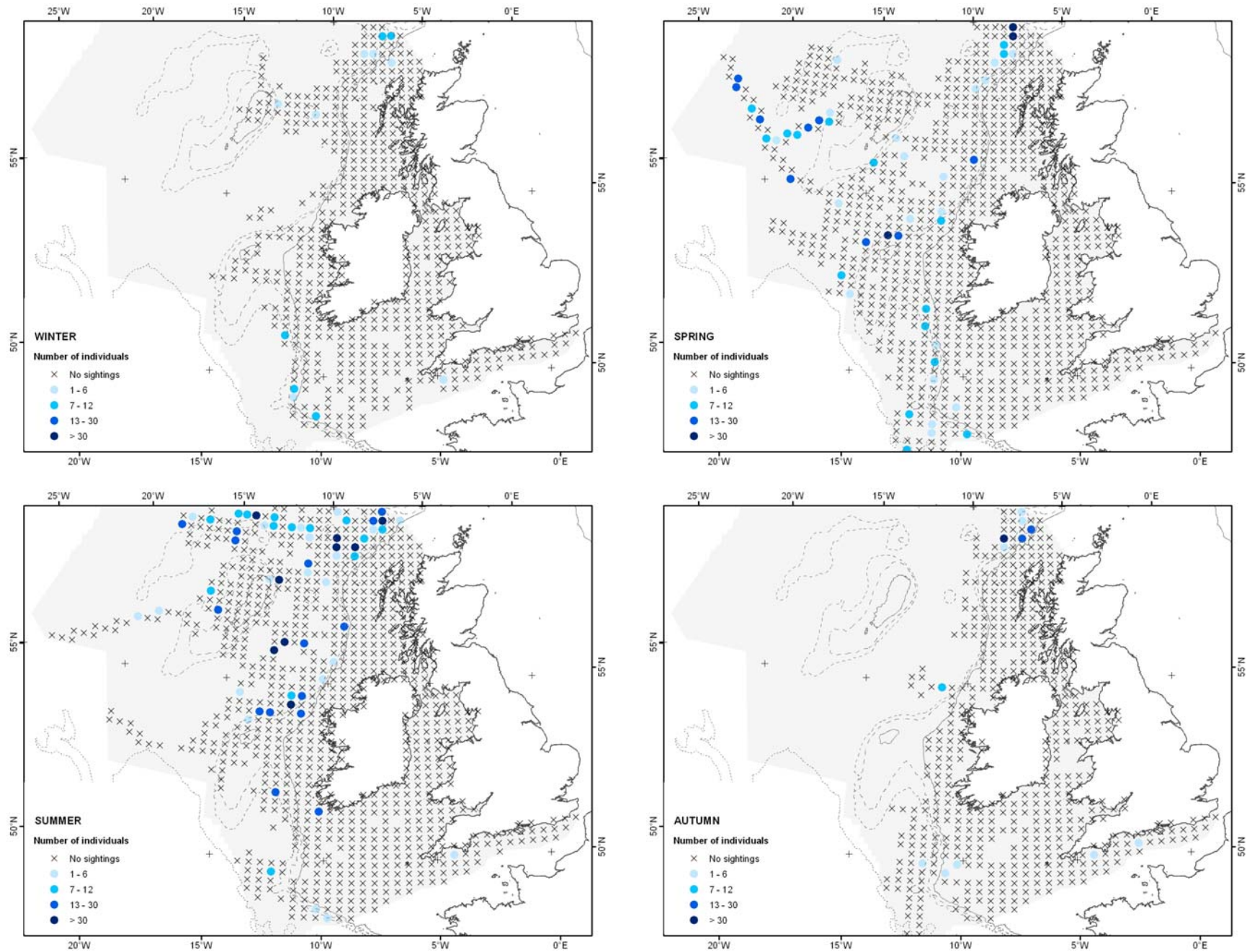


Figure 6.12. Seasonal distribution of the Long-finned Pilot Whale recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

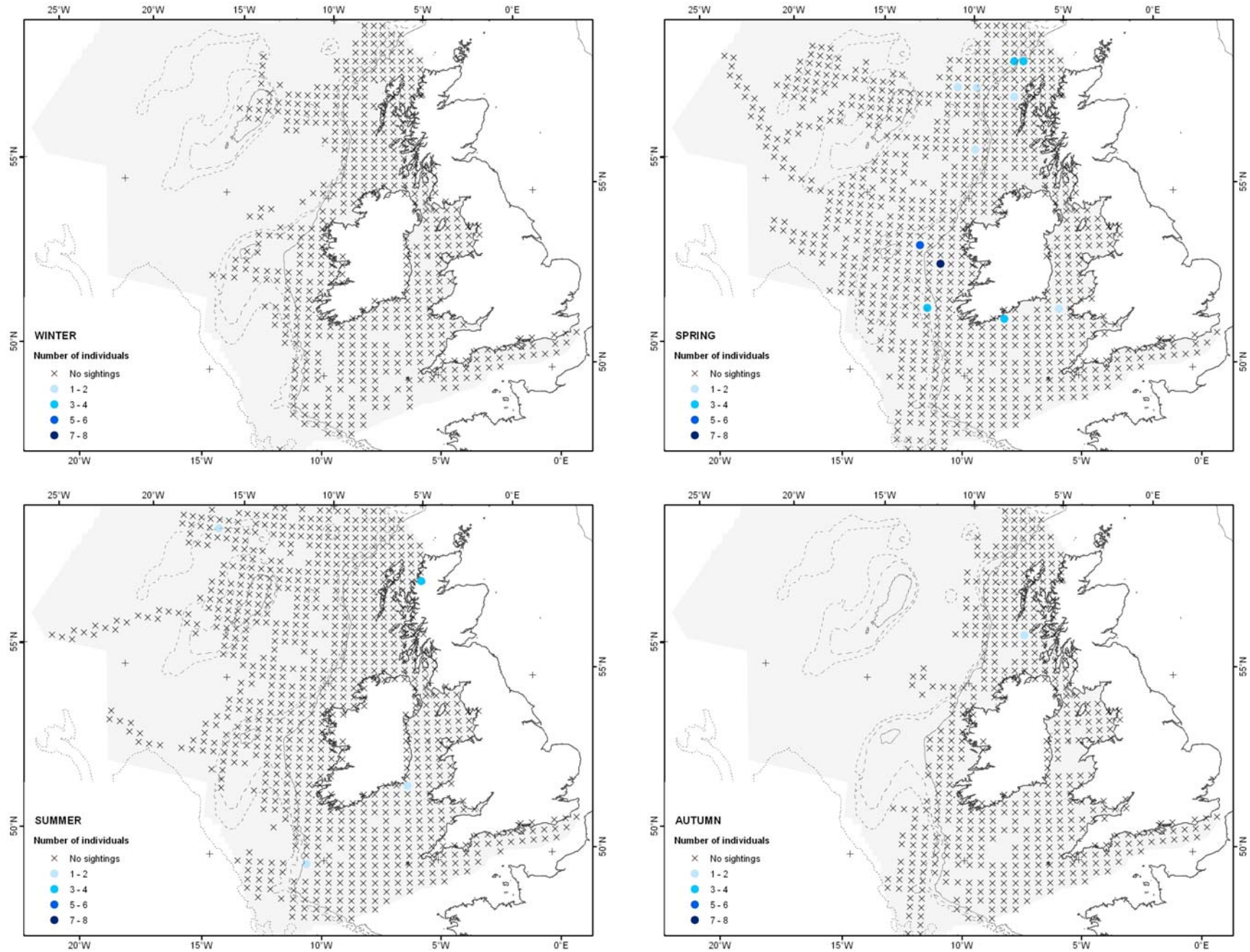


Figure 6.13. Seasonal distribution of the Killer Whale recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

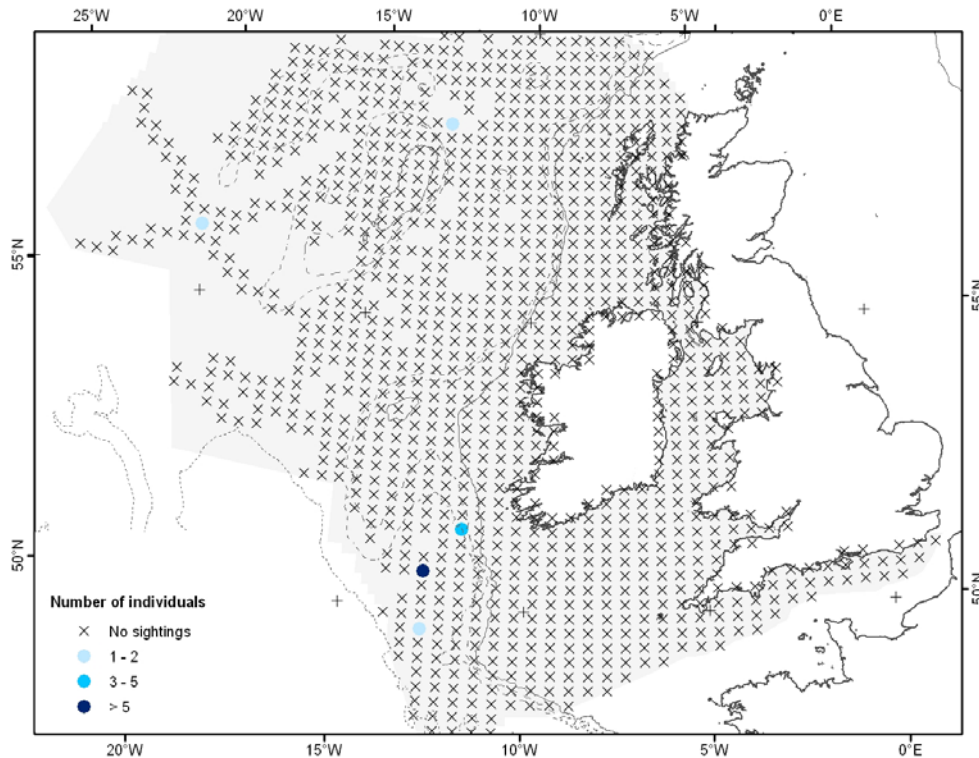


Figure 6.14. Sighting locations of False Killer Whales recorded in SEA areas 6, 7 & 8 and the IDA, 1980-2003.

Harbour Porpoise *Phocoena phocoena*

The Harbour Porpoise was the second most numerous cetacean species recorded during the 23-year study period (see Appendix). This relatively shy cetacean was widely encountered in varying numbers in coastal and shelf habitats during all seasons (Figure 6.16). The highest numbers were recorded during summer along the western and southwestern Irish coasts, over the Minch, and over the Irish Sea, along the Ireland-Britain ferry routes. Shelf-related sightings were occasionally recorded along the Hebrides Shelf, Malin Shelf and Irish Shelf. The most noteworthy Harbour Porpoise records were those encountered west of the Goban Spur during summer and the spring records over the northern sector of the Rockall Trough and the Rockall Bank (Northridge *et al.*, 1995; Mackey *et al.*, 2003). Difficulties commonly associated with recording this small, unobtrusive species in moderate sea conditions may partially account for the reduced sighting frequency during the autumn-winter period.

Bottlenose Dolphin *Tursiops truncatus*

Bottlenose Dolphins were occasionally encountered throughout the study period, with higher sighting frequencies being noted during spring and summer. Although they were relatively widespread, their distribution appeared to concentrate in the coastal, shelf and slope waters to the west and southwest of Ireland (Figure 6.17). This highly social species was also recorded in relatively moderate to high numbers northwest of the Scottish mainland, in the St George's Channel, over the deep waters of the Rockall Trough and the Porcupine Seabight and along the southeast slope of the Rockall Bank.

White-beaked Dolphin *Lagenorhynchus albirostris*

The White-beaked Dolphin was predominately recorded over shelf and slope water habitats north of 55°N (Figure 6.18). Interestingly, this robust dolphin was not recorded over the Rockall Trough or the offshore banks of the Rockall-Hatton region. The White-beaked Dolphin was recorded during all seasons in moderate to high numbers, especially over the Minch and the waters to the north of the Outer Hebrides. The most southerly records were observed during the spring-summer period, where varying numbers were encountered over the Irish Shelf, down to the slope and deepwater regions of the Porcupine Seabight. White-beaked Dolphins were also observed in low numbers off the southern coasts of the Irish counties of Cork and Wexford during autumn and summer respectively.

Atlantic White-sided Dolphin *Lagenorhynchus acutus*

The majority of the 1,676 Atlantic White-sided Dolphins recorded during standard single-observer surveys within the study area were observed in shelf, slope and deepwater habitats north of 54°N (Figure 6.19). However, spring records of this gregarious species extended southwards to the western and southern slopes of the Porcupine Bank and down to the point of the Goban Spur. Low to moderate numbers were recorded during the spring-summer period over the Rockall Trough, the Rockall-Hatton region and further west towards the eastern edge of the Iceland Basin. Shelf-related sightings were generally restricted to the summer-autumn period, where they were frequently recorded over the Malin Shelf and Hebrides Shelf.

Short-beaked Common Dolphin *Delphinus delphis*

The Short-beaked Common Dolphin was clearly the most numerous and frequently encountered cetacean species recorded throughout the study area (*see* Appendix). This acrobatic species was commonly recorded during all seasons in coastal, shelf, slope and deepwater habitats (Figure 6.20). Although coastal and shelf records were generally more common south of 56°N, summer offshore sightings extended as far north as the Rockall Bank, the northern sector of the Rockall Trough and south of the Rockall-Hatton region. Autumn sightings were frequently recorded further north along the slope waters of the Hebrides Shelf. Moderately high spring records were generally restricted to the relatively shallow water habitats of the southern Minch, the Irish Shelf and over the St George's Channel. Occasional spring records were also noted over the Hatton, Rockall and Porcupine Banks, the Rockall Trough, the Goban Spur and along the English Channel, south of Cornwall and the Scilly Isles. Apart from the coastal region off Loop Head (Co. Clare), the numbers of Short-beaked Common Dolphins encountered during winter were generally low.

Striped Dolphin *Stenella coeruleoalba*

Striped dolphins were occasionally recorded in offshore waters, generally south of 50°N (Figure 6.21). The majority of the 137 Striped Dolphins recorded during standard single-observer surveys were observed during the summer-autumn period over the slope and deep waters of the Porcupine Seabight-Goban Spur region. The most northerly records were observed during summer, where low numbers were encountered south of the Rockall Bank. The only shelf related encounters was recorded during autumn over the Irish Shelf, west of Loop Head (Co. Clare). Striped Dolphins were not recorded during standard surveys conducted in winter.

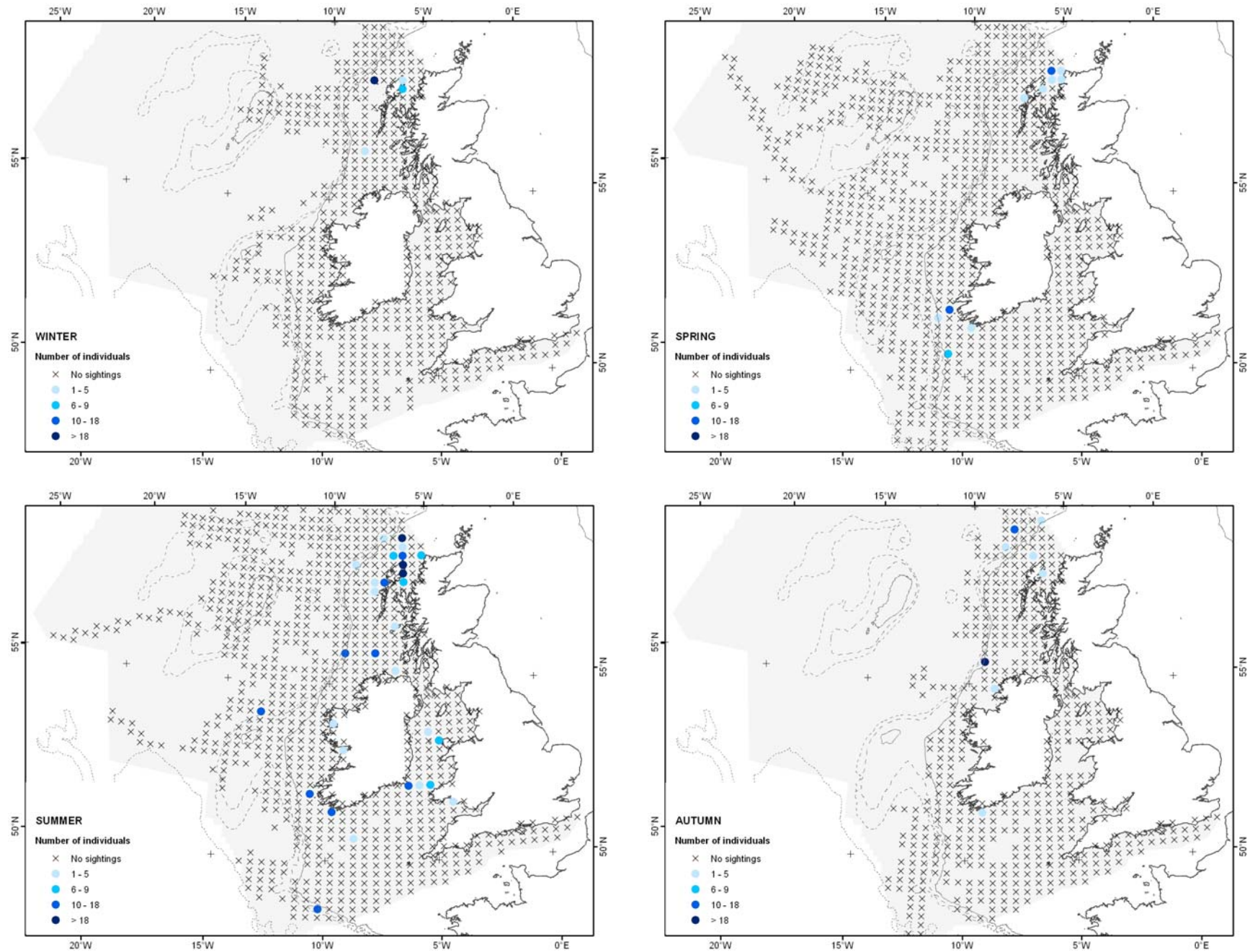


Figure 6.15. Seasonal distribution of the Risso's Dolphin recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

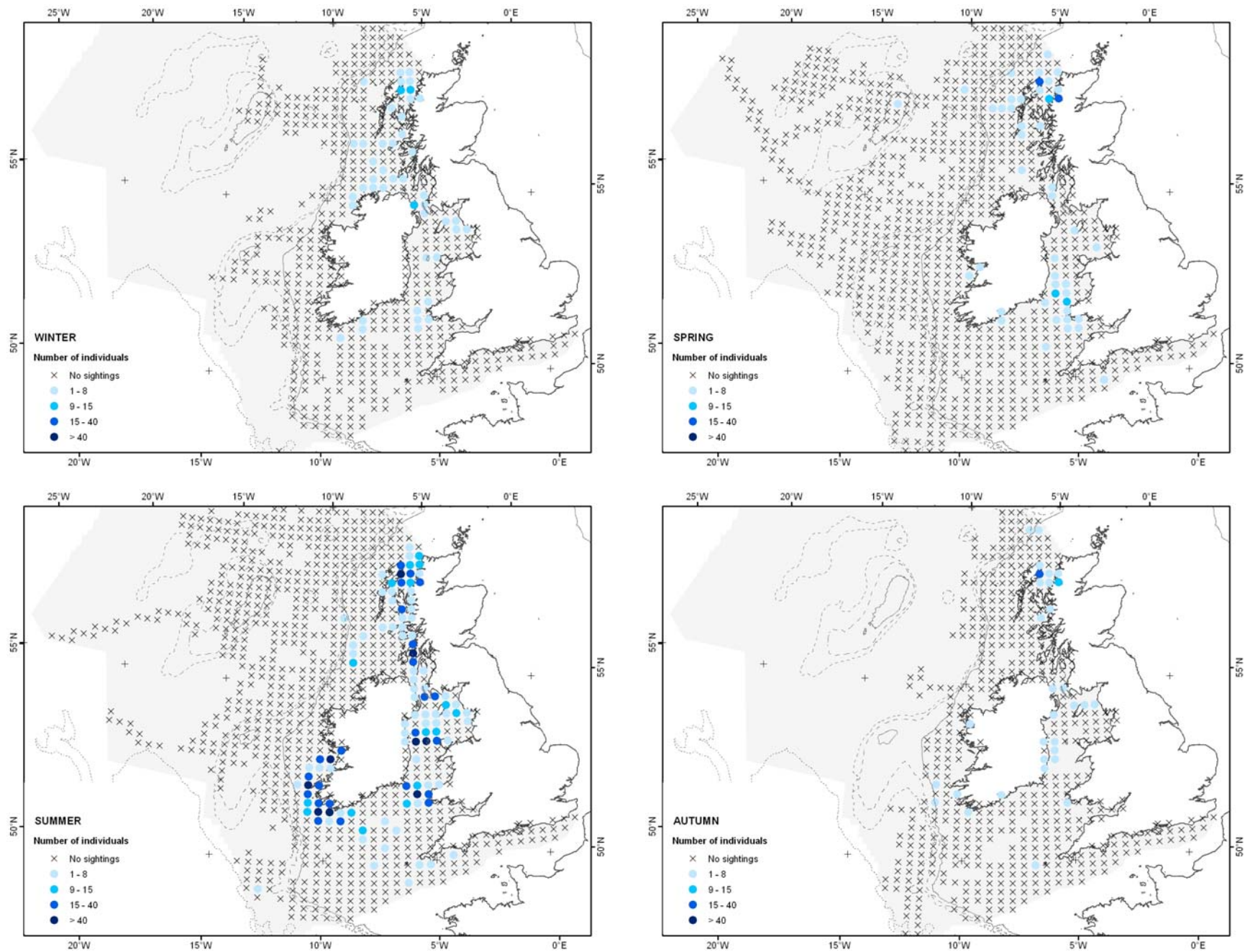


Figure 6.16. Seasonal distribution of the Harbour Porpoise recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

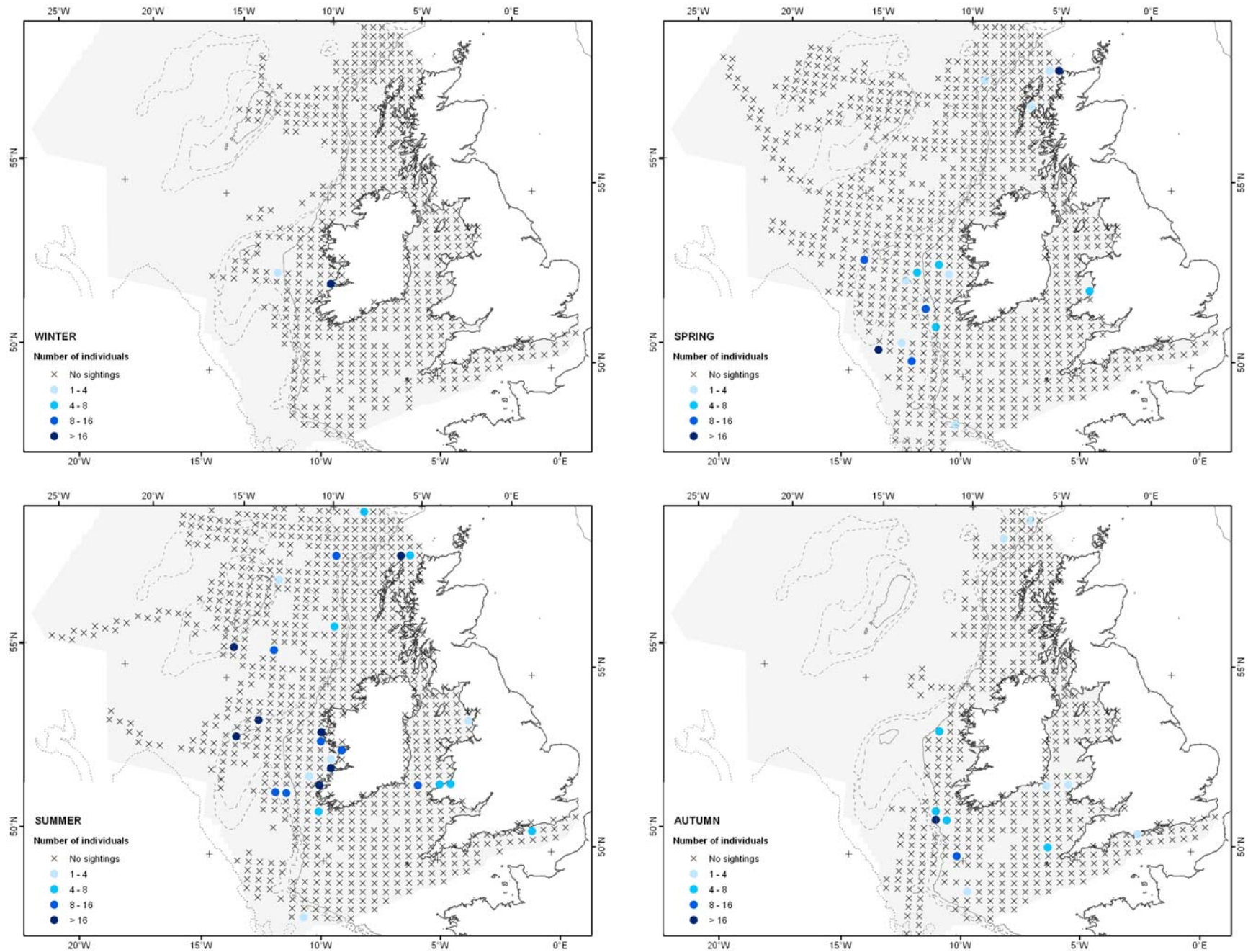


Figure 6.17. Seasonal distribution of the Bottlenose Dolphin recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

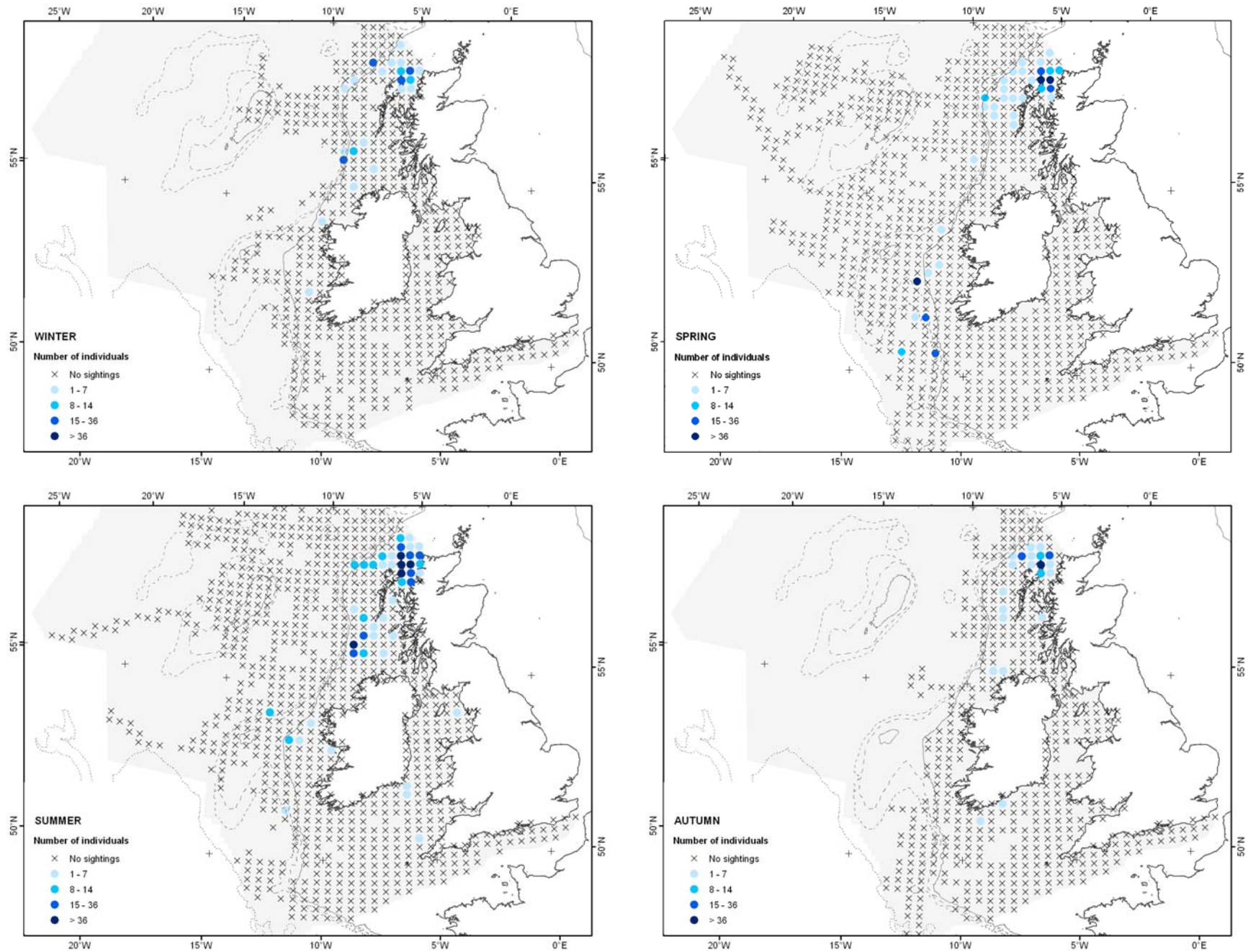


Figure 6.18. Seasonal distribution of the White-beaked Dolphin recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

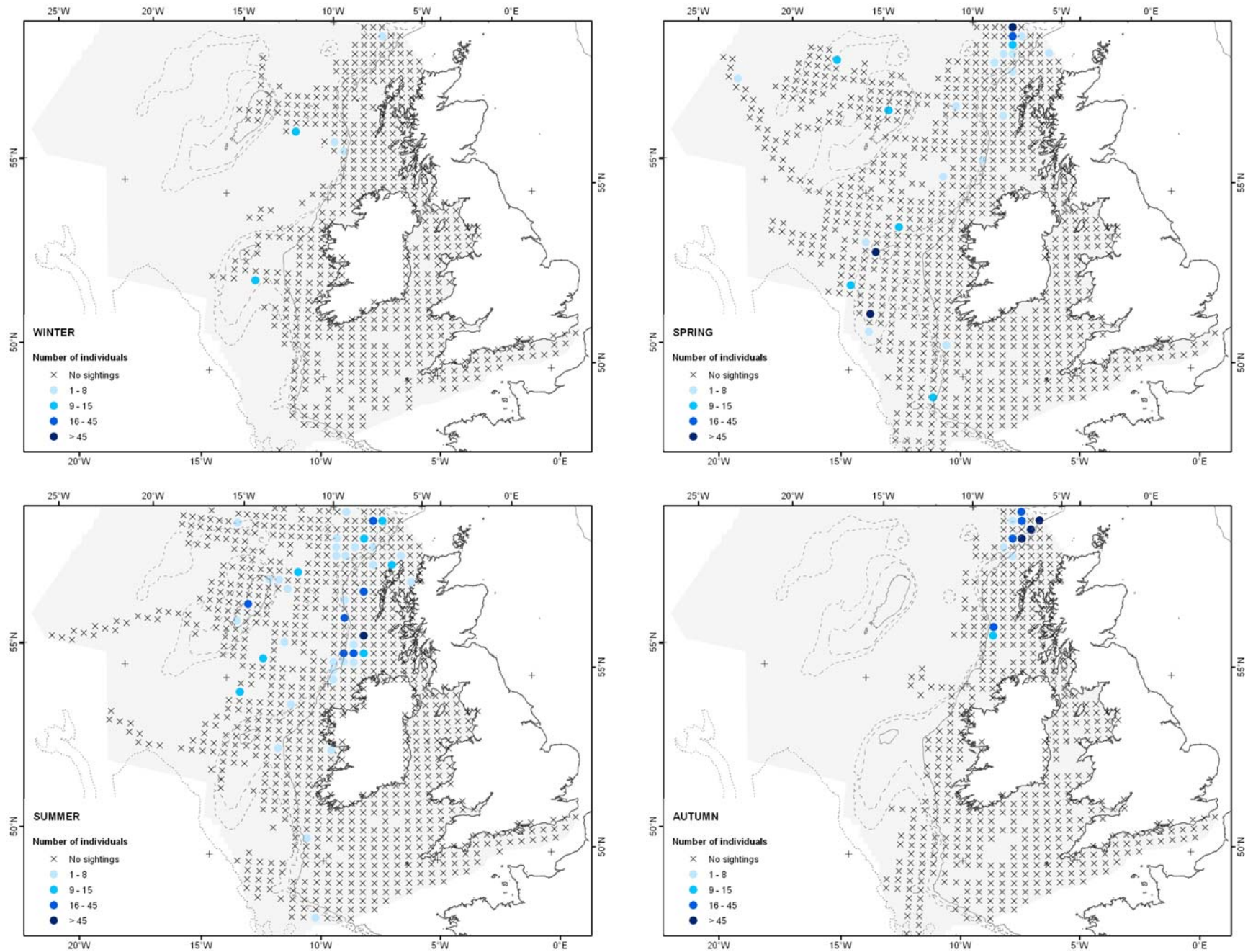


Figure 6.19. Seasonal distribution of the Atlantic White-sided Dolphin recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

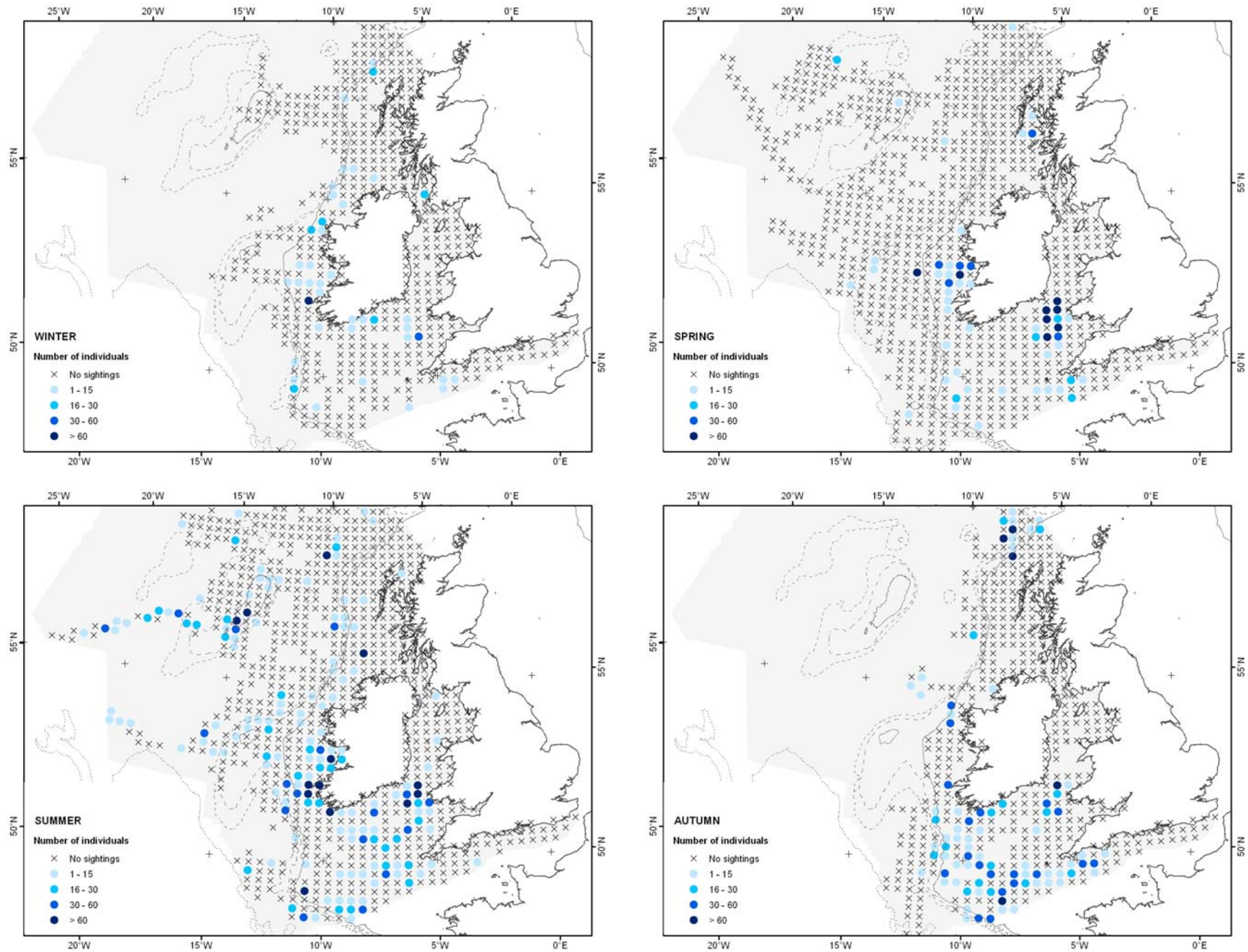


Figure 6.20. Seasonal distribution of the Short-beaked Common Dolphin recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

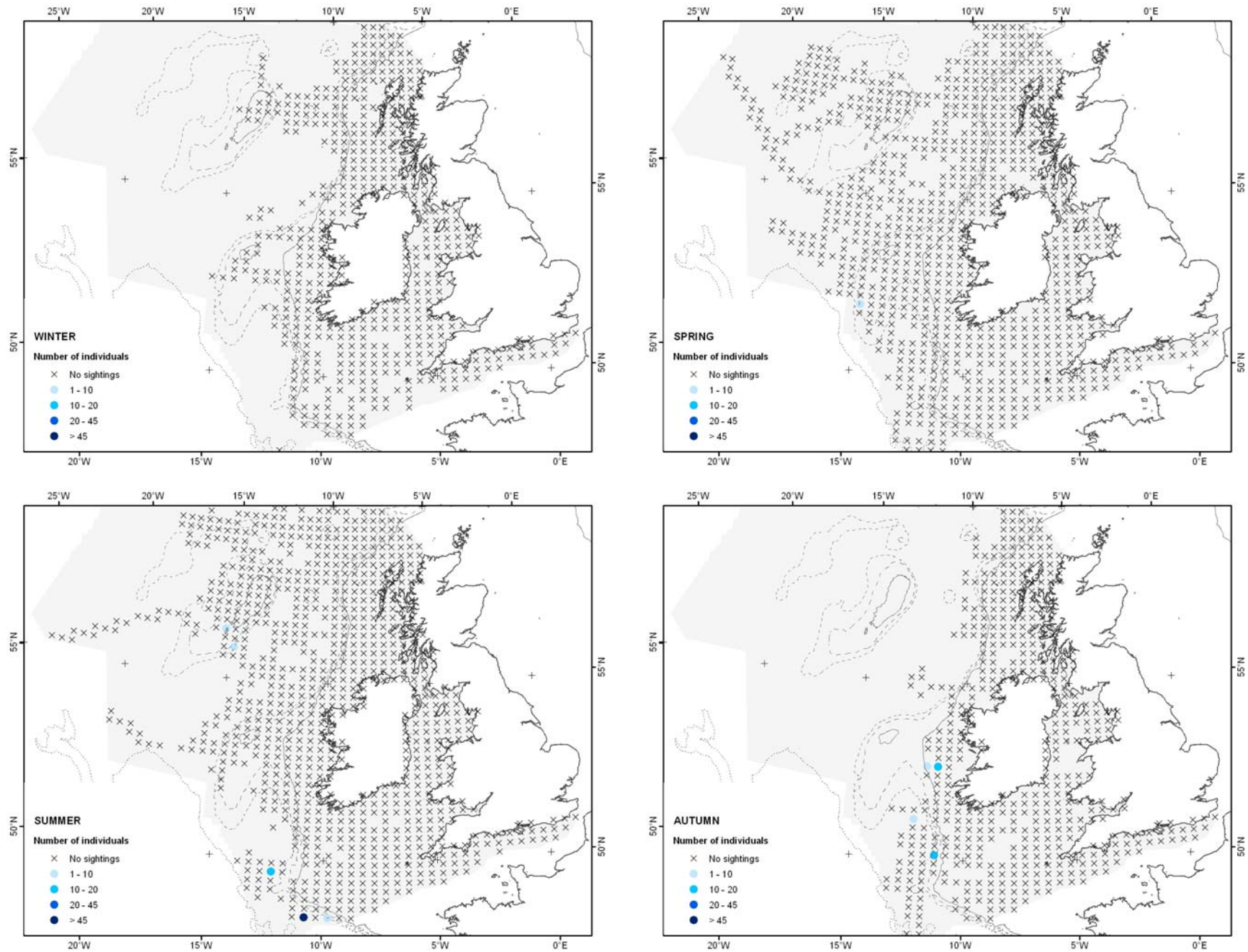


Figure 6.21. Seasonal distribution of the Striped Dolphin recorded within SEA areas 6, 7 & 8 and the IDA, 1980-2003.

7. Bibliography

Please Note:

The "Quality" value assigned to each reference in the associated Endnote bibliography file strictly refers to the relevance of each publication to the offshore cetacean surveys summarised in the current data report, and not to their standard or worth. As such, 5 = Highly relevant, 3 = Relevant, 1 = Vaguely relevant.

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10. Appendix:

Totals of cetacean species recorded during full surveys in SEA areas 6, 7 & 8 and the IDA, July 1980– August 2003.

Species	Latin Name	Total
<i>MYSTICETES</i>		
Northern Right Whale	<i>Eubalaena glacialis</i>	1
Humpback Whale	<i>Megaptera novaeangliae</i>	3
Fin Whale	<i>Balaenoptera physalus</i>	38
Minke Whale	<i>Balaenoptera acutorostrata</i>	220
Blue Whale	<i>Balaenoptera musculus</i>	1
Sei Whale	<i>Balaenoptera borealis</i>	23
<i>ODONTOCETES</i>		
Sperm Whale	<i>Physeter macrocephalus</i>	107
Northern Bottlenose Whale	<i>Hyperoodon ampullatus</i>	23
Cuvier's Beaked Whale	<i>Ziphius cavirostris</i>	1
So w er by 's Be ak ed W ha le	<i>Mesoplodon bidens</i>	9
Tr ue 's Be ak ed W ha le	<i>Mesoplodon mirus</i>	5
Long-finned Pilot Whale	<i>Globicephala melas</i>	1,754
Killer Whale	<i>Orcinus orca</i>	40
False Killer Whale	<i>Pseudorca crassidens</i>	26
Risso's Dolphin	<i>Grampus griseus</i>	401
Harbour Porpoise	<i>Phocoena phocoena</i>	2,063
Bottlenose Dolphin	<i>Tursiops truncatus</i>	552
White-beaked Dolphin	<i>Lagenorhynchus albirostris</i>	1,528
Atlantic White-sided Dolphin	<i>Lagenorhynchus acutus</i>	1,676
Short-beaked Common Dolphin	<i>Delphinus delphis</i>	7,776
Striped Dolphin	<i>Stenella coeruleoalba</i>	137