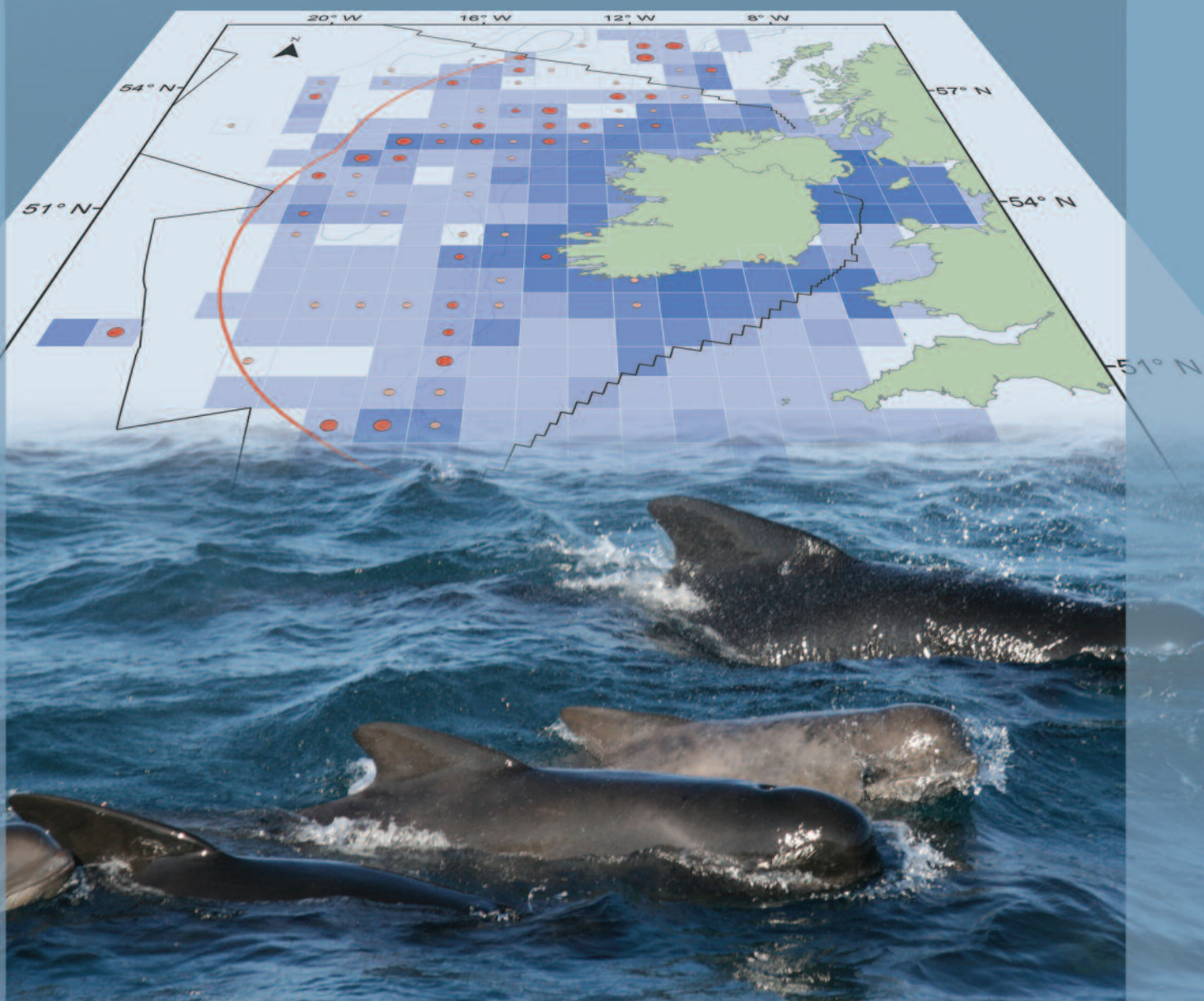


# Atlas of the Distribution and Relative Abundance of Marine Mammals in Irish Offshore Waters: 2005 – 2011



Dave Wall, Clare Murray, Joanne O'Brien, Laura Kavanagh, Chris Wilson, Conor Ryan, Brian Glanville, David Williams, Ian Enlander, Ian O'Connor, Dave McGrath, Pádraig Whooley and Simon Berrow

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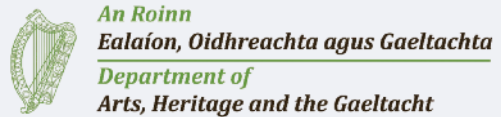
**Dave Wall<sup>1,2</sup>, Clare Murray<sup>1</sup>, Joanne O'Brien<sup>1,2</sup>, Laura Kavanagh<sup>1</sup>,  
Chris Wilson<sup>1</sup>, Conor Ryan<sup>1</sup>, Brian Glanville<sup>1</sup>, David Williams<sup>1</sup>, Ian Enlander<sup>1</sup>,  
Ian O'Connor<sup>2</sup>, Dave McGrath<sup>2</sup>, Pádraig Whooley<sup>1</sup> and Simon Berrow<sup>1,2</sup>**

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Dublin Road, Galway



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# Réamhrá

Ón mbliain 2005 go dtí an bhliain 2011, tapaíodh an deis 1078 lá ar an bhfarraige agus 5084 uair an chloig d'iarracht suirbhé ar bhord ardán grinnithe a chur i gcrích taobh istigh de zón eacnamaíoch eisiach na hÉireann agus in uiscí cóngaracha. Is os cionn scairbh ilchríochach na hÉireann a rinneadh an iarracht is fearr suirbhéireachta. Ní raibh an iarracht chomh maith sin os cionn Bhanc an Torcáin, Bhíochta an Torcáin, Umair Rocal, Bhainc Rocal, agus na Scairbhe Ilchríochaí Ceiltí ó dheas (fíor 2).

Baineadh úsáid as 2557 amharc a bhí bainteach le hiarracht agus 7454 amharc nach raibh bainteach le hiarracht, de 16 speiceas céiticeach agus de dhá speiceas róin, san anailís. Rinneadh an iarracht iomlán suirbhé (uaireanta suirbhéireachta i staid farraige 0 - 6) in aghaidh an 50 km<sup>2</sup> a shuimiú agus a mhapáil agus rinneadh an rud céanna le hiomlán na n-aonán a comhaireadh in aghaidh an 50 km<sup>2</sup> i dtaca le gach speiceas ar leith a taifeadh le linn na suirbhéanna. Maidir le speicis a raibh dóthain sonraí ina leith, mapáladh an iarracht agus an t-amharc in aghaidh an tséasúir, a sainíodh mar seo: earrach (Aibreán, Bealtaine, Meitheamh); samhradh (Iúil, Lúnasa, Meán Fómhair); fómhar (Deireadh Fómhair, Samhain, Nollaig) agus geimhreadh (Eanáir, Feabhra, Márta). Sa chás nach raibh dóthain sonraí ann chun an iarracht agus an t-amharc in aghaidh an tséasúir a mhapáil, cuimsíodh na sonraí in aon mhapa amháin.

Ríomhadh an líonmhaireacht choibhneasta mar líon na n-ainmhithe a taifeadh in aghaidh na huair. Rinneadh an iarracht suirbhé a ghrádú agus é bunaithe ar staid na farraige; staideanna níos ísle á n-úsáid le haghaidh na speiceas céiticeach sin atá deacair a bhrath agus staideanna níos airde le haghaidh na gcéiticeach sin a bhfuil leideanna amhairc atá socfheicthe go maith ag baint leo. Dá réir sin, mar shampla, níor baineadh úsáid as sonraí iarrachta agus amhairc a bailíodh ach i staid farraige de luach a dó nó níos lú i dtaca leis an muc mhara, cé gur baineadh úsáid as sonraí iarrachta agus amhairc a bailíodh i staid farraige de luach a sé nó níos lú i dtaca le droimeitigh a léiríonn séideadh ard colúnach, atá infheicthe fiú i bhfarraigí arda.

Sa chás nár taifeadh amhairc nach raibh bainteach le hiarracht i gcearnóg eangaí (ach nár tharla aon amharc bainteach le hiarracht sa chearnóg sin), marcáladh an chearnóg eangaí go dearfach maidir le hamhairc (chun mapáil dáileadh speiceas a éascú), ach níor sannadh aon luach maidir le líonmhaireacht choibhneasta don chearnóg eangaí sin. Tá mapaí curtha i láthair de dháileadh agus de líonmhaireacht na speiceas céiticeach agus róin go léir ar casadh orthu amach ón gcósta.

# Introduction

Ireland, situated on the northwest Atlantic frontier of Europe, has one of the largest maritime Exclusive Economic Zones (EEZ) in Europe. Currently the Irish EEZ (extending out to 200 nautical miles) covers some 890,000 square kilometres of marine habitats. Ireland has an obligation to report to the European Union on the favourable conservation status (FCS) of certain protected species and habitats every six years and this requires comprehensive species and habitat monitoring networks at a national level. Similar data are needed for other reporting and monitoring requirements, such as the Marine Strategy Framework Directive, the OSPAR Convention and the Irish Offshore Strategic Environmental Assessments.

Much of the previous distribution and abundance data on cetaceans in Irish waters were gathered as secondary data during seabird surveys conducted

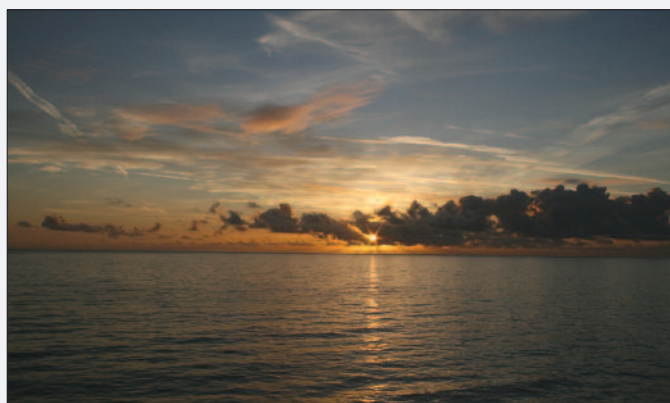
under the European Seabirds at Sea (ESAS) survey program by the Joint Nature Conservation Committee (Pollock *et al.* 1997) and the Coastal and Marine Resources Centre (CMRC) (O’Cadhla *et al.* 2004). Estimates of absolute cetacean abundance (during dedicated cetacean surveys) have been conducted during the SCANS I and II surveys in 1994 and 2005 (Hammond *et al.* 2002; Hammond, 2006), the SIAR survey conducted in 2000 (O’Cadhla *et al.* 2004) and the CODA survey conducted in 2007 (Hammond *et al.* 2010). Such abundance surveys were seasonal in nature, being conducted during a single summer month, and provided a snapshot in space and time of cetacean distribution and relative abundance within all or part of the Irish EEZ. Due to the high cost of such surveys, they are repeated on an infrequent basis, with a decade passing between the SCANS I and SCANS II surveys.



The RV Celtic Explorer was used extensively as a survey platform Photo: Dave Wall



A more structured and long-term data collection and storage system for inshore monitoring of cetaceans was developed by the Irish Whale and Dolphin Group (IWDG) under the ISCOPE project. This involved effort-related, land-based inshore monitoring (Berrow *et al.* 2010) that built on the IWDG's casual sightings database which has been in operation since 1991 (IWDG 2013).



**Offshore sunset during fine weather** Photo: Dave Wall / IWDG

Offshore cetacean monitoring has historically been less structured with surveys typically of short duration ranging from one month for the SCANS and CODA surveys, to six months for the IWDG West Coast Cetacean Survey (Wall *et al.* 2006) to three years for the Petroleum Infrastructure Programme funded CMRC surveys (O'Cadhla *et al.* 2004). The IWDG conducted long-term fixed transect cetacean surveys on commercial ro-ro ferries across the Irish Sea from 2001 – 2011, as part of a Europe-wide network of similar surveys (Brereton *et al.* 2011). From 2006 to 2009 the IWDG conducted offshore line-transect survey effort on board Irish and EU research vessels as part of the ISCOPE II project (Wall and Murray, 2009). The National Parks and Wildlife Service (NPWS) commissioned a number of short, localised visual and acoustic surveys of bays and inshore areas from 2007 to 2011 (Berrow *et al.* 2007; Leeney 2007; Berrow *et al.* 2008a; 2008b; 2011a and 2011b; Ingram *et al.* 2009; Oudejans *et al.* 2010; Ryan *et al.* 2010a).

Cetacean sightings and survey effort data were historically held by the various survey institutions both in Ireland and abroad. One of the first joint databases for cetacean data in Europe was operated by the Joint Nature Conservation Committee in the UK which acted as a repository for ESAS bird and cetacean survey data collected from 1979-2002 (JNCC 2012). In 2012 a Joint Irish Cetacean Database was created. This

was driven by the NPWS and National Biodiversity Data Centre (NBDC) (Regan *et al.* 2008), following a proposal by the Irish Whale and Dolphin Group in 2006 for such a database. This work led to the creation of a National Data Dictionary for Marine Mammals which prescribed a minimum standard for marine mammal data collection in Irish waters and led to the incorporation of cetacean data into the NBDC's online Atlas of Mammals in Ireland (NBDC 2013).

The NBDC now acts as a repository for Irish cetacean survey data. Further steps towards a joint European cetacean database are underway with the establishing of the Joint Cetacean Protocol (JCP) by the JNCC. Originally designed as a joint UK database, work is in progress towards expanding the JCP to act as a joint database for cetacean survey data from northwest European waters (Thomas 2009). During the West Coast Cetacean Survey (Wall *et al.* 2006) and the ISCOPE and ISCOPE II programmes



**Surveying from the bridge of the car ferry MV Ulysses**  
Photo: Dave Wall / IWDG

(Wall and Murray 2009), a practical and cost effective method was developed for conducting a comprehensive, adequate, long-term monitoring programme for cetaceans within the Irish EEZ through the use of platforms (ships and aircraft) of opportunity. This monitoring program was further developed under the joint IWDG/Galway-Mayo Institute of Technology (GMIT) Marine Mammals and Megafauna in Irish waters – Behaviour, Distribution and Habitat use project from 2009-2011, funded by the Marine Institute and NPWS.

This Atlas presents data collected during the IWDG ISCOPE I and II projects, the IWDG/GMIT Marine Mammals and Megafauna in Irish waters project, the IWDG Ferry Surveys Programme and the IWDG casual and effort-based sightings scheme between January 2005 and January 2011.



Dutch research vessel *Pelagia* Photo: Dave Wall / IWDG

## Ship Surveys

A single marine mammal observer (or up to three observers, in the case of IWDG ferry surveys) conducted visual survey effort from research vessels, naval service vessels and commercial ro-ro ferries between 2005 and 2011. Survey effort was conducted either from the ships' bridge, the monkey island (the roof of the bridge) or from the 'crow's nest' (*R.V. Celtic Explorer*).

Observer effort focused on a 90 degree arc ahead of the ship; however sightings located up to 90 degrees to port and starboard were included. Surveyors scanned the area by eye and using binoculars (typically 10X40 or 8X50). Bearings to sightings were measured

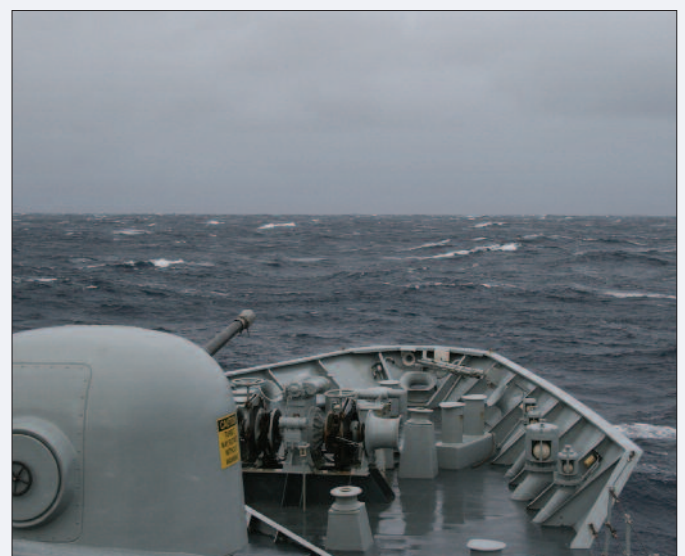
using an angle board and distances were estimated with the aid of a range finding stick (Heinemann 1981).

Environment data were recorded every 15 – 20 minutes using Logger 2000 software (IFAW 2000). Sightings were also recorded using Logger 2000. Automated position data were obtained through a laptop computer linked to a USB GPS receiver. Survey effort was conducted up to Beaufort sea-state six and in moderate to good visibility. As these were surveys on board vessels of opportunity, the surveys were conducted in 'passing mode' and cetaceans sighted were not approached.

Sightings were identified to species level where possible, with species identifications being graded as definite, probable or possible. Where species identification could not be confirmed, sightings were downgraded (e.g. unidentified dolphin / unidentified whale / unidentified beaked whale etc.) according to criteria established for the IWDG's cetacean sightings database (IWDG 2013).

## IWDG Online Database

All casual sightings submitted to the IWDG went through a validation process. Around 15% of sighting records were accompanied by images, which were useful in assisting validation. Where species identification could not be confirmed, sightings were downgraded (e.g. unidentified dolphin / unidentified whale / unidentified beaked whale etc.) according to criteria established for the IWDG's cetacean sightings database (IWDG 2013).



Surveying in rough weather from Naval Service vessel *LE Roisín* Photo: Dave Wall / IWDG

## Data Treatment

Effort and sightings data were assigned to the European Environment Agency 50 km<sup>2</sup> reference grid (EEA 2013) using ARCMAP 10™ GIS software. Total survey effort (hours surveyed in sea state 0-6) per 50 km<sup>2</sup> were summed and mapped for each grid square as were total numbers of individuals counted per 50 km<sup>2</sup> for each species recorded during the surveys. For species with sufficient data, effort and sightings were mapped by season. Season definitions were based on the astronomical cycle and were defined as: spring (April, May, June); summer (July, August, September); autumn (October, November, December) and winter (January, February, March). Where data for a species were insufficient to map seasonal effort and sightings, the data were combined into a single map. Relative abundance was calculated as number of animals recorded per survey hour. Time-based analysis of relative abundance was used as it was

judged to be more suitable than area-based analysis when amalgamating data from a variety of different survey platforms, travelling at different speeds (Reid *et al.* 2003).

Survey effort was graded based on sea state, with lower sea states being used for cetacean species which were difficult to detect and higher sea states for cetaceans with more readily visible sightings cues. So, for example, only survey effort and sightings collected in sea state two or less were used to calculate harbour porpoise relative abundance, whereas sightings and survey effort collected in sea state six or less were used to calculate fin whale relative abundance, as fin whales display tall columnar blows that are visible even in very poor sea conditions.

Where non-effort related sightings were recorded in a grid square (but no effort-related sightings occurred in

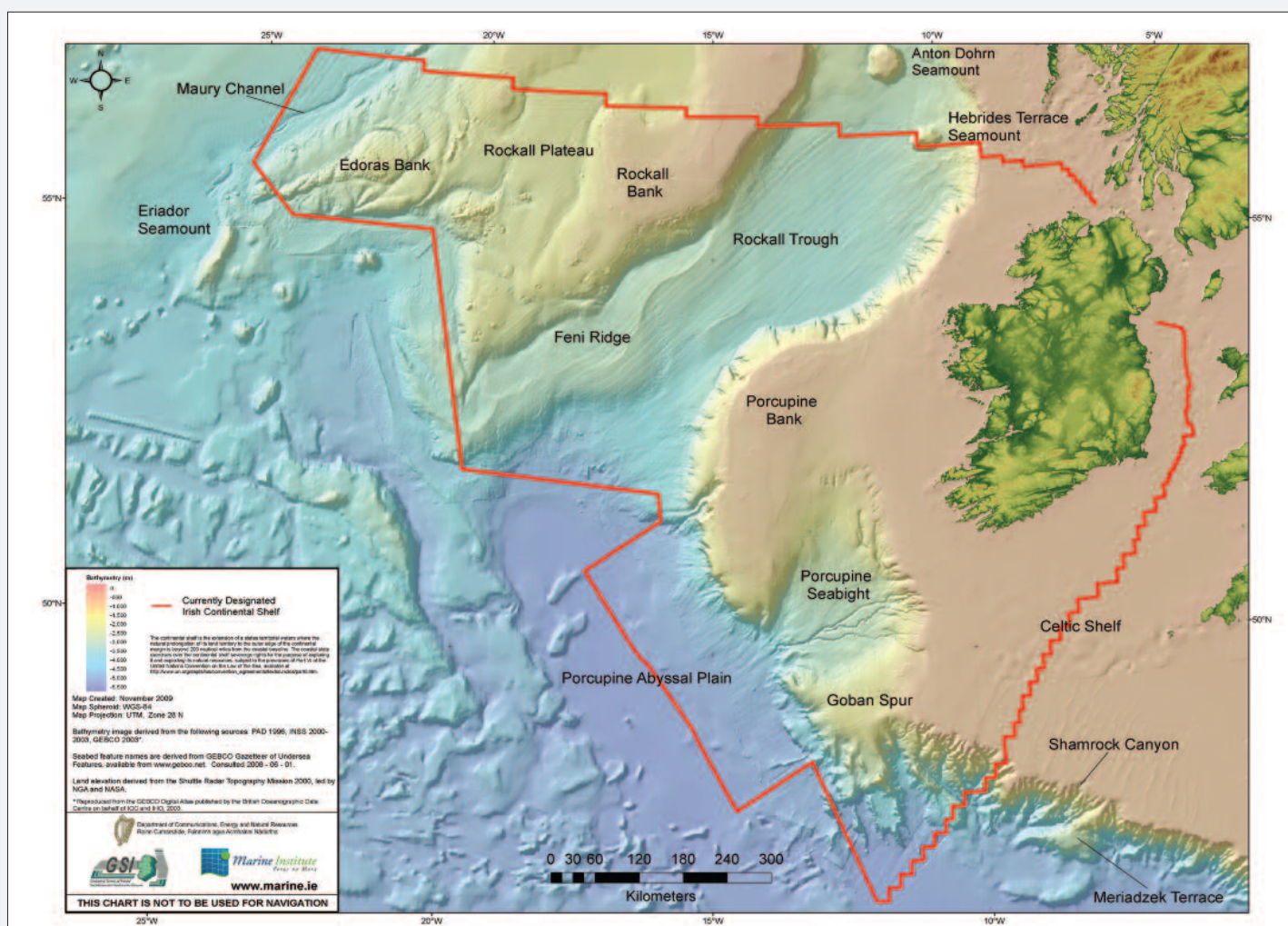


Figure 1. Map of seabed features of the Irish Designated Area. © Marine Institute/GSI.

that square), the grid square was marked positive for sightings (to facilitate species distribution mapping), but no relative abundance value was assigned to that grid square. The maps show survey effort per 50 km grid square, with darker shading indicating greater survey effort. Relative abundance values are denoted by red circles, with larger circles indicating higher relative abundances. Relative abundance values for grid squares with higher survey effort may therefore be expected to be more accurate than relative abundances in grid squares with very low survey effort.

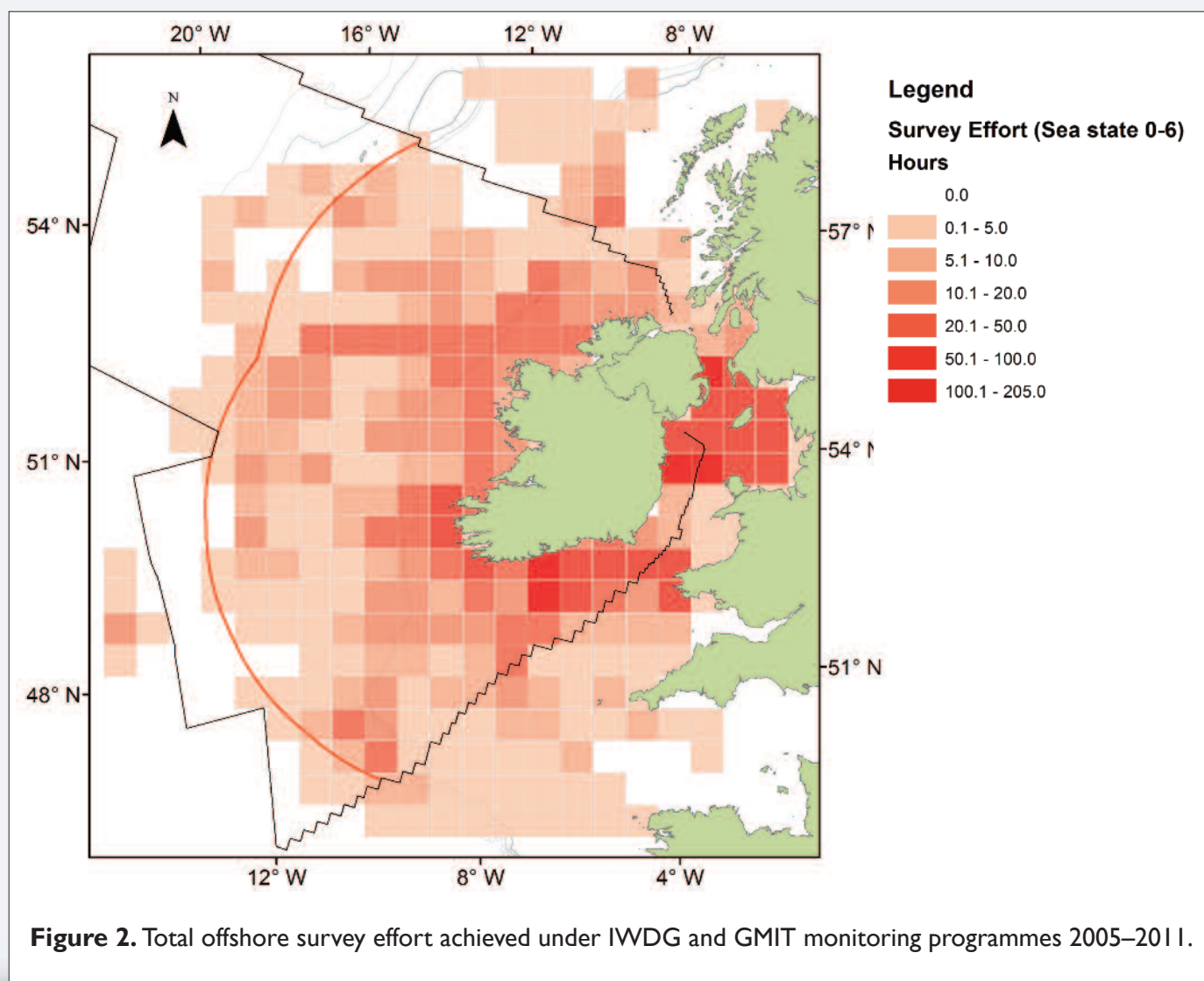
### Survey Area

Survey effort was conducted within the Irish EEZ) and the wider Irish Designated Area. Due to the multi-national nature of many European marine surveys, effort was also conducted within the EEZ of adjacent EU countries.

The Irish EEZ encompasses a wide variety of marine habitats from the shallow waters of the Irish continental shelf (0-200 m) to the slopes and sub-sea canyons of the shelf edge (200-2000 m) and the deep oceanic waters of the Porcupine Abyssal Plain, Porcupine Seabight and Rockall Trough (2000-5000 m). A number of offshore banks rise up from the ocean depths to within 160 m of the surface, the two major offshore banks in Irish offshore waters are the Rockall Bank and the Porcupine Bank (figure 1). Each of these seabed features has an array of marine habitats associated with them such as sandbanks, deep-water coral reefs, carbonate mounds and benthic assemblages. Each habitat in turn has an associated network of marine life.

### Geographic Coverage and Survey Effort

From 2005 to January 2011, 1078 days-at-sea were completed on board platforms of opportunity within



**Figure 2.** Total offshore survey effort achieved under IWDG and GMIT monitoring programmes 2005–2011.

the Irish EEZ and adjacent waters. 5084 hours of survey effort were conducted in sea state six or less.

The highest levels of survey effort were achieved over the Irish shelf. Lower levels of effort were achieved over the Porcupine Bank, Porcupine Seabight, Rockall Trough, Rockall Bank and southern Celtic Shelf (figure 2).

Geographic coverage varied with season, depending on survey platform availability and the nature of research surveys or naval patrols in any given season.

### Data Sets

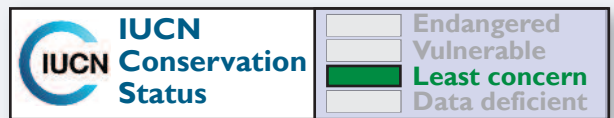
2557 effort-related sightings and 7454 non-effort-related sightings, of 16 cetacean species and two seal species were used in the analysis.



North Atlantic gale on board the RV Celtic Explorer Photo: Dave Wall / IWDC

## Harbour Porpoise / Muc Mhara

*Phocoena phocoena*



Harbour porpoises are Ireland's smallest cetacean species with an average body length of 1.5 m. Their body colour is dark-grey with a white underside extending up the sides a little beneath the dorsal fin. The head is rounded with no distinct beak. A small triangular dorsal fin is situated half-way along the

back, with a slightly curved trailing edge. Typically no blow is visible but in calm conditions a short sharp exhalation can be heard, giving rise to the common name of 'puffing pig', sometimes used for this species. Harbour porpoises rarely approach vessels or breach clear of the water.



Harbour porpoise, western Irish Shelf Photo: Randal Counihan / IWDG

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex II and IV

- Two candidate SACs listed (Roaringwater Bay, Co. Cork and the Blasket Islands, Co. Kerry) and an additional SAC proposed from Rockabill to Dalkey Island, Dublin
- Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000
- OSPAR List of Threatened and Declining Species and Habitats.

### Global Distribution

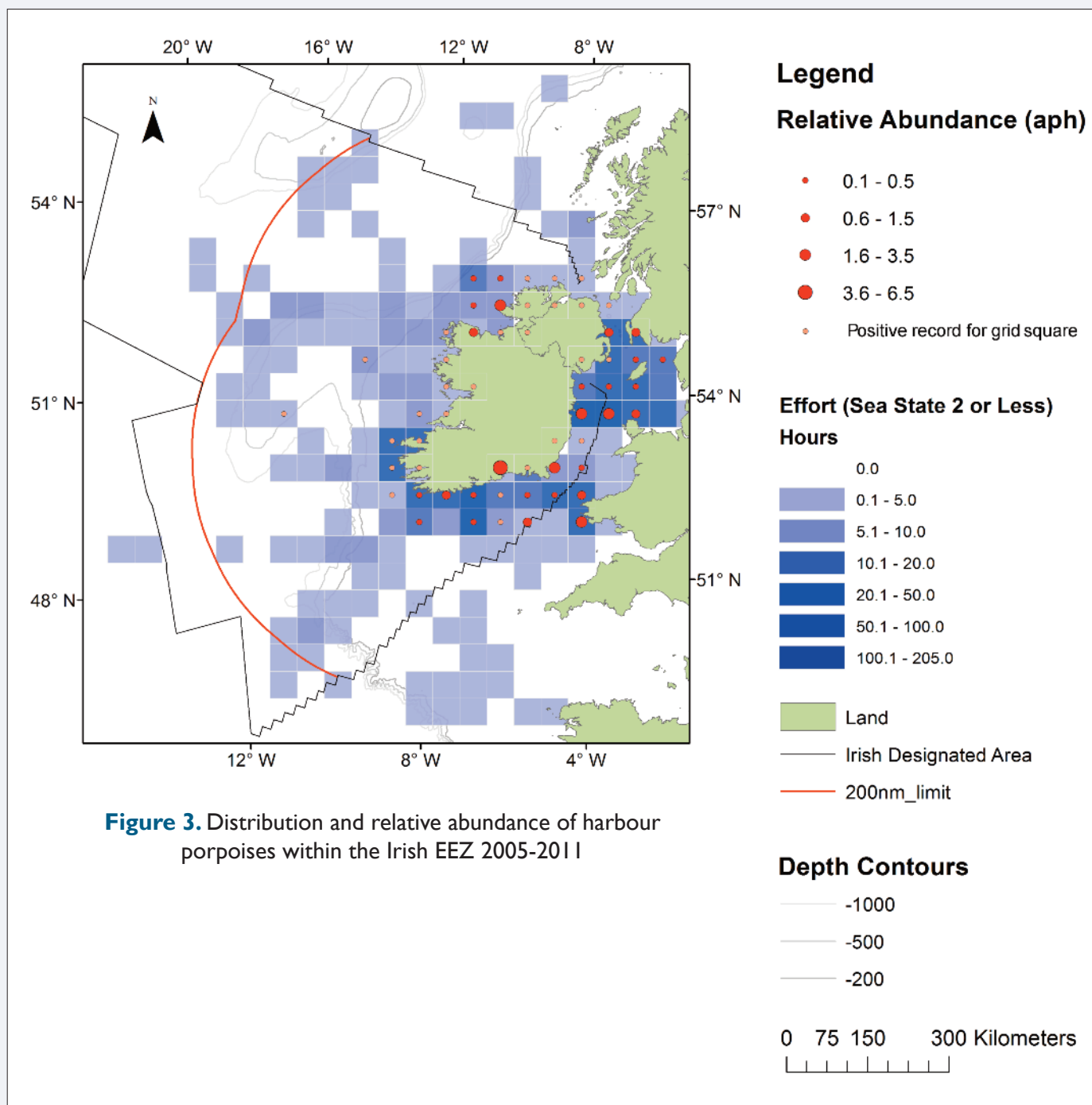
Harbour porpoises occur in continental shelf waters across the North Atlantic from North America to Europe and northwest Africa. They are also found in the Barents Sea, Baltic Sea and Black Sea. They occur in the North Pacific from northern California and Japan, north to the Chukchi Sea (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

The harbour porpoise was a common inshore species found around the entire Irish coast and was observed from many headlands throughout the year (Berrow *et al.* 2010).

In offshore areas, harbour porpoises occurred at highest densities in the Irish Sea and its northern and southern channels. The highest relative abundances were recorded in the western half of the central Irish Sea (figure 3). The 2005 SCANS II survey estimated a population of c. 15,000 harbour porpoises in the Irish Sea, with a total estimate of 385,000 in Northwest European waters (Hammond *et al.* 2006).

Harbour porpoises were less commonly encountered in offshore shelf waters of the Atlantic and Celtic Sea. This may partly be due to differing survey methods between the Irish Sea (where ferries were extensively used) and elsewhere (where research and naval vessels were used exclusively). It may also partly result from less favourable survey conditions in Atlantic waters as the detection rates for harbour porpoise decrease significantly in sea states greater than Beaufort 2 (Reid *et al.* 2003).

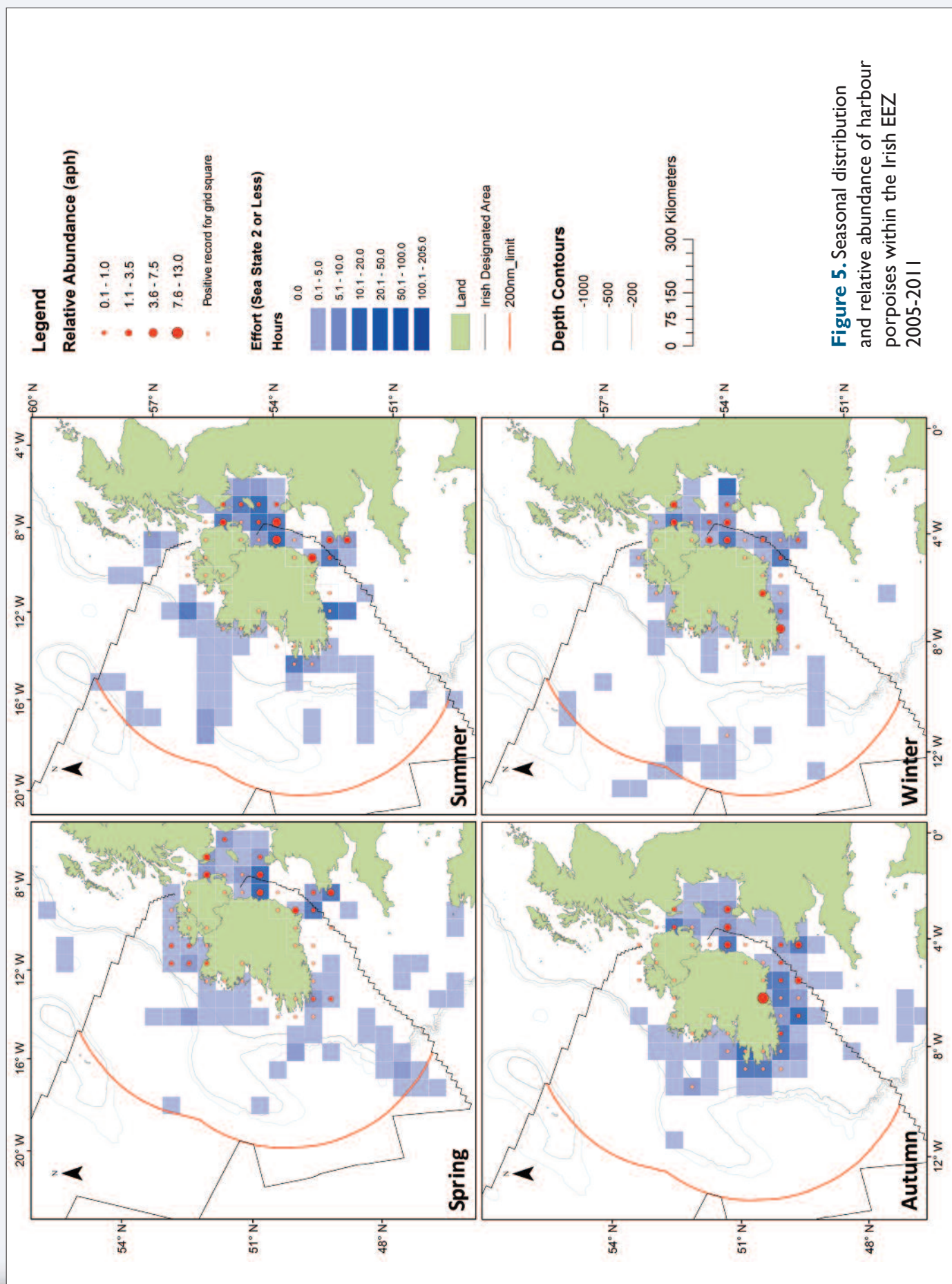


**Figure 3.** Distribution and relative abundance of harbour porpoises within the Irish EEZ 2005-2011

Porpoises were common off the south coast throughout the year and were also recorded in offshore areas of the northwest Irish shelf in the Spring. Occasional sightings of harbour porpoise were reported from shallower waters of offshore banks, such as the Porcupine Bank and the Rockall Bank (Wall *et al.* 2006). It is likely in the latter case that these animals originated from continental shelf areas to the northeast of the Rockall Bank.

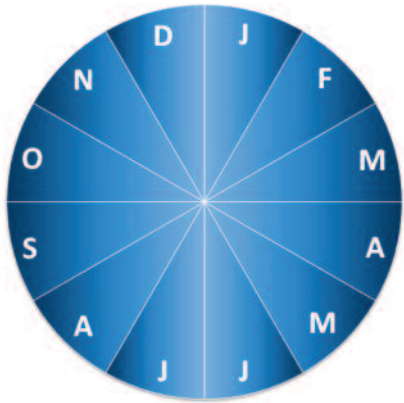
### Seasonal Variation

Harbour porpoises were recorded in Irish waters in all months of the year (figure 4). There appeared to be comparatively little seasonal variation in their relative abundances within the Irish Sea. Harbour porpoises calve in Irish waters and data from land-based monitoring indicated an offshore movement of animals in early summer which was probably linked to calving (IWDG 2013).



**Figure 5.** Seasonal distribution and relative abundance of harbour porpoises within the Irish EEZ 2005-2011





**Figure 4.** Detection positive months for harbour porpoises (months in which 1% or more of all sightings occurred)

The highest relative abundances of harbour porpoises were recorded in the Irish Sea during the summer months (figure 5). High relative abundances of harbour porpoises were also recorded off the south coast in the autumn and winter, when pelagic schooling fish were prevalent (Saunders *et al.* 2010).

## Short-beaked Common Dolphin / Deilf

*Delphinus delphis*



Common dolphins are Ireland's most widespread and abundant dolphin species. They have an average body length: of 1.7 – 2.6 m. The beak, and back are dark brown to black, and the underbelly is white. The front flank patches are yellow and the rear flanks and the sides of the tailstock are streaked light grey. These features give a distinctive hourglass pattern on the sides, below the dorsal fin. The eye is surrounded by black, and a narrow stripe runs forward to the melon. Another dark stripe runs from beak to

flipper and several beak-to-anus stripes may also be visible.

A falcate dorsal fin is located mid-way along the back. The general body shape is sleek with the head having a prominent black beak. Common dolphins often approach vessels to bow ride and frequently breach clear of the water. Melanism is sometimes seen in this species, with melanistic animals lacking yellow pigmentation, which is replaced with black.



Short-beaked common dolphins, Celtic Sea Photo: Dave Wall / IWDG

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

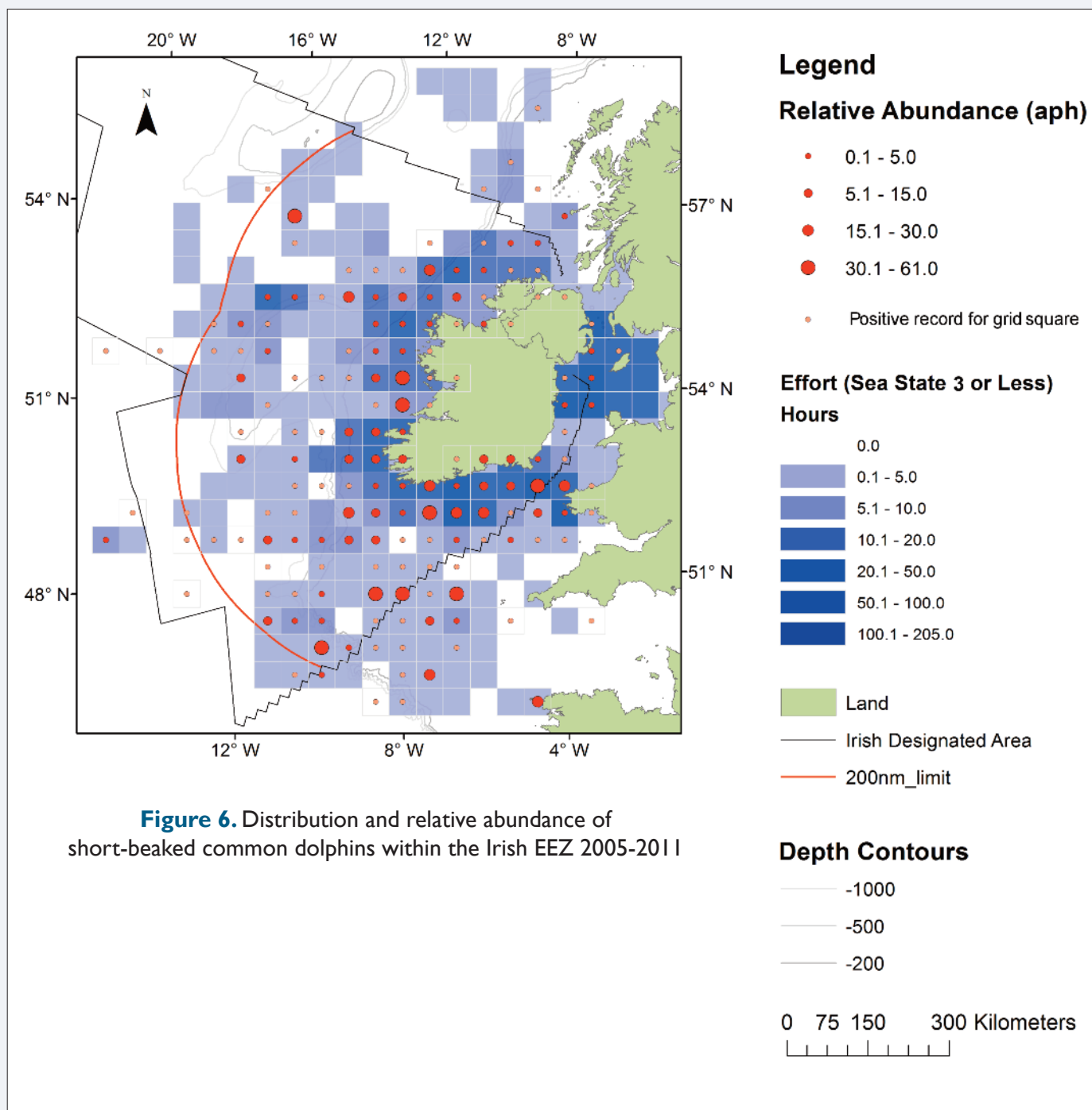
• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

Short-beaked common dolphins are widespread primarily in warm temperate and sub-tropical waters, though they occur in the tropics also. They appear to be largely absent from the Indian Ocean (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

Common dolphins occurred in all offshore waters of the Irish Shelf. Highest relative abundances were recorded off the south and southwest coasts (figure 6). They occurred at lower densities along the Irish shelf slopes and in the deeper waters of the Rockall Trough and Porcupine Abyssal Plain and occurred seasonally in the central Irish Sea.



**Figure 6.** Distribution and relative abundance of short-beaked common dolphins within the Irish EEZ 2005-2011

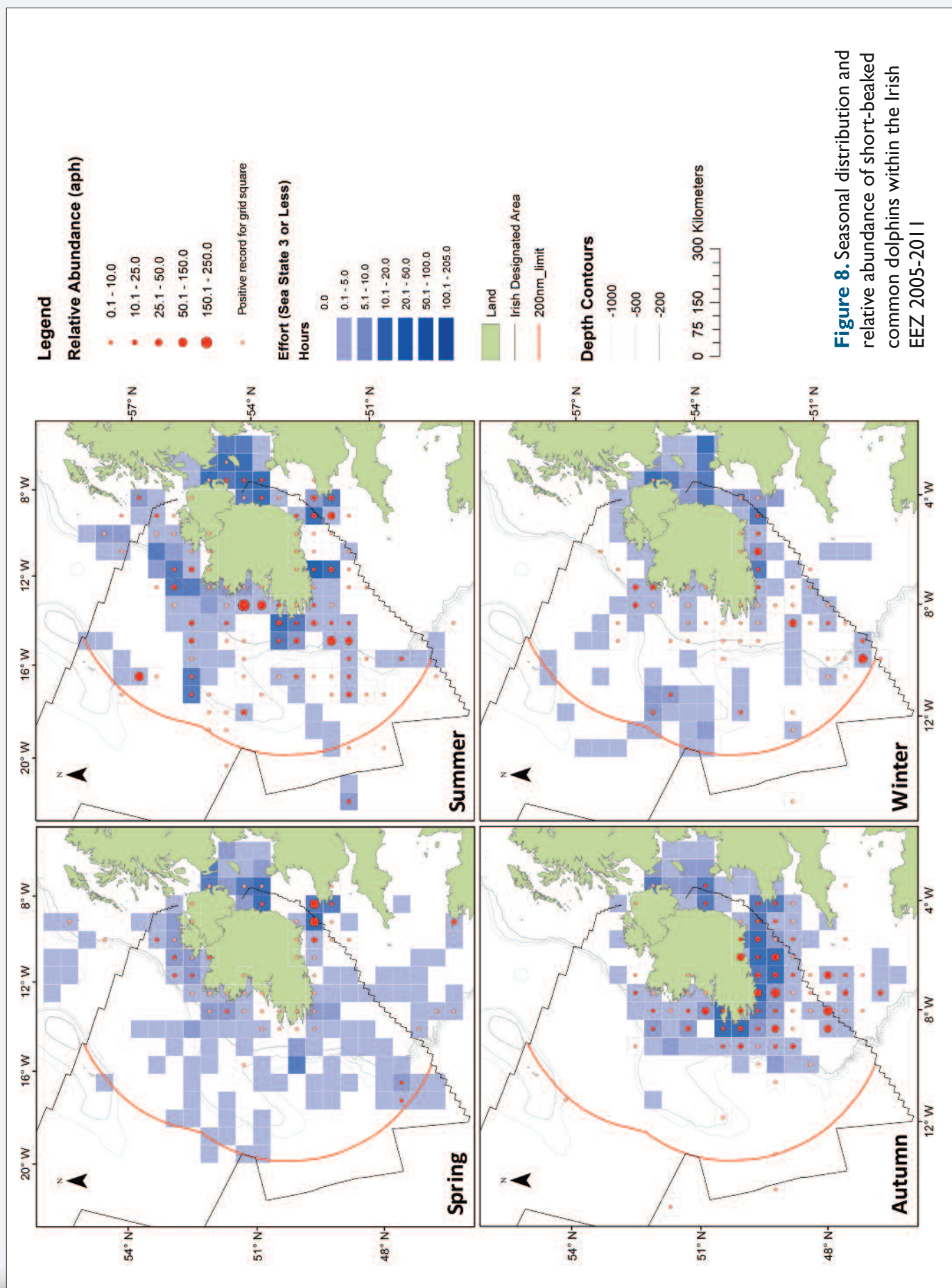
Abundance estimates from the SCANS II and CODA surveys indicated a total population of c. 40,000 animals for Irish waters (although this is likely to fluctuate significantly on a seasonal basis) out of a total northwest European population of c. 180,000 animals (Hammond 2006 and Hammond *et al.* 2010).

### Seasonal and Geographic Variation

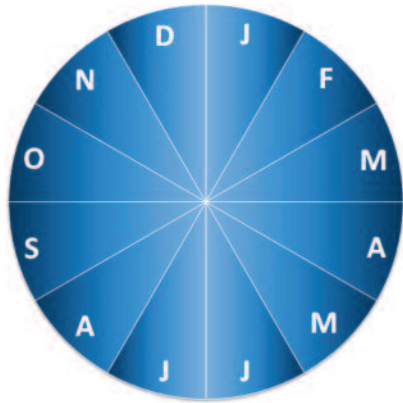
Common dolphins were recorded in Irish waters in all months of the year (figure 7). The highest densities of common dolphins were recorded off south and south-

west coasts in the summer and autumn (figure 8). These areas were a seasonal foraging ground for common dolphins due to the presence of a large biomass of pelagic schooling fish (Saunders *et al.* 2010).

High densities of common dolphins occurred in the southern approaches to the Irish Sea in the spring and summer. Superpods consisting of hundreds or thousands of animals were occasionally reported by researchers off Pembroke and a pod of some 3000



**Figure 8.** Seasonal distribution and relative abundance of short-beaked common dolphins within the Irish EEZ 2005-2011



**Figure 7.** Detection positive months for short-beaked common dolphins (months in which 1% or more of all sightings occurred)

animals was sighted in the area by an IWDG ferry survey team in 2005. In the central Irish Sea common dolphins occur seasonally and at low densities from late spring to mid autumn but were largely absent during the winter months.

Common dolphins calve in Irish waters, with calves primarily recorded from late summer to late autumn.

## Striped Dolphin / Deilf Riabhach

*Stenella coeruleoalba*



Striped dolphins have a maximum body length of 2.6 m. They are a sleek dolphin species with a slender beak, similar in shape to common dolphin but slightly smaller. A falcate dorsal fin (dark grey in colour) is located half-way along the back.

The body coloration consists of a dark grey cape extending from the beak to behind the dorsal fin. The flanks are a lighter grey, leading to pink-white undersides. A thin dark stripe runs from the eye to

the anus (between the grey and white areas), while a broad dark band runs from the cape, just below the dorsal fin and tapers to a point on the flanks above the pectoral fins.

The striped dolphin is a fast active swimmer which sometimes bow-rides, but not as frequently as the common dolphin, which it resembles in body size and shape.



**Striped dolphins** Photo: L.Armentia / Tethys Research Institute

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

Striped dolphins occur worldwide in tropical and warm temperate waters. They generally occur in deep waters beyond the shelf edge (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

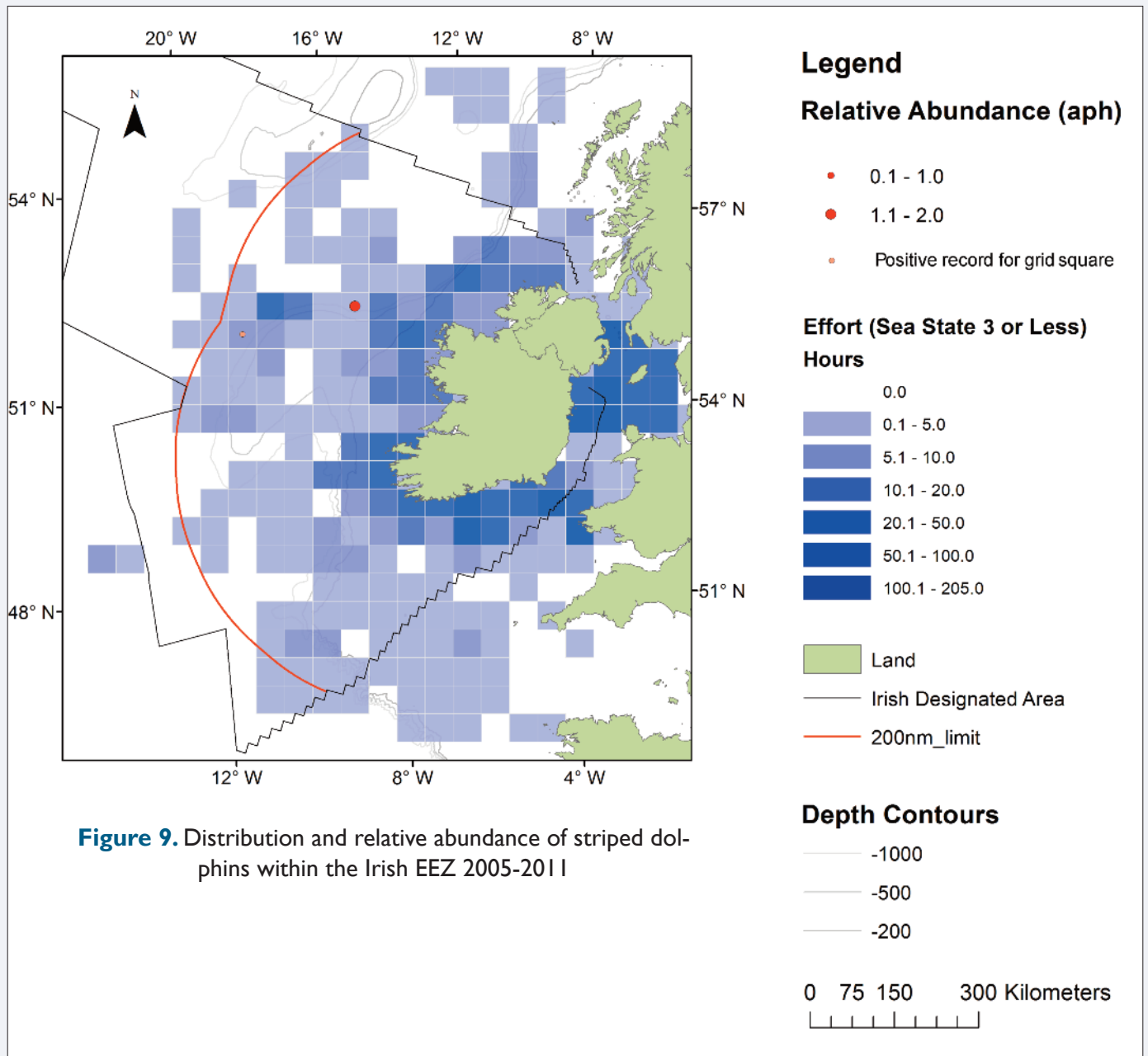
There are no population estimates available for Irish or Northern European waters. Despite being the third most commonly stranded dolphin species in Irish

waters (IWDG 2013), sightings of striped dolphins in Irish waters were very rare.

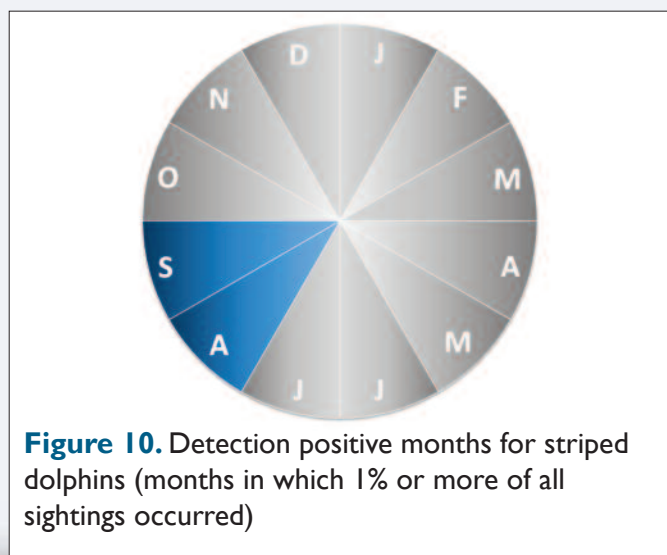
The two sightings recorded during this study were recorded on the slopes of the Porcupine Bank (figure 9). Bycatch data from the tuna driftnet fishery in the 1990s indicated that the main distribution of striped dolphins lay in deep waters to the southwest of the Irish Shelf (Rogan and Mackey 2007).

### Seasonal and Geographic Variation

Both sightings recorded during this study occurred in the summer months (figure 10), however strandings occurred throughout the year (IWDG 2013).



**Figure 9.** Distribution and relative abundance of striped dolphins within the Irish EEZ 2005-2011



**Figure 10.** Detection positive months for striped dolphins (months in which 1% or more of all sightings occurred)

# Common Bottlenose Dolphin

## Deif Bolgshrónach *Tursiops truncatus*

 IUCN Conservation Status		Endangered
		Vulnerable
		Least concern
		Data deficient

The common bottlenose dolphin is one of Ireland's most recognisable cetacean species. They have a robust, muscular body shape with an average body length: of 1.9m – 3.8 m. The body colour is grey with a light grey (that can show variations of grey patterns) or white underside. A tall falcate dorsal fin with a broad base sits half-way along the back. Bottlenose dolphins exhibit a moderately keeled tailstock.

The head has a short, rounded beak with the lower jaw protruding slightly beyond the upper. A soft mouth line curves upwards at back to give the familiar 'smile' that is characteristic for this species. They often approach vessels to bow ride in inshore waters and in the Shannon Estuary and frequently display acrobatic activity at the surface. Conversely offshore animals often appear wary of approaching vessels.



Common bottlenose dolphins, Rockall Trough Photo: Dave Wall / IWDG / GMIT

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex II and IV

- One candidate SAC (the Lower Shannon Estuary) and a further proposed SAC on the west Connacht coast.
- Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

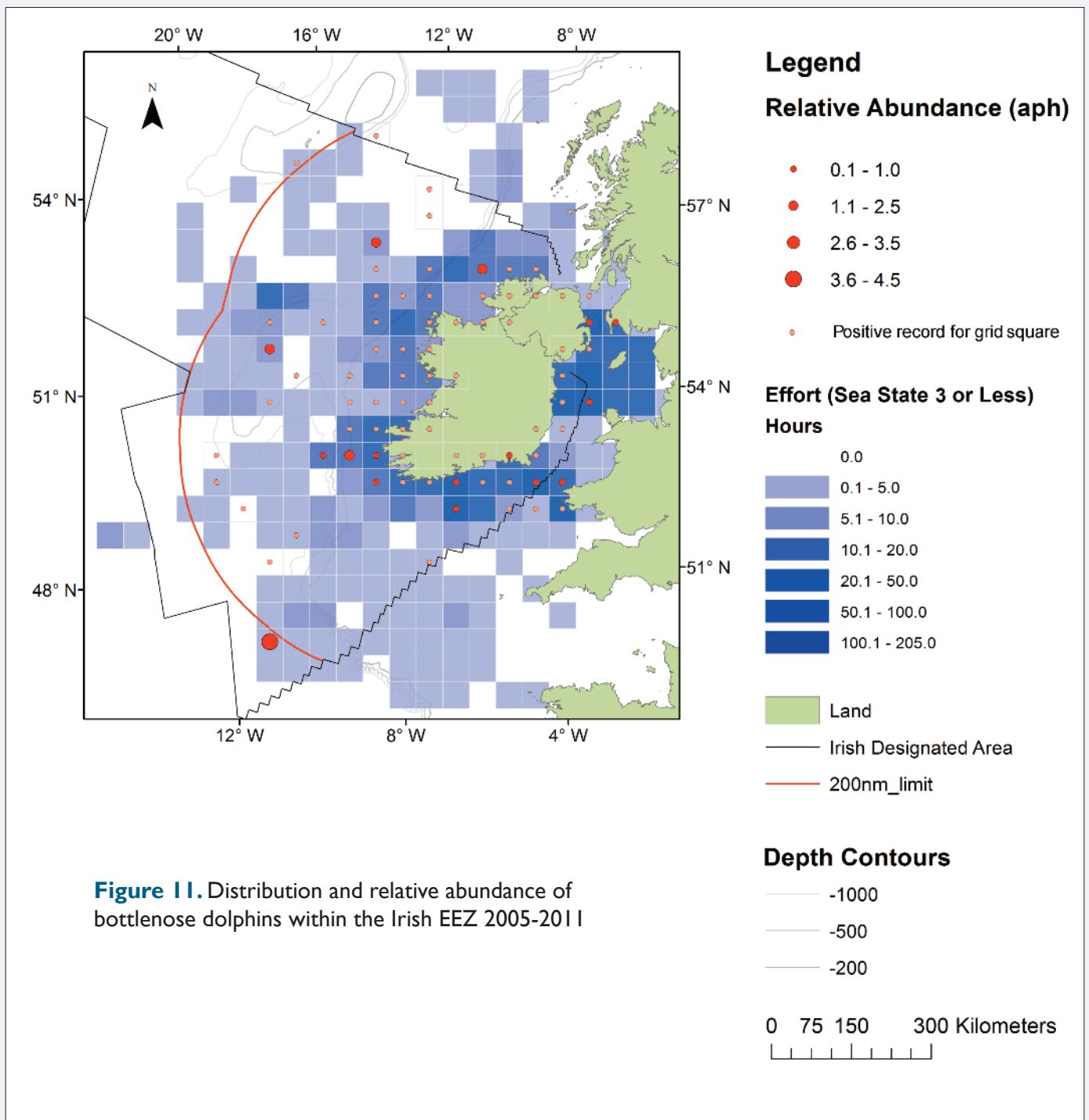
Bottlenose dolphins are found in all seas outside of the Polar Regions. In the Atlantic they occur as far north as Iceland and as far south as Patagonia. In the Pacific they occur from New Zealand in the south to the Northern United States and Japan in the north (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

Common bottlenose dolphins occurred off all Irish coasts with inshore animals moving around the entire Irish coastline (O'Brien *et al.* 2009) and between the UK and Ireland (Robinson *et al.* 2012). Resident or semi-resident groups were present in the Shannon Estuary (Berrow *et al.* 1996) and Cork Harbour (Ryan *et al.* 2010b).

There is increasing evidence (from sightings and genetic analysis) to suggest that an offshore ecotype of bottlenose dolphin exists in Irish waters (Wall *et al.* 2009, Oudejans *et al.* 2010 and Mirimin *et al.* 2011). Though bottlenose dolphin distribution was





continuous from inshore to offshore areas, some evidence existed that offshore animals exhibited preference for the slopes of the Irish Shelf and offshore banks. Bottlenose dolphins also occurred in abyssal waters, where they sometimes formed mixed species groups with pilot whales.

The highest relative abundances of bottlenose dolphins were recorded in offshore waters to the

west of Ireland (figure 11). Most notably in 2009 a single pod of over 200 animals (larger than the total population estimate for the Shannon Estuary) was encountered during a dedicated cetacean survey on the northwest slopes of the Irish shelf (Wall *et al.* 2009).

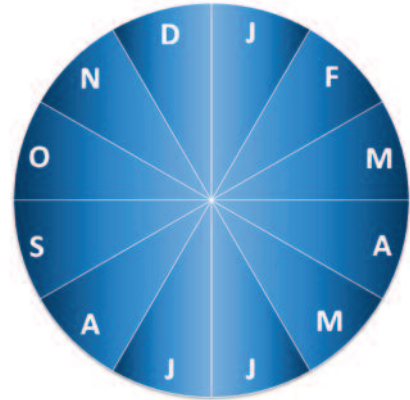
The SCANS II survey estimated a population of c. 550 animals for Irish inshore waters and the Irish Sea and a

population of as many as 3,000 animals in offshore waters over the Irish Shelf (Hammond 2006). The CODA survey estimated c. 8,500 animals in waters over the Irish shelf slopes and the deeper waters of the Rockall trough and Porcupine Abyssal Plain (Hammond *et al.* 2010).

### Seasonal and Geographic Variation

Insufficient data were available to examine seasonal variation in bottlenose dolphin relative abundance, however bottlenose dolphins were recorded in Irish waters in all months of the year (figure 12).

Bottlenose dolphins calve in Irish waters with calves recorded primarily in the summer months (Berrow *et al.* 2010).



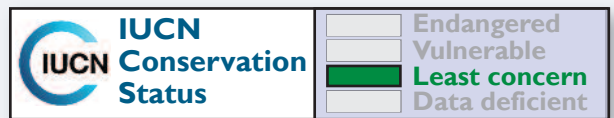
**Figure 12.** Detection positive months for common bottlenose dolphins (months in which 1% or more of all sightings occurred)



**Common bottlenose dolphins** Photo: Irish Air Corps

## White-beaked Dolphin

Deilf na Goba Bána *Lagenorhynchus albirostris*



White-beaked dolphins are large, robust dolphins with an average body length of 2.7 m. They have a short but distinct beak which is usually white or light grey. Some animals in the south of their geographical range are reported to have dark or even black beaks.

White-beaked dolphins have a very prominent dark dorsal fin mid-way along the back, which is large and sickle shaped. The dorsal fin, flukes and pectoral fins are a uniform dark grey. A distinctive white or pale-grey saddle is present behind the dorsal fin and

is characteristic of this species. Two white patches are normally found on the flanks, one either side in front of the dorsal fin and the others on the flank behind the dorsal fin. These patches may merge into the pale saddle behind the dorsal fin.

They are strong swimmers, and often swim very energetically along the surface and breach on occasion. They occasionally bow ride vessels, especially larger ships.



White-beaked dolphin Photo: Faith Wilson

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

White-beaked dolphins occur in cold and temperate continental shelf waters of the North Atlantic from Cape Cod and the Bay of Biscay, north to Greenland and Svalbard (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

Sightings of white-beaked dolphins were rare in Irish waters. Occasional sightings were recorded from inshore waters of the northwest coast (figure 13).

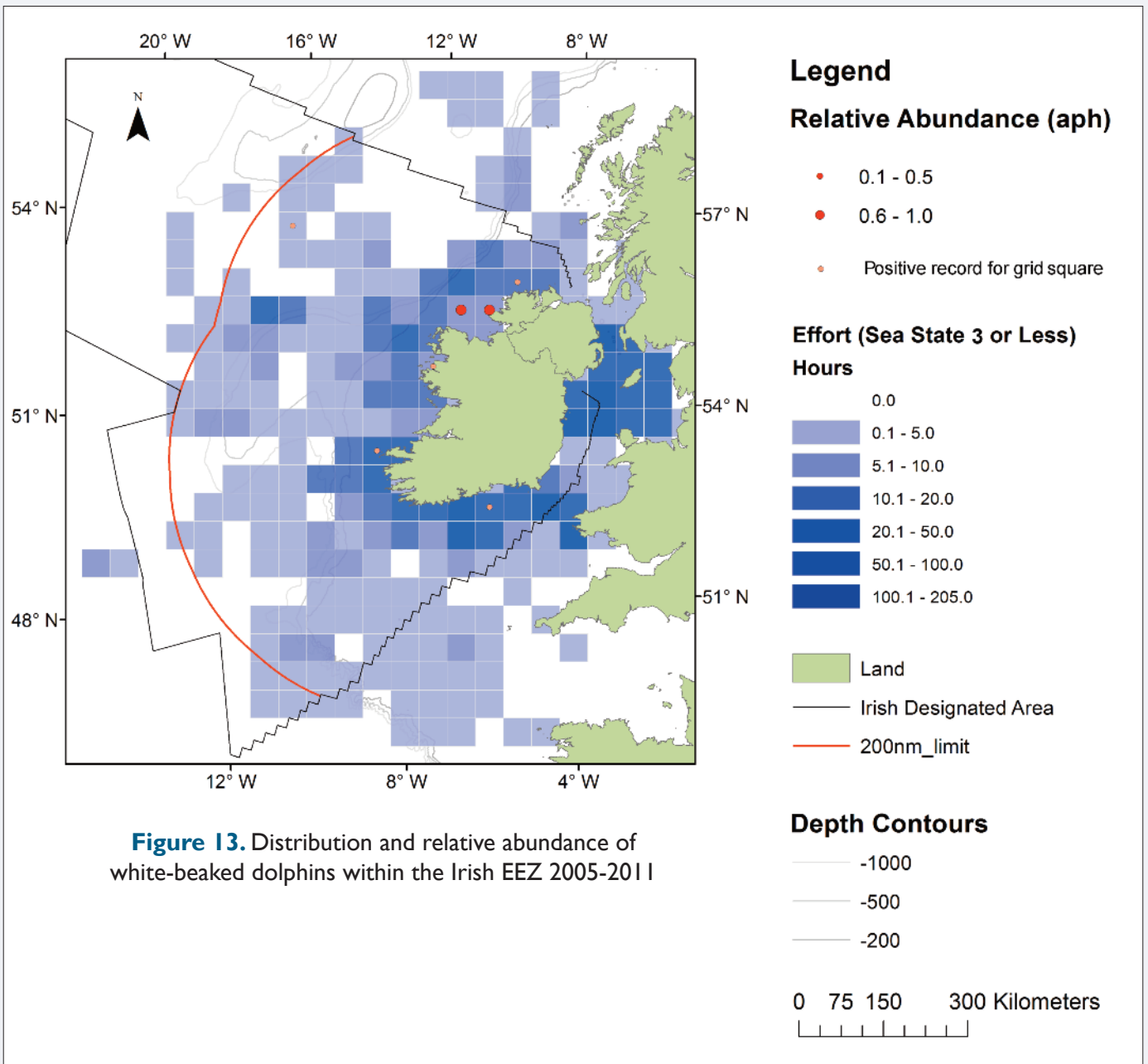
The 2005 SCANS II survey produced an estimate of between 250 and 1350 animals for Irish Shelf waters (Hammond *et al.* 2010). However such estimates were

inconsistent with the extremely low sightings rates for white-beaked dolphins in Irish waters.

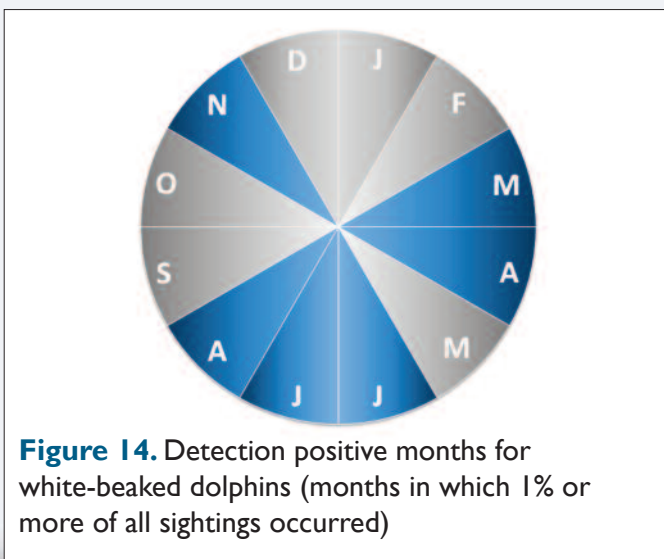
Data from Irish and UK waters over the past 10-15 years waters indicated that the white-beaked dolphin is a species in decline in Irish waters, with rising sea temperatures seen as the most probable cause. Predicted continuing increases in global sea temperatures may lead to white-beaked dolphins becoming absent from Irish waters. Indeed they may become a species of increasing global conservation concern as suitable shelf habitat is reduced as the species retracts further north with increasing sea temperatures (Learmonth *et al.* 2006).

### Seasonal and Geographic Variation

White-beaked dolphins were sighted year round in Irish waters (figure 14), however the scarcity of sightings meant that it was not possible to robustly assess temporal changes in distribution and abundance.



**Figure 13.** Distribution and relative abundance of white-beaked dolphins within the Irish EEZ 2005-2011



# Atlantic White-sided Dolphin

## Deilf le Cliathán Bán *Lagenorhynchus acutus*



Atlantic white-sided dolphins are robust dolphins with a maximum body length of 2.8 m for males and 2.5 m for females. They have a short beak which is black above and white below. The dorsal fin, located half-way along the back is tall and falcate with a sharply pointed tip and a narrow base.

The back and upper beak are black, as are the pectoral fins and flukes. The flanks are grey and a white band below the dorsal fin connects with

yellow/mustard coloured broad band on either side of the tailstock. The body is robust, with a gently sloping forehead. The tailstock is strongly truncated. The pectoral fins are sickle shaped and pointed.

This species can be very active at the surface, with breaching and tail slapping however it seldom bow rides and does not readily approach ships.



### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

Atlantic white-sided dolphins occur in cold and temperate waters of the North Atlantic from North Carolina and the Bay of Biscay, north to Greenland and Svalbard. They are typically a species of the continental shelf slopes and deep oceanic waters (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

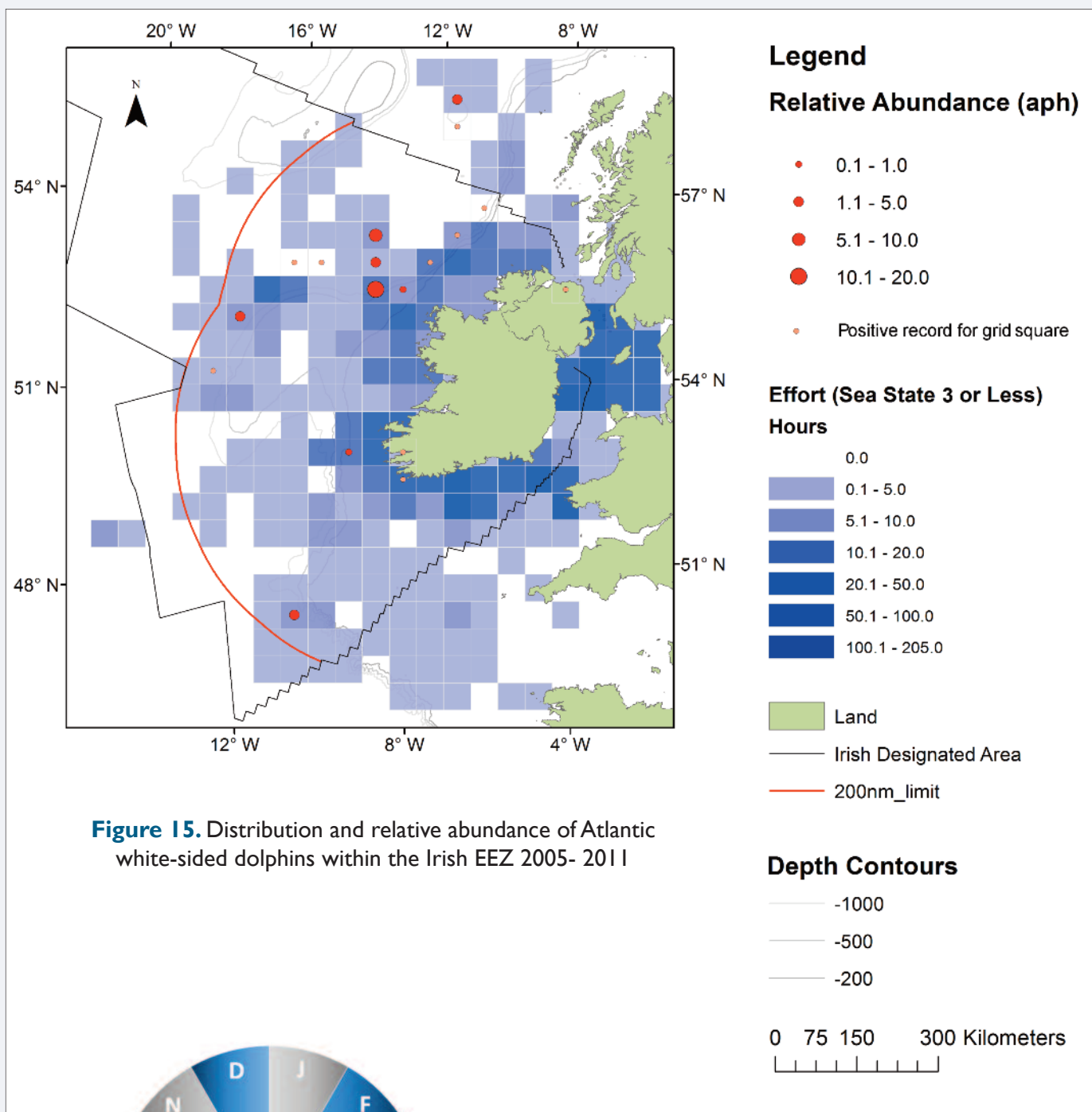
Sightings of Atlantic white-sided dolphins occurred primarily in deep waters (>200 m) on or adjacent to the slopes of the Irish continental shelf and offshore banks. Sightings also occurred in the deep waters of the central Rockall Trough.

Occasional sightings of white-sided dolphins were made over Irish shelf waters, however such sightings were rare and it is clear that this species shows a strong preference for waters deeper than 200 m (figure 15).

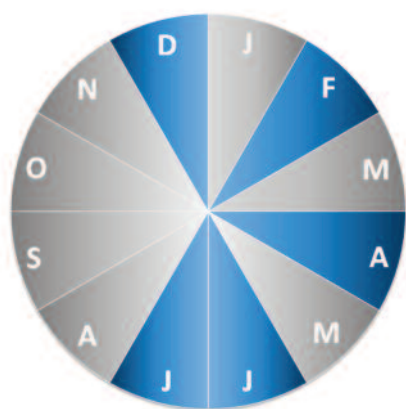
Highest relative abundances were recorded in the Rockall Trough to the northwest of Ireland, where group sizes of up to 250 animals were recorded. O’Cadhla *et al.* (2004) estimated some 5,500 white-sided dolphins for the Rockall Trough and Porcupine Bank in August 2000.

### Seasonal and Geographic Variation

There were insufficient data for a robust assessment of temporal variation in the distribution and abundance of Atlantic white-sided dolphins in Irish waters, however available data suggest that they are present in Irish waters from December to June, with a



**Figure 15.** Distribution and relative abundance of Atlantic white-sided dolphins within the Irish EEZ 2005- 2011

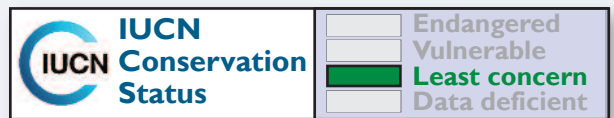


**Figure 16.** Detection positive months for Atlantic white-sided dolphins (months in which 1% or more of all sightings occurred)

peak in sightings in summer and a reduced number of sightings in autumn (figure 16). The absence of sightings in autumn is likely to be an artefact of low survey effort in deep water habitats during this period, however strandings data indicate a similar pattern with a peak in strandings in summer and a lower strandings rate in the autumn (IWDG 2013).

## Risso's Dolphin / Deilf Liath

*Grampus griseus*



Risso's dolphins are very robust with an average adult body length of 3.2 m. At birth calves are grey (overall colour ranging from light to dark grey) with a paler underside. As they age, adult Risso's become paler due to increasing levels of white scarring resulting from tooth rake marks gained during social interactions.

Adult Risso's appear pale grey or largely white (depending on levels of scarring), particularly around the head. There is a white anchor-shaped patch on the chest and the underside of the belly is also

typically white. The head is blunt and bulbous, with no evident beak. A distinct vertical cleft is evident on the front of the melon.

A tall, dark and very prominent dorsal fin is located mid-way along the back. The tip may be rounded or pointed with a concave trailing edge. The pectoral fins are long, dark and sickle shaped. A small but noticeable blow may be seen at close range. Risso's dolphins can be very acrobatic at the surface with repetitive breaching and tail slapping.



Risso's dolphins, western Irish Shelf Photo: Nick Massett

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

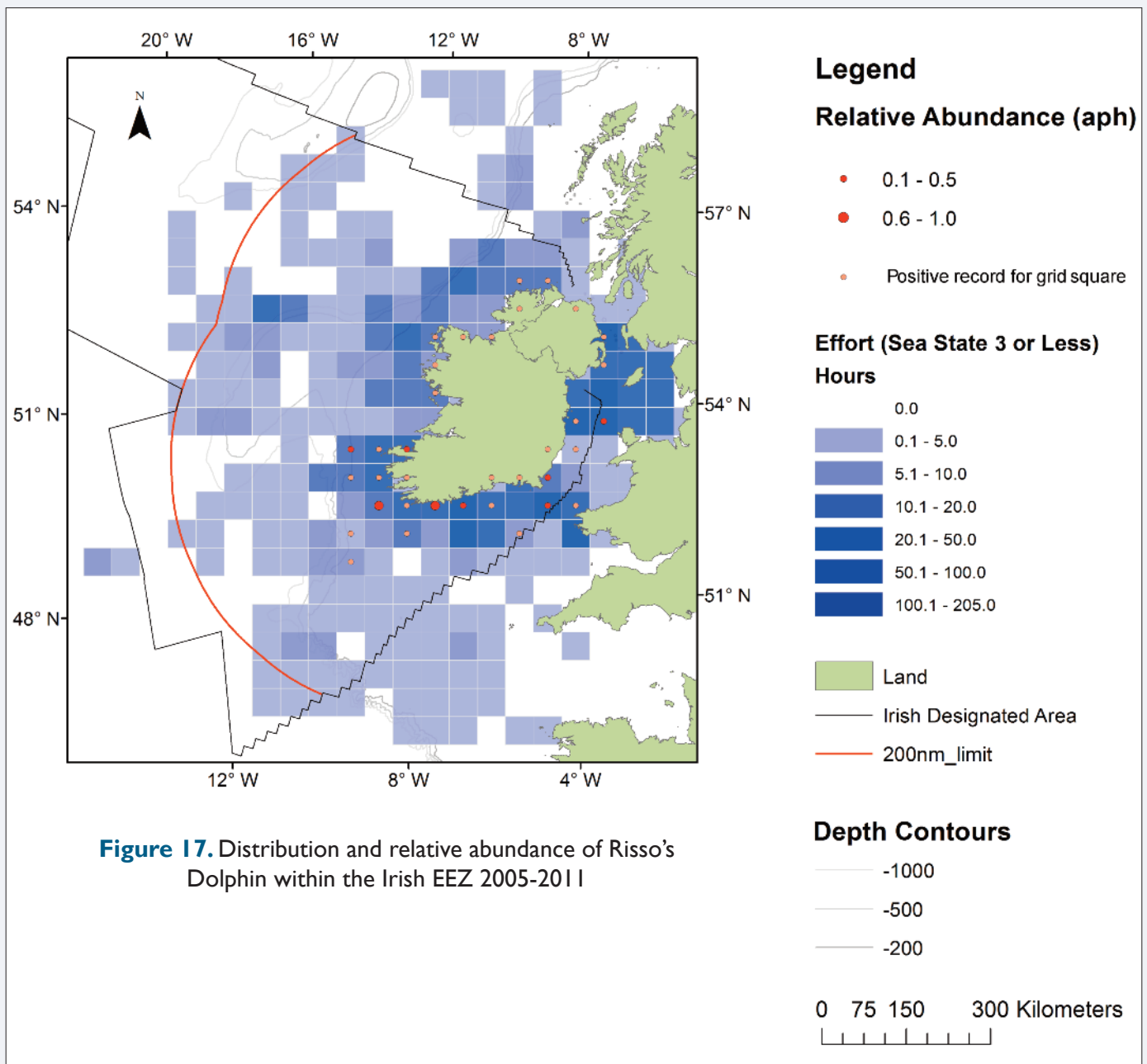
Risso's dolphins are found worldwide from the tropics to temperate seas. Most sightings are recorded from deep water (200 m+) areas over the continental shelf slopes or the slopes of oceanic islands (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

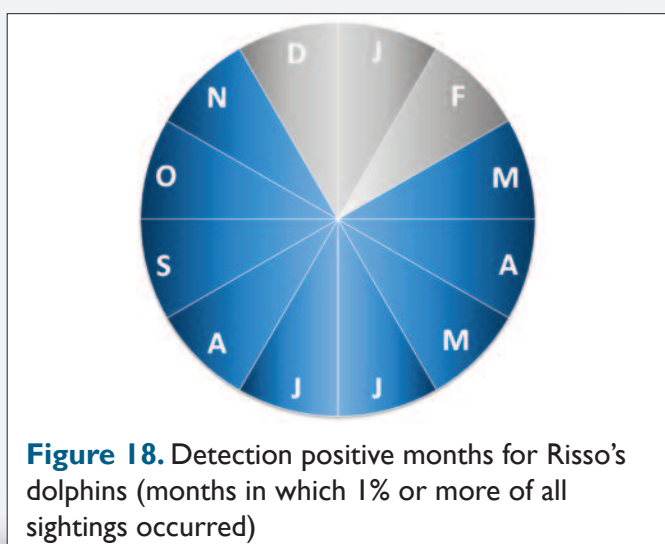
Risso's dolphins were recorded on a regular but infrequent basis in inshore waters around the entire Irish coast (Berrow *et al.* 2010). Their offshore distribution lay over the Irish Shelf, with highest relative abundances recorded off the southwest and southeast coasts (figure 17).

Risso's dolphins in Irish waters did not occur in deep water habitats along the shelf slopes and this is in stark contrast to their reported preference for such habitats elsewhere in the world (Shirihai and Jarrett 2006). Why Risso's in Irish waters displayed a preference for inshore shelf waters is not known, however other hotspots for Risso's dolphins have been reported from adjacent shelf waters in the central Irish Sea (Baines and Evans 2012) and the northwest of Scotland (Weir *et al.* 2001). There are no abundance estimates of Risso's dolphin numbers for northwest European waters.

Despite the fact that Risso's dolphins have a distribution that extends as far as the Faroe Islands to the north, relative abundances off the north and northwest coasts were low. The reasons for this are not understood. However, Wall *et al.* (2006) noted that the relative abundance of all dolphin species in Irish



**Figure 17.** Distribution and relative abundance of Risso's Dolphin within the Irish EEZ 2005-2011



**Figure 18.** Detection positive months for Risso's dolphins (months in which 1% or more of all sightings occurred)

Shelf waters to the north and northwest of Ireland were much lower than elsewhere in the Irish EEZ.

### Seasonal and Geographic Variation

Risso's dolphins were recorded in Irish Waters from April to November, with sightings peaking during the summer months. The presence of young calves in some groups indicated that calving occurred in Irish waters. Risso's dolphins were largely absent from Irish Shelf waters from December to March (figure 18).



## Long-finned Pilot Whale

Míol Phíolótach *Globicephala melas*

 IUCN Conservation Status		Endangered
		Vulnerable
		Least concern
		Data deficient

Long-finned pilot whales are very large and robust dolphins with an average body length of 6.7 m for males and 5.7 m for females. A low bushy blow is often visible and quite audible when in close proximity to the animals. The head is bulbous, with a very short and poorly defined beak. The bulbous melon is quite prominent in males and may overhang the beak.

The dorsal fin is located slightly before the half-way point along the animal's back and is large, with a

very broad base and rounded at the tip. The pectoral fins are long, sickle-shaped and pointed at the tip. Long-finned pilot whales are black in colour with a white anchor-shaped throat patch and white belly patch. Some animals display a paler grey saddle patch behind the dorsal fin. Calves are lighter in colour and often appear to have a brown tinge. Long-finned pilot whales can be very active at the surface and commonly breach, tail slap and spy-hop.



Long-finned pilot whale, Rockall Trough Photo: Dave Wall / IWDG / GMIT

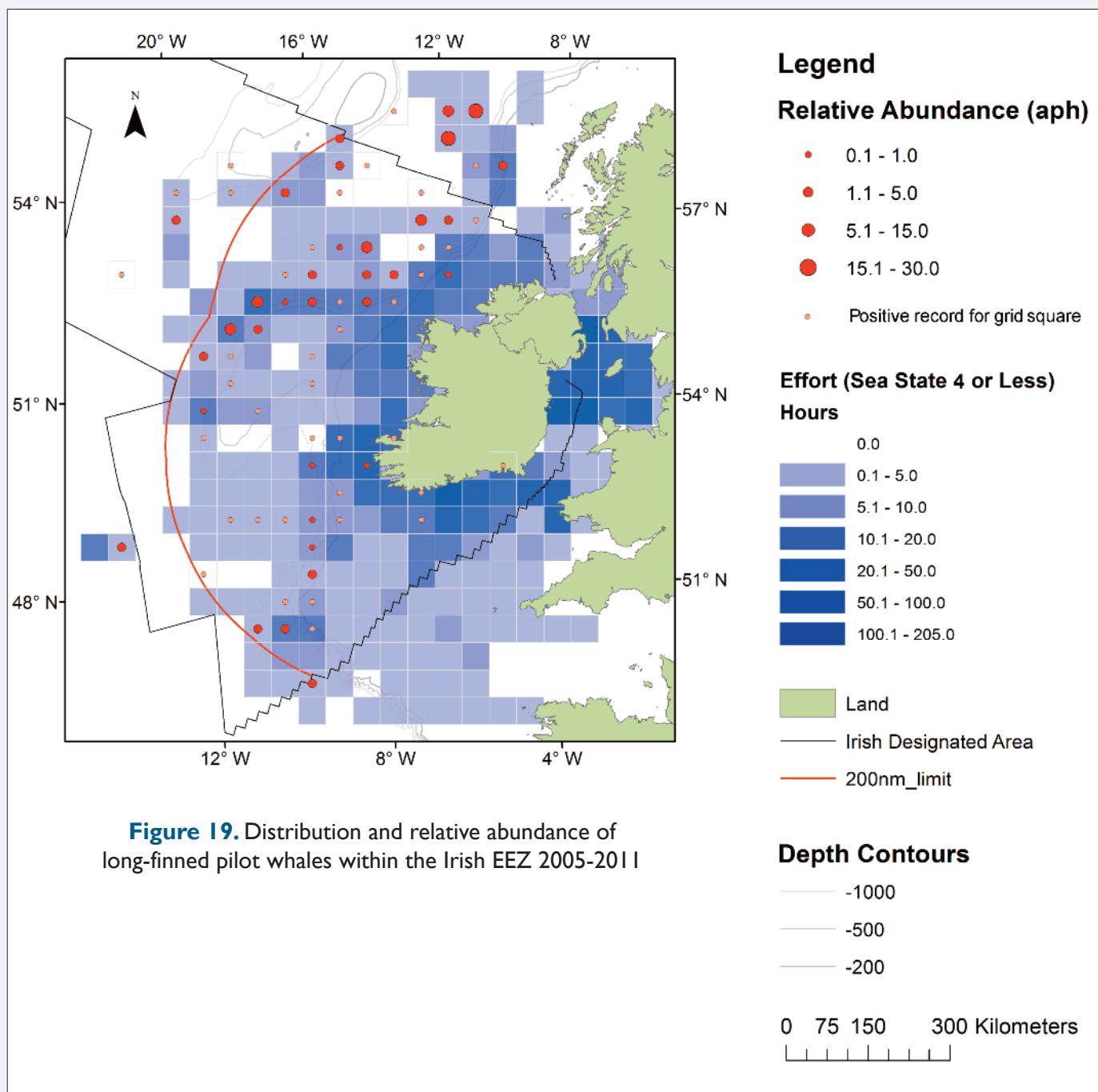
### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

Long-finned pilot whales are found in the North Atlantic from the western Mediterranean and Azores west to the North Carolina Coast and north to



**Figure 19.** Distribution and relative abundance of long-finned pilot whales within the Irish EEZ 2005-2011

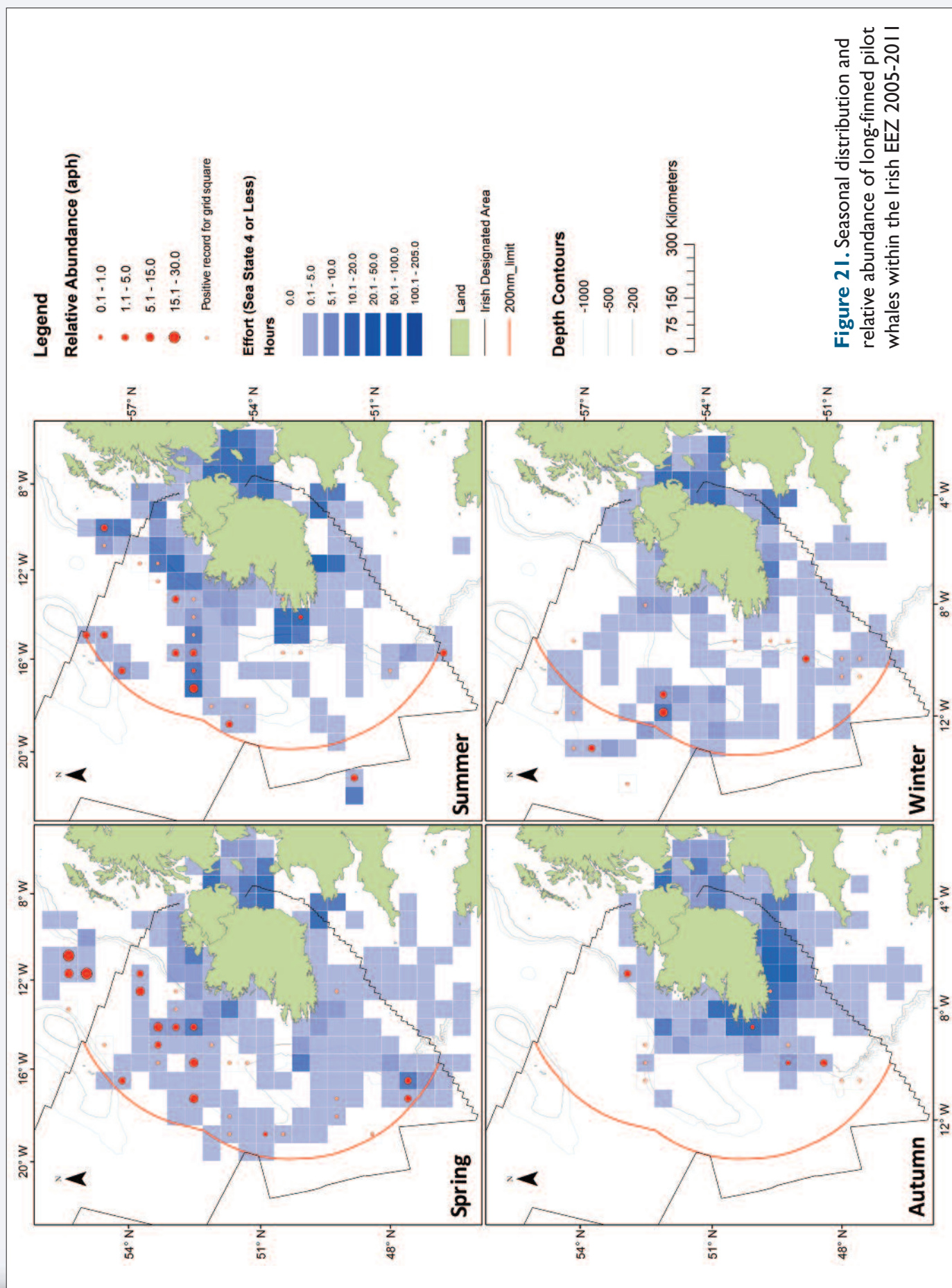
Greenland and the Barents Sea. A geographically and genetically separate sub-species exists in the southern hemisphere, with a circumpolar distribution reaching to 30 degrees south. A north Pacific sub-species existed historically but is now considered to be extinct (Shirihai and Jarrett 2006).

#### Irish Offshore Distribution

Long-finned pilot whales primarily occurred in deep waters (500 m+) beyond the Irish Shelf edge (figure 19). Highest relative abundances were recorded in the Rockall Trough, particularly along the lower

continental shelf slopes and the lower slopes of the Porcupine Bank. High relative abundances were also recorded in the vicinity of deep water bathymetric features such as sea mounts.

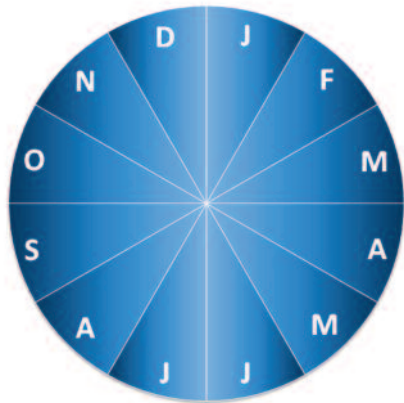
Pilot whales were recorded in the Porcupine Seabight, but at lower densities than in the Rockall Trough. Higher relative abundances were recorded in the deeper waters of the Irish Shelf slopes to the south of the Goban Spur.



**Figure 2.1.** Seasonal distribution and relative abundance of long-finned pilot whales within the Irish EEZ 2005-2011

Occasional sightings were recorded from waters over the Irish Shelf, especially off the southwest coast. Sightings recorded near to shore have mostly been associated with stranding or near stranding events (Berrow *et al.* 2010).

The 2007 CODA survey of deep water habitats in Northwest Europe estimated a total of c20,000



**Figure 20.** Detection positive months for long-finned pilot whales (months in which 1% or more of all sightings occurred)

pilot whales in the deep waters to the west of Ireland and Scotland (Hammond *et al.* 2010), while surveys conducted in late 1980s derived an estimate of c780,000 long-finned pilot whales in the Northeast Atlantic (Buckland *et al.* 1993).

### Seasonal and Geographic Variation

Long-finned pilot whales were recorded in Irish waters throughout the year (figure 20), with highest relative abundances recorded along the slopes of the Rockall Trough and Irish Shelf during the spring and summer months (figure 21). The apparent reduction in relative abundance in autumn and winter reflects similar temporal fluctuations in pilot whale abundance around the British Isles reported by Abend and Smith (1999) but does not reflect the seasonal trends in pilot whale strandings (IWDG 2013).

Further survey effort in deep water habitats in autumn and winter would help clarify the extent of temporal change in long-finned pilot whale abundance or whether the apparent changes are an artefact of variation in seasonal survey coverage.



**Juvenile Long-finned pilot whale breaching, Hatton Bank** Photo: Dave Wall / IWDG / GMIT

## Killer Whale / Cráin Dubh

*Orcinus orca*



Killer whales are the largest dolphin species, with adults reaching up to 9.5 m in length. The blow is low and bushy with a sharp sound, audible from a distance. The head is rounded with an indistinct blunt beak.

The triangular dorsal fin, located half-way along the back, is the largest of any cetacean species and reaches 1.8 m in height in males. The dorsal fin on females and juveniles is falcate and more dolphin-like.

Body colour is jet-black above and on the flanks. They have white undersides with a white patch above and

slightly behind the eye and a white patch stretching from the underside onto the flanks. A lighter coloured saddle patch varies in colour from white to grey to brownish.

Identification at sea is easy if the group contains an adult male, which they almost always do, as there is no mistaking the male dorsal fin. Even females and sub-adults have a noticeably larger dorsal fin than other species. The striking body colouration is also diagnostic.



**Killer whale, western Irish Shelf** Photo: Pádraig Whooley / DEHLG / IWDG

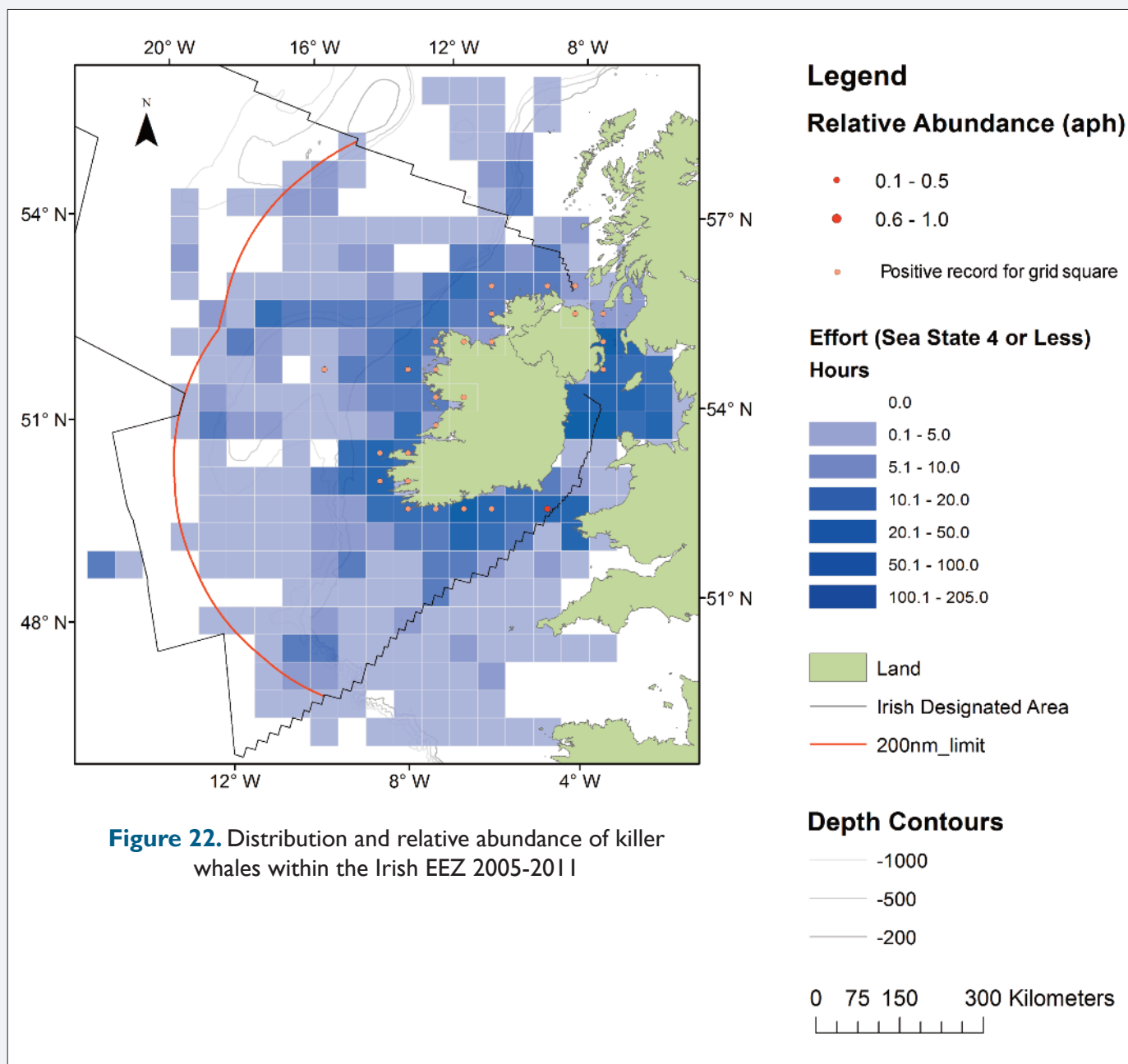
### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

Killer whales are the most widespread cetacean species on earth, occurring from the cold fringes of the polar pack ice to the warm waters of the tropics (Shirihai and Jarrett 2006).



**Figure 22.** Distribution and relative abundance of killer whales within the Irish EEZ 2005-2011

### Irish Offshore Distribution

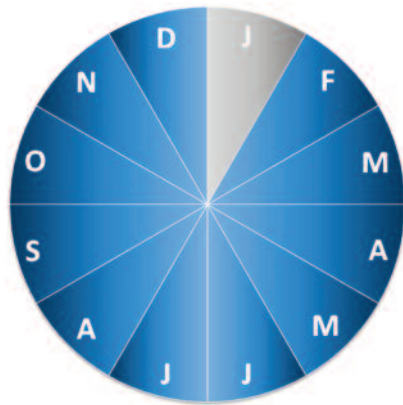
Killer whales were recorded predominantly in inshore waters of the northeast, north, west and south coasts. A small number of sightings also occurred in offshore waters over the Irish Shelf (figure 22). No sightings were recorded from the Irish Sea, however anecdotal evidence from divers and yacht crews indicate killer whales pass through the Irish Sea but do so well offshore, perhaps due to a lack of major food sources inshore.

No population estimates exist for this species in Irish or EU waters. Seven killer whales have been

photo-identified from Irish waters (IWDG 2013) and all but one of these are known to be part of the 'West Coast Community' killer whale group, first identified in waters off the Scottish West coast and consists of just ten animals. This group are known to predate on both marine mammals and fish (HWDT 2013).

### Seasonal and Geographic Variation

Killer whales were recorded in all months, except January (figure 23), with most sightings recorded during the summer months. The majority of sightings were made close to shore, particularly around bays and islands.



**Figure 23.** Detection positive months for killer whales (months in which 1% or more of all sightings occurred)



Anecdotal evidence from inshore fishermen suggests that killer whales were preying on seals in some locations. Reports of large aggregations of up to 100 killer whales feeding among the mackerel fishing fleet have been reported off the northwest coast by the Irish Naval Service (IWDG 2013), though these animals were likely to have originated from Norwegian or Shetland populations.



**Killer whale, western Irish Shelf** Photo: Pádraig Whooley / DEHLG / IWDG

## The Beaked Whales

Five species of beaked whale have been recorded in Irish waters:

 <b>IUCN Conservation Status</b>		Endangered
		Vulnerable
		Least concern
		Data deficient

Common Names	Irish Names	Scientific Names
<b>Northern Bottlenose Whale</b>	<b>Míol Bolgshrónach</b>	<i>Hyperoodon ampullatus</i>
<b>Cuvier's Beaked Whale</b>	<b>Míol Mór Gobach Cuvier</b>	<i>Ziphius cavirostris</i>
<b>Sowerby's Beaked Whale</b>	<b>Míol Mór Gobach Sowerby</b>	<i>Mesoplodon bidens</i>
<b>True's Beaked Whale</b>	<b>Míol Mór Gobach True</b>	<i>Mesoplodon mirus</i>
<b>Gervais' Beaked Whale</b>	<b>Míol Mór Gobach Gervais</b>	<i>Mesoplodon europaeus</i>

Identification of beaked whales at sea can be difficult, especially of juvenile animals. Northern bottlenose whales are perhaps the most easily recognised due to their large size (adults can reach up to 9.8 m in length), robust body and prominent bulbous forehead and beak. They have a brown/olive colour and a prominent falcate dorsal fin located two-thirds of the way along the back (with adults often being mistaken for minke whales if the bulbous head is not seen). The pectoral fins are paddle shaped and sit into grooves on the flanks of the body.

The next most recognisable species is Cuvier's beaked whale. This again is a large and robust animal, with adults reaching 7 m in length. The bulbous melon is much reduced and indistinct as compared to the bottlenose whale and the beak is also indistinct. The head is usually paler in colour than the rest of the body and adult animals are heavily scarred along the

back and flanks. The dorsal fin, located two-thirds of the way along the back, is more triangular than in the northern bottlenose whale.

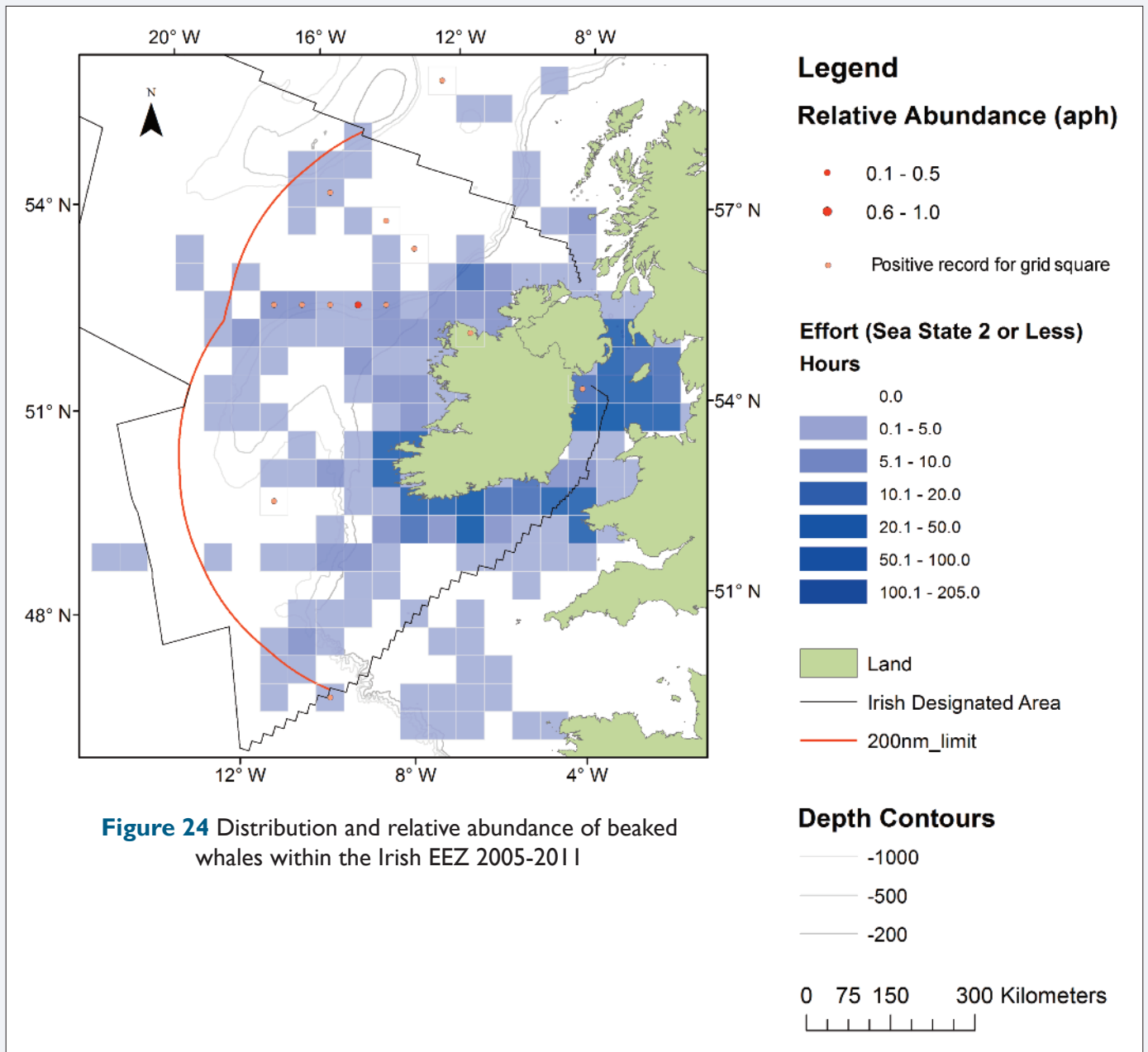
The three *mesoplodon* species are very similar in body shape and size, reaching an average maximum size of 5.5 m. The general body shape is more slender and dolphin-like than Cuvier's beaked whale and breaching *mesoplodons* can resemble breaching bottlenose dolphins from a distance. Each of the *mesoplodon* species has a small triangular dorsal fin located two-thirds of the way along the back. The three *mesoplodon* species differ from each other primarily in beak shape, teeth placement in adult males, and body colouration.

Sowerby's beaked whales have an elongated beak that is highly distinctive in adult animals. The beak in juveniles is less pronounced. Adult male Sowerby's beaked whales have two triangular teeth located



Northern bottlenose whale, western Irish Shelf Photo: Pádraig Whooley / IWDC

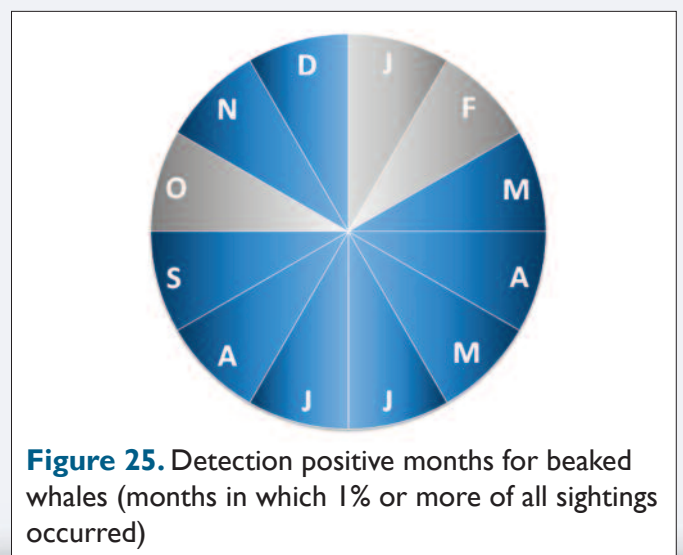




half-way along the lower jaw. The body colour is green/grey above with a pale underside and adult animals have scarring along the back and flanks.

True's beaked whales are similar in shape and size to Sowerby's beaked whales but with a shorter beak length. Body colour is uniform mid-grey with pale underside and a dark patch around the eye. Adult males have two small triangular teeth located at the tip of the lower jaw. Adult True's beaked whales also have scarring along the back and flanks.

Gervais' beaked whales are a vagrant species in Irish waters. They have a similar body shape and size to the other *mesoplodon* species but the beak is less



pronounced than in either Sowerby's or True's beaked whales. Adult males have two triangular teeth located approximately one-fifth of the way back from the tip of the lower jaw. Body colour in Gervais' beaked whales is blue/grey with a pale underside.

All species of beaked whale in Irish waters readily breach clear of the water and often do so in perfectly synchronised displays.

### **IUCN Conservation Status**

All species except Cuvier's beaked whale are listed as being 'data deficient' whilst Cuvier's beaked whale is listed as of 'least concern'.

### **Legal Protection**

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### **Global Distribution**

#### **Northern Bottlenose Whale**

This species occurs in cold and temperate waters of the North Atlantic from the Canary Islands and Gulf of St. Lawrence in the south to Davis Strait and the Barents Sea in the north (Shirihai and Jarrett 2006).

#### **Cuvier's Beaked Whale**

Cuvier's beaked whales occur globally in temperate, sub-tropical and tropical waters. In the Atlantic they occur from Tierra del Fuego in the south to Ireland and the UK in the north (Shirihai and Jarrett 2006).

#### **Sowerby's Beaked Whale**

Sowerby's beaked whales occur in temperate and cold-temperate waters of the North Atlantic from the Canaries and Massachusetts in the south to Labrador and the Norwegian Sea in the north (Shirihai and Jarrett 2006).

#### **True's Beaked Whale**

Little is known of the global distribution of this species. They occur in warm temperate waters of the north Atlantic, with Ireland marking the northernmost limit. True's beaked whales also occur in the warm temperate waters off South Africa and South Australia (Shirihai and Jarrett 2006).

### **Gervais' Beaked Whale**

Gervais' beaked whales occur in tropical and warm temperate waters of the north Atlantic. They occasionally occur in cooler temperate seas, with Ireland marking the northern most limit of their distribution (Shirihai and Jarrett 2006).

### **Irish Offshore Distribution**

The majority of beaked whale sightings in Irish waters were recorded in slope and canyon habitats of the Rockall Trough, but also in the deeper waters of the central Rockall Trough (figure 24). Sightings also occurred in the Porcupine Seabight and occasionally in inshore coastal waters, though the latter were predominantly associated with subsequent stranding events (IWDG 2013).

Strandings data indicated a wider distribution for beaked whales in deep waters off the entire western shelf edge. One area of high beaked whale activity has been identified in Irish waters, on the southern slopes of the Rockall Trough (figure 24). This is an area containing a number of large subsea canyon systems. Such canyons have been identified as important habitat for beaked whales elsewhere (Waring *et al.* 2001).

Most sightings of beaked whales occurred in unfavourable sighting conditions and were of distant breaching animals, therefore, many sightings were not identified to species level. It was not possible to conduct a robust analysis of differences in distribution between beaked whale species.

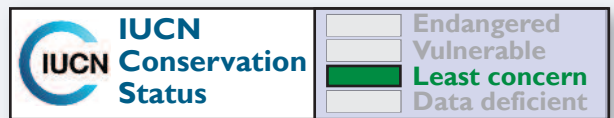
There were estimated to be some 40,000 northern bottlenose whales in the eastern North Atlantic in 1995 (Taylor *et al.* 2012). There are no population estimates available for other beaked whale species in the Northeast Atlantic.

### **Seasonal and Geographic Variation**

Beaked whales were recorded year-round in Irish waters. Individual species may undertake seasonal migrations, such as the northern bottlenose whale which is thought to migrate to southern temperate waters in summer and early autumn, returning to colder northern waters in early spring (Santos *et al.* 2001). Little is known of the movements of other beaked whale species in Irish waters.

# Minke Whale / Droimeiteach Beag

*Balaenoptera acutorostrata*



Minke whales grow to an average body length of 8.5 m. Body colour is dark grey with a white underside and lighter patches of grey extending up the flanks in a variety of patterns. Brilliant white bands are evident on the upper surface of both pectoral fins and are often visible even when the animal is below the surface.

The head is sharply pointed and v-shaped with a noticeable rostrum in front of the blowhole. A prominent, falcate dorsal fin is located two-thirds of

the way along the back. The blow is diffuse and usually not visible, though it may be seen and/or heard in very calm conditions.

The dorsal fin usually appears simultaneously with the blowhole. This species almost never flukes and rarely breaches, however some spectacular displays of breaching have been observed in Irish waters and animals may breach continuously for prolonged periods.



## Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

- No SACs listed
- Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

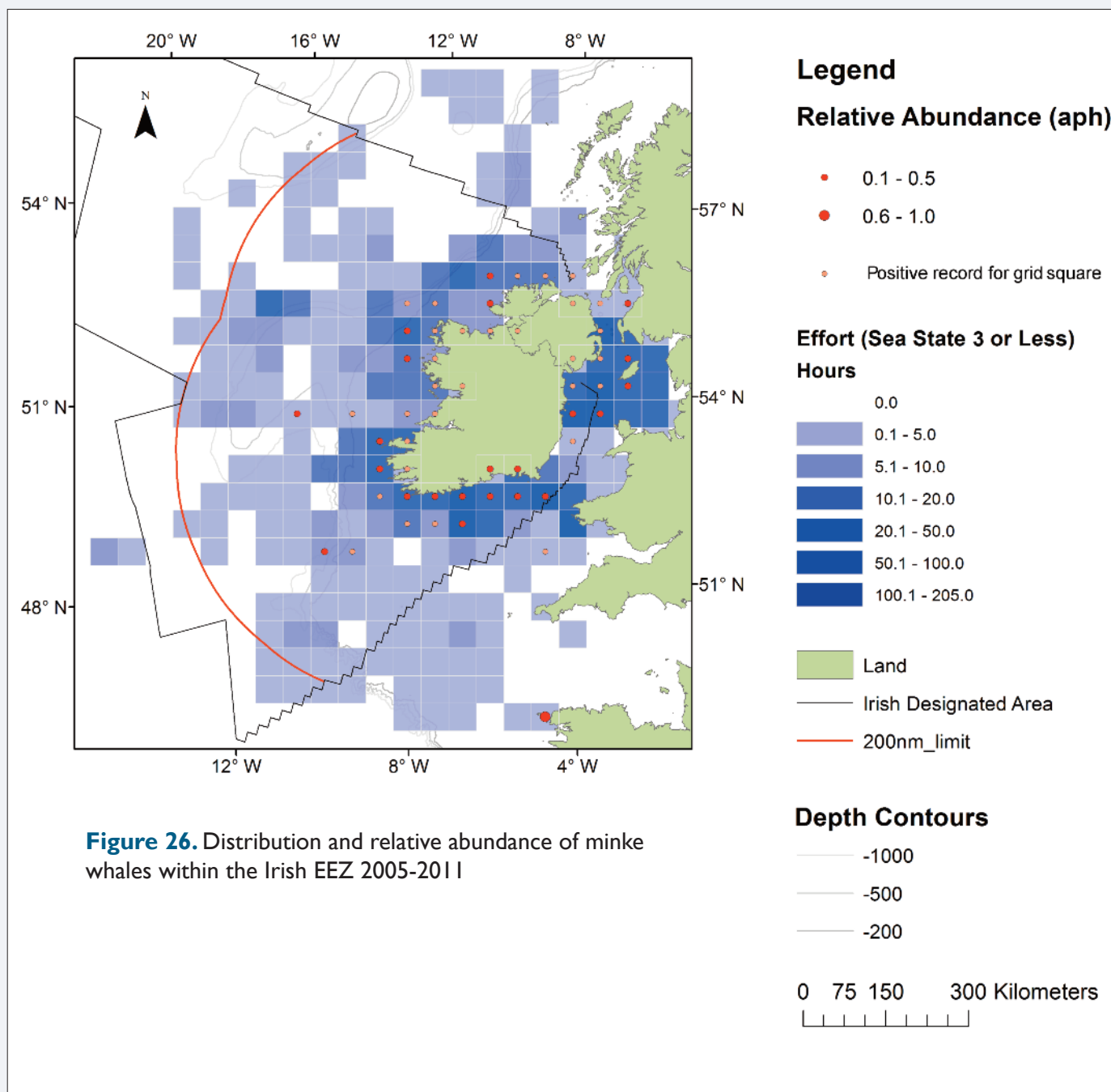
## Global Distribution

Northern minke whales are found only in the northern hemisphere and are classed as a different species to the Antarctic minke whale. They are

primarily distributed in temperate and polar regions of the Atlantic and Pacific where they form two distinctive subspecies (Shirihai and Jarrett 2006).

## Irish Offshore Distribution

Minke whales were the most likely whale species to be seen in inshore waters around the Irish coast (Berrow *et al.* 2010). Sightings were recorded off all coasts with almost all sightings occurring in shallow waters



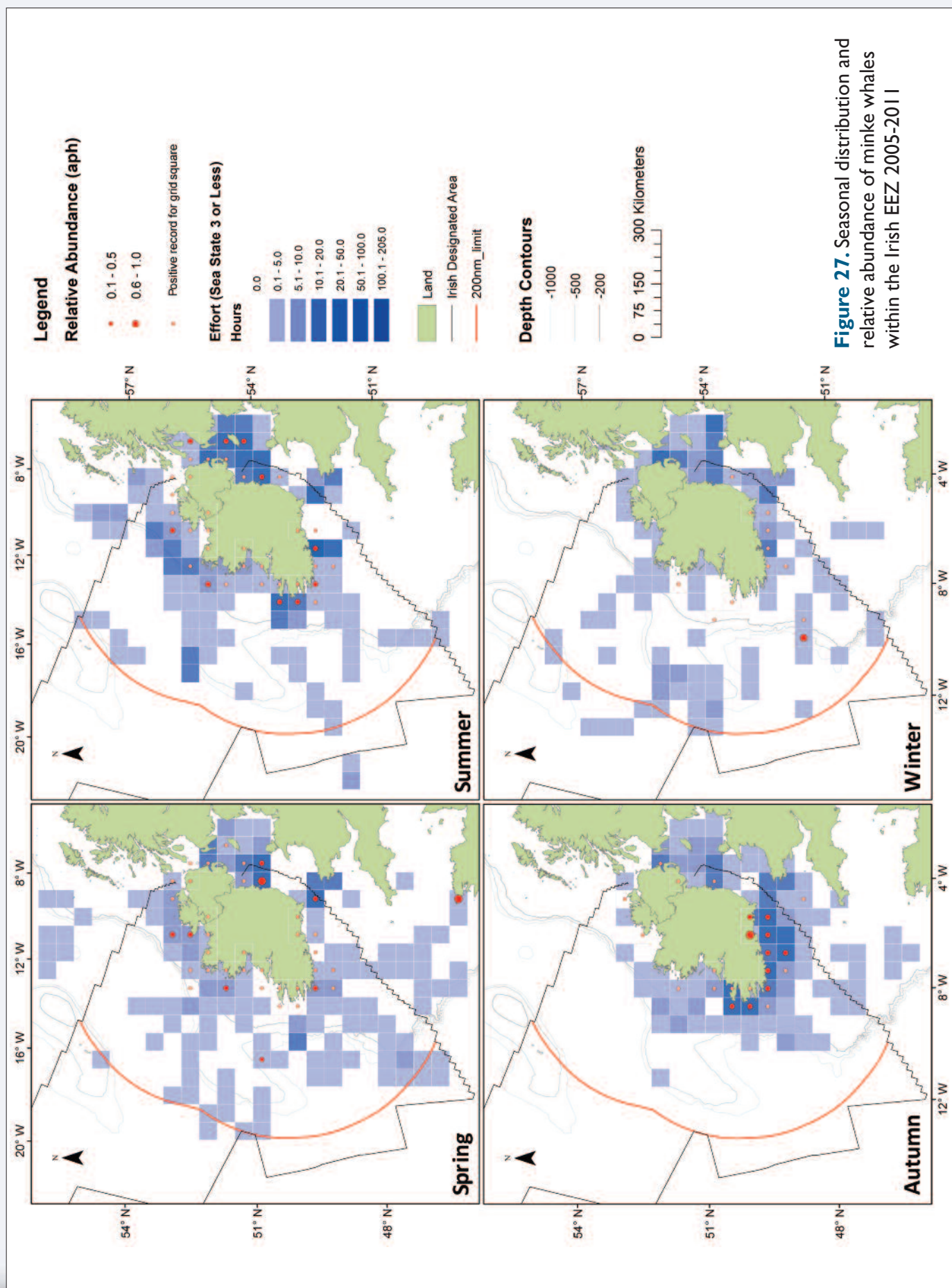
(<200 m) over the Irish Shelf, though sightings were also recorded over shallower areas of the Porcupine and Rockall Banks (Wall *et al.* 2006).

Relative abundances were typically low, reflecting the fact that most sightings involved single animals. In areas of active foraging, minke whales were sometimes seen in groups of two or three and loose feeding aggregations of up to seven animals were recorded in the Irish Sea (figure 26).

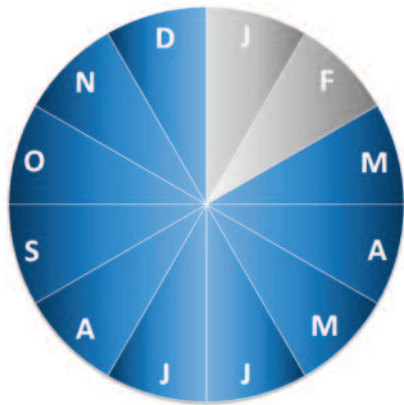
Hammond *et al.* (2011) estimated a total summer population of c30,000 – 40,000 minke whales for northwest European waters.

### Seasonal and Geographic Variation

Highest relative abundances of minke whales were recorded off the south and southwest coasts in the autumn and in the western Irish Sea in spring. Both peaks in relative abundance were thought to be due to whales foraging on concentrations of pelagic schooling fish.



**Figure 27.** Seasonal distribution and relative abundance of minke whales within the Irish EEZ 2005-2011



**Figure 28.** Detection positive months for minke whales (months in which 1% or more of all sightings occurred).

Minke whales were present in the Irish Sea from late April through to early August but were largely absent for the rest of the year. Outside of the Irish Sea, minke whales were present at low relative abundances across the Irish Shelf from early spring through to late autumn (figure 27). They were largely absent from Irish waters during the winter months (figure 28). There is no evidence of minke whales calving in Irish waters and it is likely that they migrate to lower latitudes to breed during the winter. They are thought to calve on two breeding grounds, the location of which remains a mystery (Anderwald *et al.* 2011).



**Minke whale lunge feeding, Celtic Sea** Photo: Pádraig Whooley / IWDC

# Humpback Whale / Míol Mór Cruiteach

*Megaptera novaeangliae*



Adult humpbacks range from 11-16 m in length, with females being slightly larger than males. The head is broad with a series of fleshy knobs on rostrum (and sometimes on the lower jaw), called tubercles. Body colour is black with white on the throat and belly. The pectoral fins are extremely long (one-third of the body length) with scalloped leading edges. They are typically white in colour but may have a dark upper surface, with white beneath. The tail fluke typically has a dark upper surface with white be-

neath, however the under-surface can be dark in some individuals. The scarring, colour pattern and shape of each tail fluke is unique and provides for identification and tracking of individuals. The dorsal fin is small with a broad base, raised hump in front and "knuckles" behind.

The blow is typically low and bushy and has a distinct V-shape when viewed from directly behind or in front of the animal.



Humpback whale lunge feeding, Celtic Sea Photo: Pádraig Whooley / IWDG

## Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

- No SACs listed
- Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

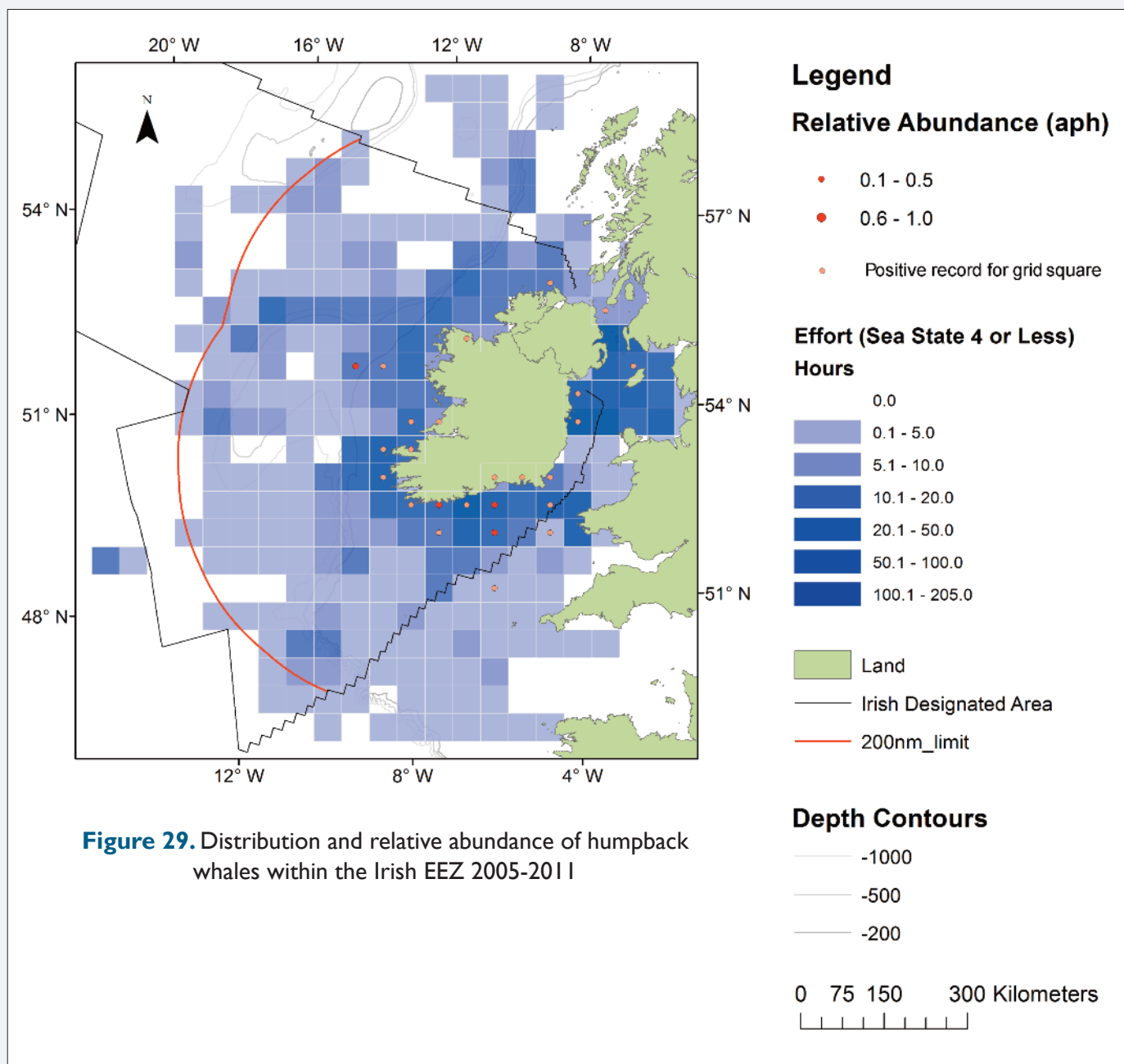
## Global Distribution

Humpback whales are a global species with separate populations in the North Atlantic and North Pacific and nine or more sub-populations in the southern hemisphere. There is seasonal migration between

summer feeding grounds and winter breeding grounds (Shirihai and Jarrett, 2006).

## Irish Offshore Distribution

The majority of inshore and offshore sightings in Irish waters were recorded in seasonal foraging grounds off the south and southwest coasts. Two sightings were made to the west of the Irish Shelf and may have been animals using the western shelf edge as a migratory corridor (Charif and Clark 2009).



**Figure 29.** Distribution and relative abundance of humpback whales within the Irish EEZ 2005-2011

Occasional sightings of single animals occurred in the Irish Sea and off the north coast. In the foraging grounds off the south coast humpback whales were often seen in pairs (figure 29).

A population of c11,600 animals has been estimated for the North Atlantic breeding grounds in the West Indies, however this estimate does not include animals from the Cape Verde breeding grounds (IWC 2012). 21 humpback whales have been photo-identified in Irish waters since 1995 (IWDG 2013).

Humpback whales were hunted by the Norwegian owned whaling stations based in Co. Mayo at the turn

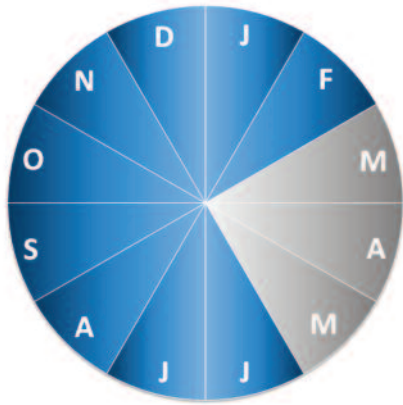
of the last century. Just six humpback whales were killed between 1908 and the closure of the Irish whaling stations in 1922 (Fairley 1981).

### Seasonal and Geographic Variation

Humpback whales were present in Irish waters from June to February but were largely absent from March to May when animals presumably migrated to the tropical breeding grounds (figure 30).

Records of foraging animals were most frequent off the south coast from the Blasket Islands to Hook Head, peaking from late July to early February. Their presence coincided with a large biomass of pelagic





**Figure 30.** Detection positive months for humpback whales (months in which 1% or more of all sightings occurred)

schooling fish during that time of the year, with both fish biomass and whale activity moving eastward through the autumn and into winter.

Photo-identification studies conducted by the IWDG have shown a high-degree of site fidelity in humpback

whales foraging off the south coast with a high resighting rate of photo-identified whales in the IWDG catalogue. Some animals have been recorded periodically foraging in the area since 1999 (IWDG 2013).

The presence of humpback whales in the Irish Sea was noted in spring and early summer. This is the same period in which minke whale relative abundance peaks in the western Irish Sea, and is thought to be due to the presence of pelagic schooling fish in the western Irish Sea at that time.

Data from the US Navy's SOSUS hydrophone array indicate that humpback whales migrate southward to the west of the Irish Shelf from mid-October to late-March each year, peaking in March (Charif and Clark 2009). No northward movement of humpbacks was detected by the SOSUS array but data from satellite tagged whales indicate that they may return northward along migratory routes which lie to the west of the Hatton Bank (IWDG 2013).

## Sperm Whale / Caisealóid

*Physeter macrocephalus*



Sperm whales are Ireland's most widespread and abundant deep water whale species and indeed may be the most abundant large whale species within the Irish EEZ. They have a maximum body length of 15-18 m. The body profile is characteristic, with a large square head with and under slung jaw. The head forms one-third of the overall body length.

There is no true dorsal fin, but two-thirds of the way down the back is a raised dorsal hump and beyond this are a series of 4 or 5 knuckles. The pectoral fins are short and stubby, but the tail flukes are broad and powerful. The scarring and shape of each tail fluke is unique and provides for identification of individuals.

Body colour is typically dark grey to brown. There are often white blotches on other parts of the head or body. The skin on the head is frequently patterned with circular scars formed by the suckers of giant squid on which the whales feed.

They have a short bushy blow which is angled forward and slightly to the left (caution: the blows of other species may appear similar when surfacing at an angle). The blow sequence is characteristic with logging animals blowing every 20-30 seconds. The breathing rate increases as the animal prepares to dive.



Sperm whale fluking before a deep dive, Rockall Trough Photo: Dave Wall / IWDG

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

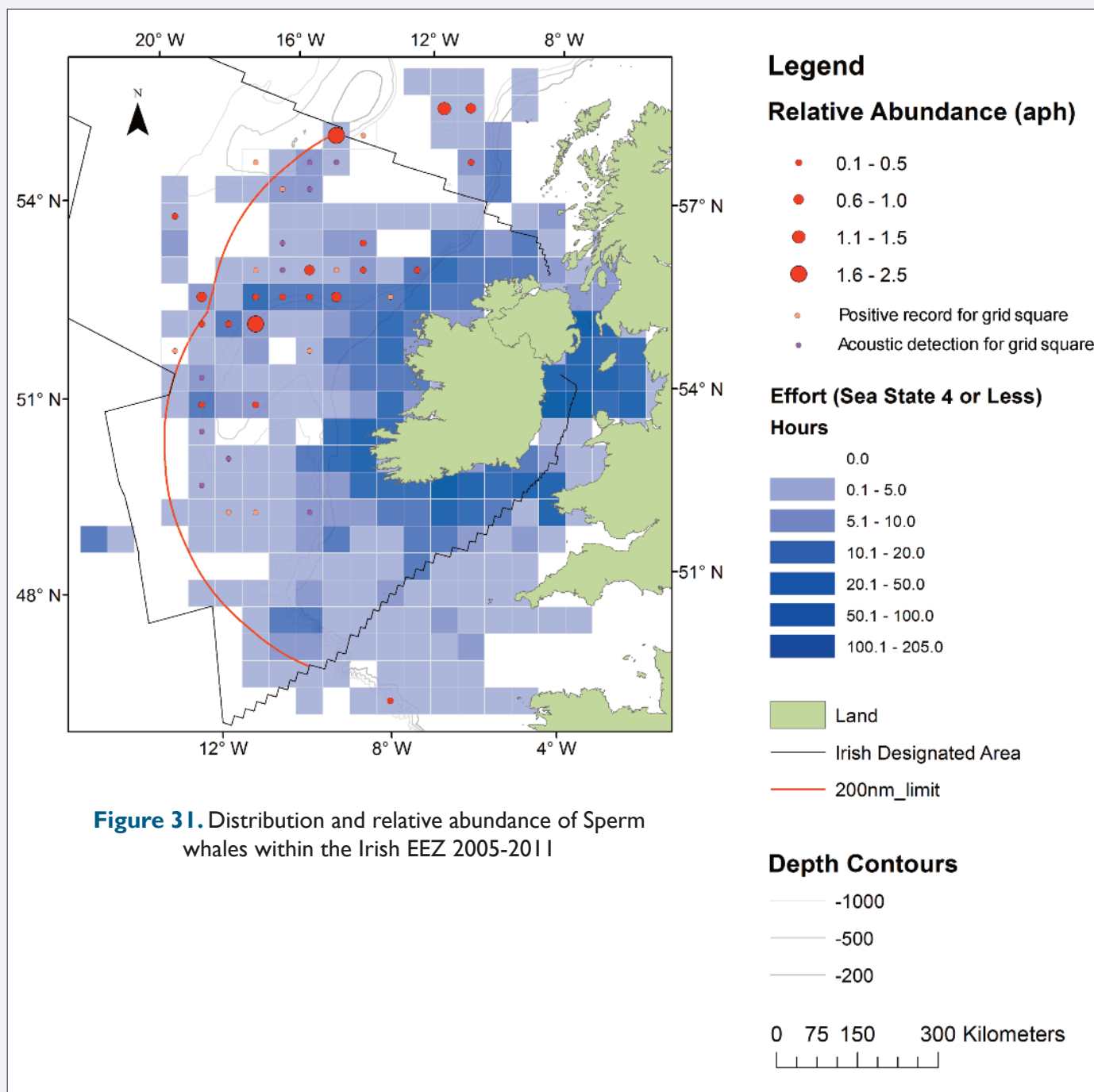
### Global Distribution

Possibly the most cosmopolitan whale species, sperm whales are found in all the world's deep oceans but avoid the pack ice of the poles. There is sexual segregation with females and calves remaining in

tropical and sub-tropical waters while males are generally found further poleward, migrating towards the tropics for mating (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

Sperm whale sightings occurred almost exclusively in the Rockall Trough. All sightings of sperm whales were recorded in deep waters (>500 m) beyond the edge of the Irish shelf, with the majority of sightings occurring in waters deeper than 1000 m (figure 31). Sperm



**Figure 31.** Distribution and relative abundance of Sperm whales within the Irish EEZ 2005-2011

whale distribution was focused in areas adjacent to the slopes of the Rockall Trough and over underwater features such as seamounts.

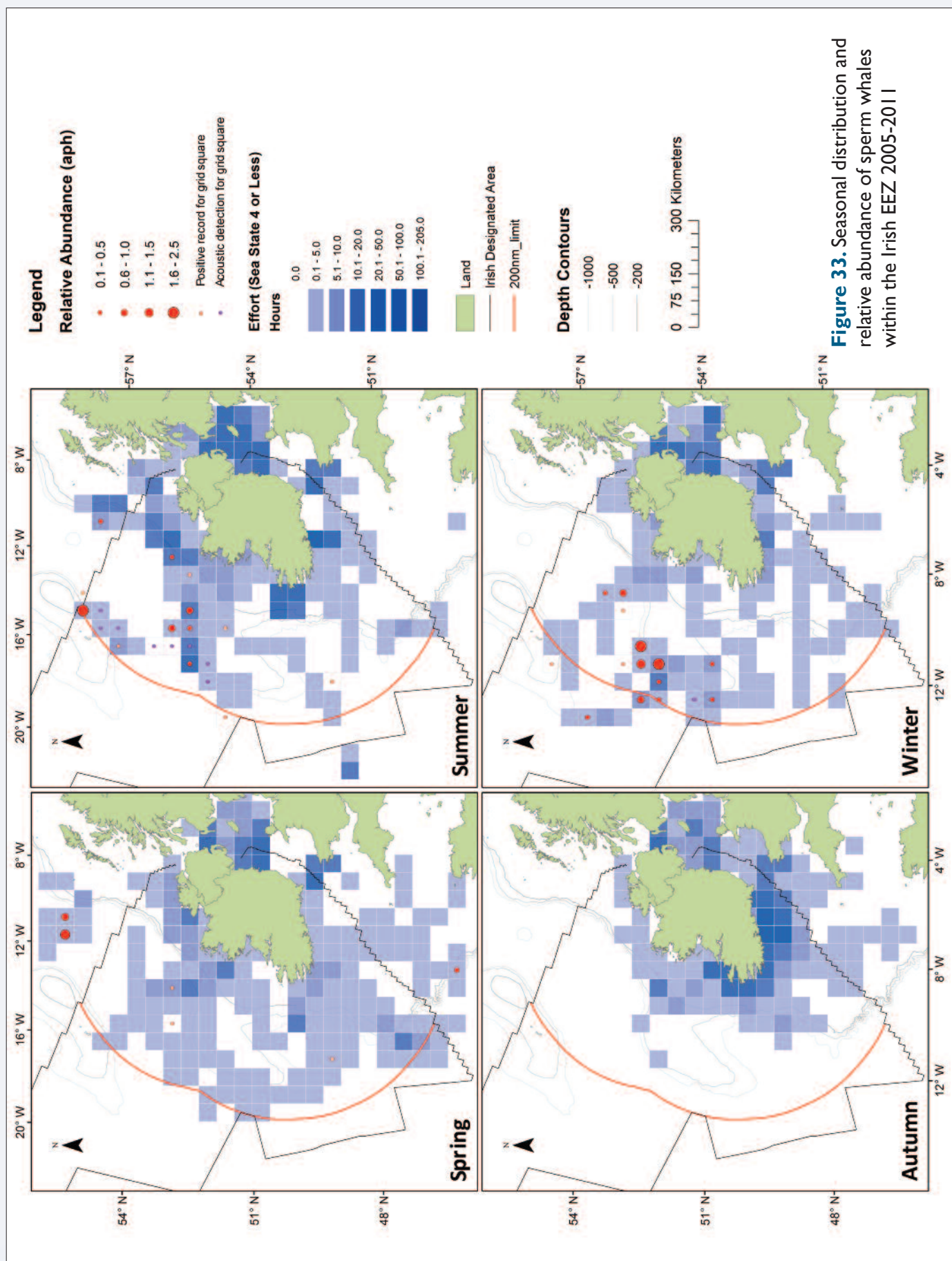
The CODA survey of European offshore waters produced an estimate of c1100 animals for waters to the west of Ireland and Scotland (Hammond *et al.* 2010). They are the most commonly stranded large whale species in Irish waters (IWDG 2013).

Sperm whales were hunted by the Norwegian owned whaling stations based in Co. Mayo at the turn of the

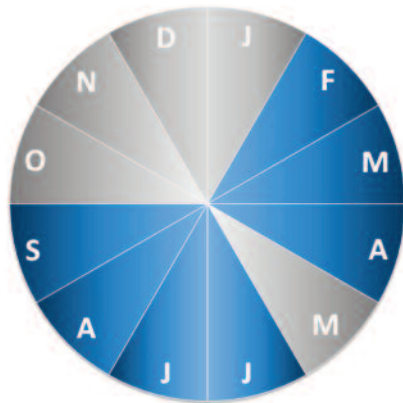
last century, though were not a priority target for the whalers. 63 sperm whales were killed between 1908 and the closure of the Irish whaling stations in 1922 (Fairley 1981).

### Seasonal and Geographic Variation

Sperm whales were recorded from February to September (figure 32), although limited survey effort in deep-water habitats in autumn precluded an accurate assessment of sperm whale distribution and relative abundance during that period.



**Figure 33.** Seasonal distribution and relative abundance of sperm whales within the Irish EEZ 2005-2011



**Figure 32.** Detection positive months for sperm whales (months in which 1% or more of all sightings occurred)

The highest relative abundances of sperm whales were recorded during the winter months in the Rockall Trough. Sperm whales also occurred throughout the Rockall Trough in the summer, but despite good survey coverage, the relative abundance of sperm whales in the Rockall Trough in spring was low (figure 33).

It must be noted that sperm whales spend over 80% of their lives deep below the surface of the ocean, feeding at depths of up to 3000 m for over an hour at a time (Watwood *et al.* 2006) and are therefore largely unavailable for detection by visual survey. Wider use of acoustic survey methods, twinned with visual survey effort is required for a comprehensive assessment of sperm whale distribution and relative abundance in Irish waters.

## Fin Whale / Míol Mór Eiteach

*Balaenoptera physalus*



The fin whale is Ireland's most common large baleen whale and grows to a maximum body length of 24 m in the north Atlantic. Body colour is grey with a white underside. The head is v-shaped with a prominent rostrum in front of the blowhole. Jaw-colour is asymmetrical with the right lower jaw being white in colour and the left being grey, this is diagnostic for the species.

A pattern of light and dark grey chevrons is noticeable behind the head in good light conditions.

The dorsal fin is prominent and located two-thirds of the way along the back. It is variable in shape, though typically falcate or triangular. The species produces a tall columnar blow up to 6 m high which is very noticeable. The blow can sometimes appear angled if the animal blows while surfacing from depth. This species almost never flukes or breaches in Irish waters. Lunge feeding at the surface is sometimes seen off the south coast.

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

Fin whales occur in both temperate and tropical waters, but generally are more abundant in temperate regions. Temperate animals may migrate to the tropics or sub tropics to calve but migration routes are not known. Separate populations exist in the North Atlantic, Mediterranean, Pacific and Southern Ocean (Shirihai and Jarrett 2006).

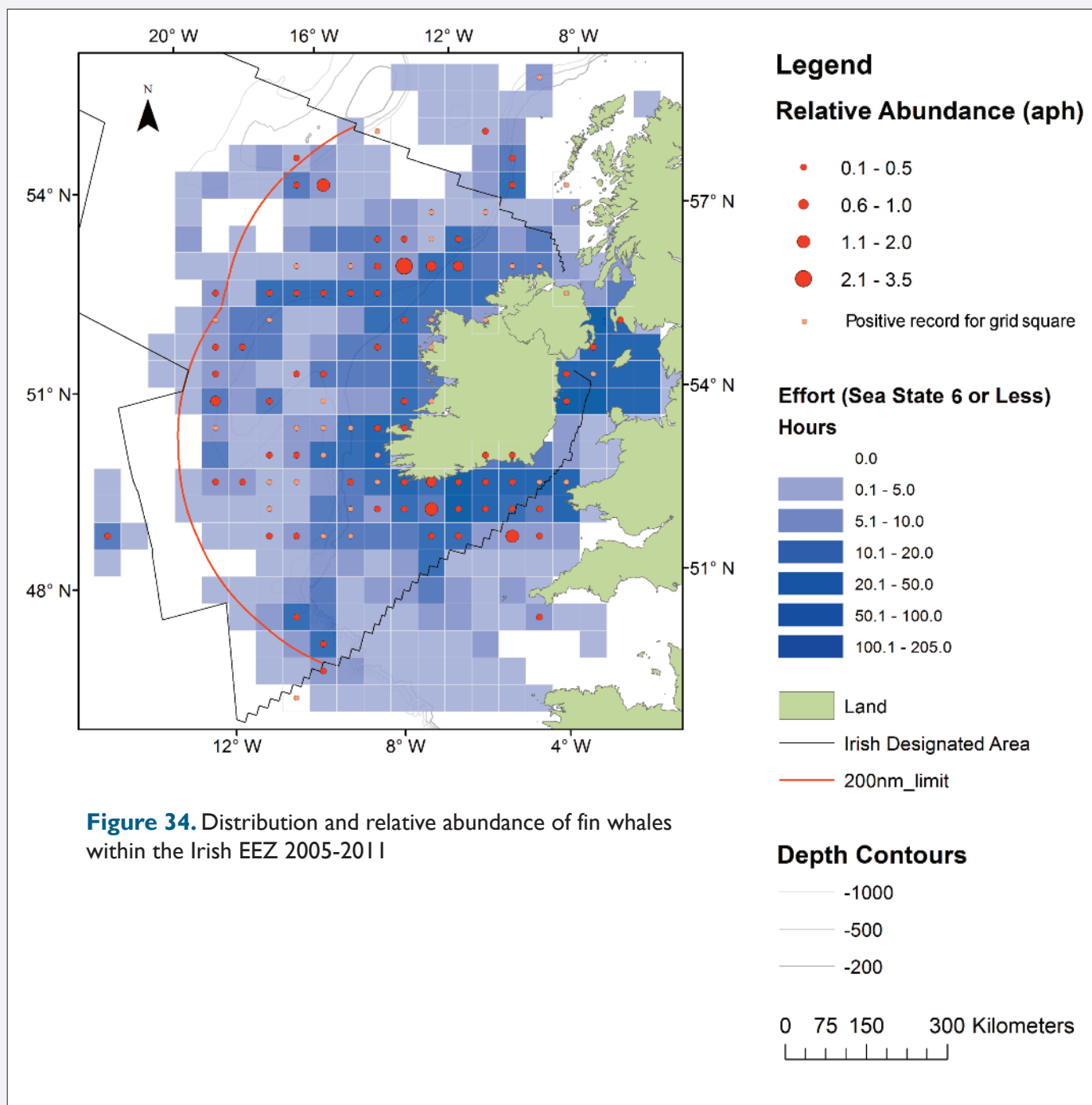
### Irish Offshore Distribution

Sightings of fin whales were recorded off all coasts, with highest relative abundances occurring off the south coast in waters extending from inshore, south to the Labadie Bank and east to the Celtic Deep (figure 34).

This area was a foraging ground for fin whales feeding on pelagic schooling fish. Photo identification studies in inshore waters along the south coast showed that some fin whales exhibited a degree of site fidelity, with the same individuals being recorded across several years (Whooley *et al.* 2011).



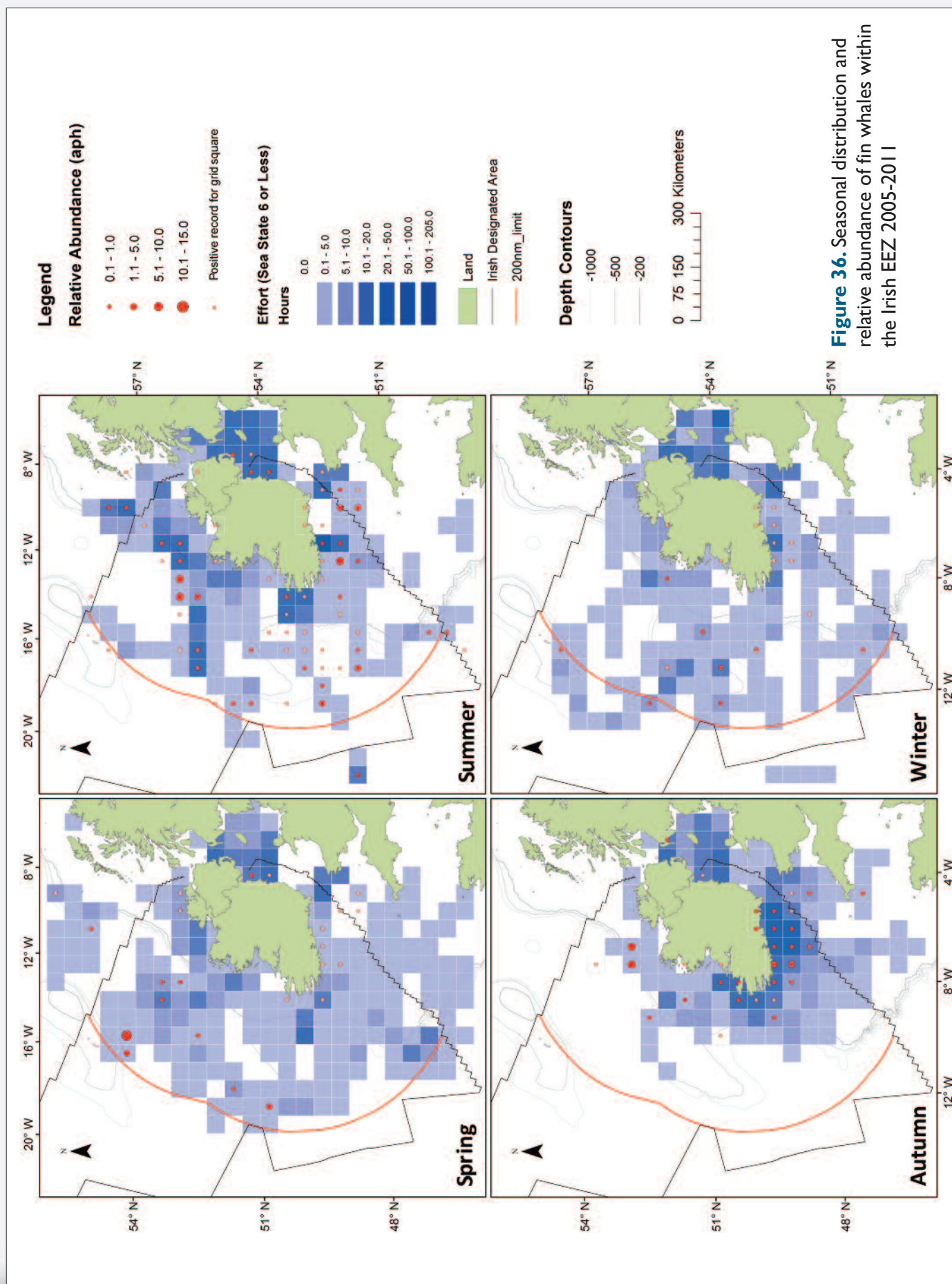
Fin whale, Celtic Sea Photo: Dave Wall



High relative abundances were also recorded along the northwest continental shelf slopes. It is interesting to note that these northwest shelf slopes formed the primary whaling grounds for Ireland's only modern whaling stations. The Norwegian owned whaling stations, based in Co. Mayo at the turn of the last century, took 592 fin whales between 1908 and the closure of the stations in 1922 (Fairley 1981).

Fin whales were also recorded in the deep waters of the Rockall Trough and along the slopes of the Porcupine Bank and southern Irish Shelf. Occasional sightings also occurred in the western Irish Sea.

Hammond *et al.* (2011) estimated c.20,000 animals for northwest European waters. However it is uncertain how robust this estimate was as it was based on data collected during July which lies outside of the peak activity period for fin whale activity in Irish waters.



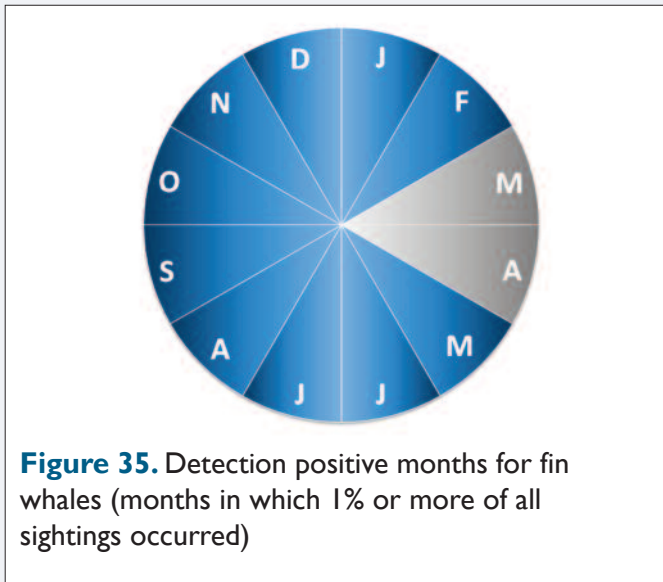
**Figure 36.** Seasonal distribution and relative abundance of fin whales within the Irish EEZ 2005-2011



### Seasonal and Geographic Variation

Fin whales appeared to be largely absent from Irish Shelf waters during the winter and early spring, though a few animals remained foraging in inshore waters off the southeast coast during the early winter (IWDG, 2013). They were present in Irish waters from May to February but sightings in March and April were negligible (figure 35).

Fin whale abundance and distribution increased in the waters of the Irish shelf and Rockall Trough throughout the summer and peak relative abundances were recorded off the south coast and the northwest shelf slopes in late summer and autumn (figure 36).



**Figure 35.** Detection positive months for fin whales (months in which 1% or more of all sightings occurred)

Fin whales were present along the slopes of the Rockall Trough throughout the year but their numbers peaked from August to March (Charif and Clark 2009). Data from the US Navy's SOSUS array suggested that these animals migrate southward through the Rockall Trough as acoustic detections at SOSUS hydrophones in the south-western North Atlantic peak in March and April, when detections are at their lowest in the northeast Atlantic (Clark and Gagnon 2002). There is no evidence of fin whales calving in Irish waters and it is likely that they migrate to the lower latitudes to breed, however the location of their breeding grounds is unknown.

Although animals recorded along the slopes of the Rockall Trough were thought to be primarily migrating, opportunistic foraging on krill blooms along the shelf slopes has been recorded (Wall *et al.* 2009). In 2001 another fin whale, tagged in the Faroe Islands, was recorded foraging off the northwest coast of Ireland for several weeks before heading south towards the Azores (Mikkelsen *et al.* 2007).

Occasional sightings of fin whales were recorded in the Irish Sea in late spring and summer (when pelagic schooling fish may provide a foraging opportunity) but fin whales were largely absent off the east coast at other times of the year.

## Blue Whale / Míol Mór Gorm

*Balaenoptera physalus*

	 <b>Endangered</b>
	 Vulnerable
	 Least concern
	 Data deficient

Blue whales are the largest whale species in the world and the largest animal which has ever existed, reaching a maximum length of 33 m. Calves are born at up to 7 m in length. Body colour is blue-grey, mottled with grey, white or silvery patches.

The dorsal fin is tiny in comparison to the animal, roughly triangular in shape and is set three-quarters of the way along the back. The head has a broad, flattened, u-shaped rostrum. A single raised ridge runs

from almost the tip of the rostrum to the very prominent splash-guard around the blowhole.

Blue whales typically produce a very strong blow, rising in a single thick column 6-12 m high, however this is not a diagnostic feature in Irish waters where fin whales are common. Surfacing sequence is a tall columnar blow followed by a long muscular back and (after a period) the tiny dorsal fin. Approximately 20 % of blue whales fluke when deep diving and this trait is specific to individuals (COSEWIC 2002).



Blue whales, Porcupine Seabight Photo: Irish Air Corps

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex IV

• No SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

### Global Distribution

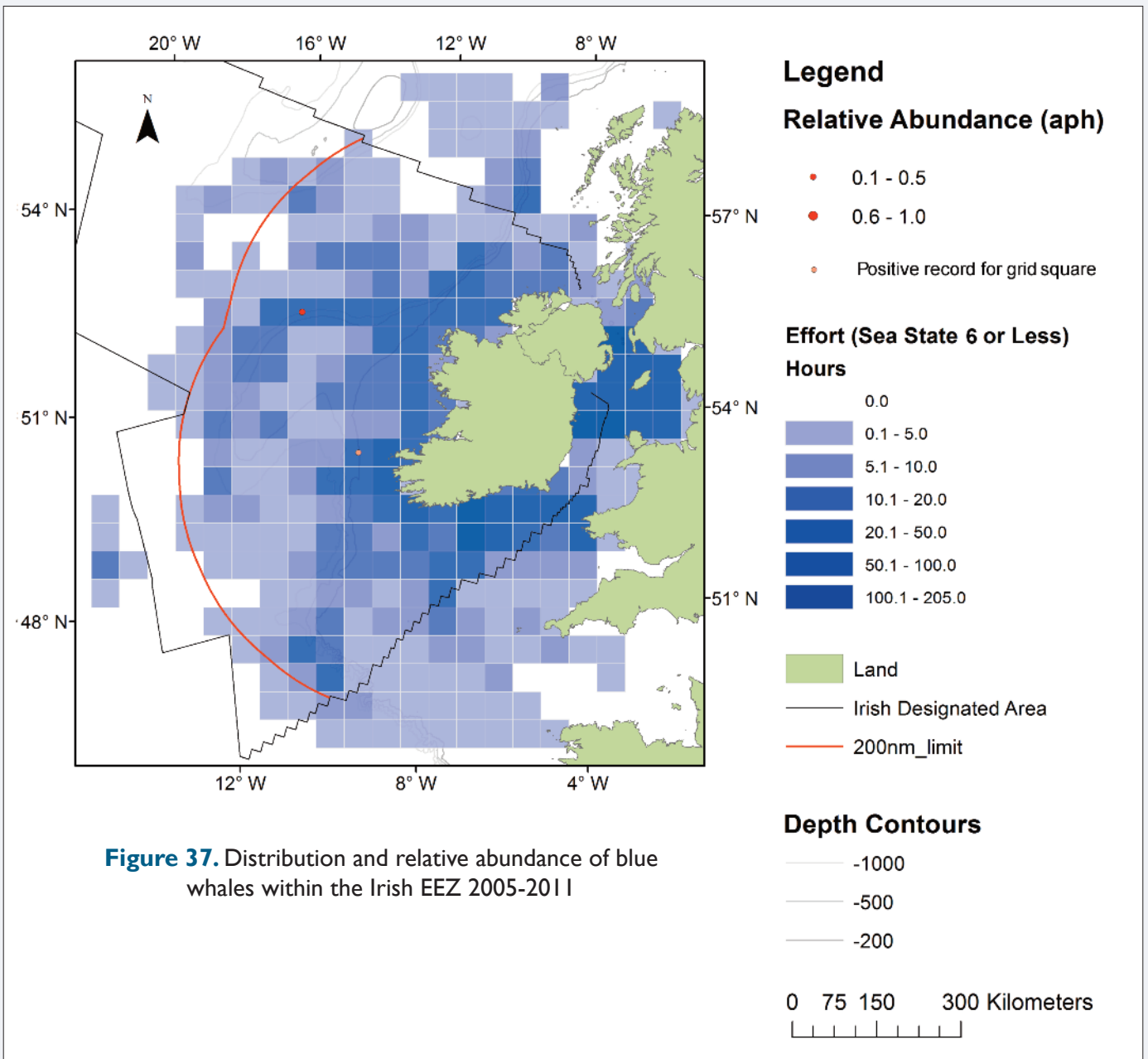
Blue whales have a global distribution, with separate populations in the North Atlantic, North Pacific, Indian Ocean and Southern Ocean. They migrate between summer feeding areas and winter breeding areas in the tropics (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

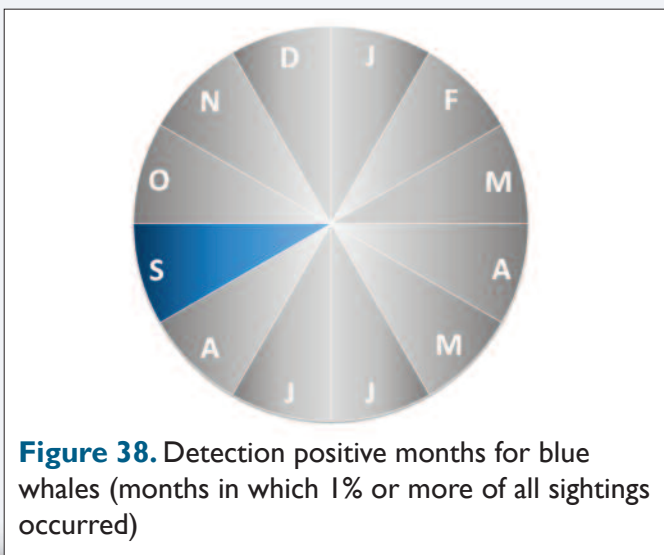
Only two sightings of blue whales were recorded during the survey period (although a further sighting was recorded in late summer 2012) with all sightings

recorded on the slopes of the Irish Shelf and Porcupine Bank (figure 37). Animals in Irish waters were thought to be predominantly migrating between foraging areas off Iceland and breeding areas in the tropics, however opportunistic foraging, most likely on northern krill (*Meganyctiphanes norvegica*), has been noted on the Irish Shelf slopes (Wall *et al.* 2009). A population of up to 2,500 animals has been estimated for the central North Atlantic (Pike *et al.* 2009).

Blue whales were hunted by the Norwegian owned whaling stations based in Co. Mayo at the turn of the last century. 124 blue whales were killed between 1908 and the closure of the Irish whaling stations in 1922 (Fairley 1981).



**Figure 37.** Distribution and relative abundance of blue whales within the Irish EEZ 2005-2011



**Figure 38.** Detection positive months for blue whales (months in which 1% or more of all sightings occurred)

### Seasonal and Geographic Variation

Both sightings of blue whales occurred during September, as did the most recent 2012 sighting (figure 38). Data from the US Navy's SOSUS hydrophone array indicate that blue whales migrate southward to the west of the Irish Shelf from July to March each year, peaking during the autumn months. They are thought to return northward along migratory routes which lie far to the west of Irish waters (Charif and Clark 2009).

## Grey Seal / Rón Mór

*Halichoerus grypus*



Grey seals are the largest seal species in Irish waters. Male grey seals are considerably larger than females, growing up to 2.6 m in length. Females grow up to 2 m in length. The coat is dark grey on the back and flanks with a lighter underside and with irregular

black mottling over the entire animal. Grey seals have a 'Roman nose' shaped muzzle. Newborn pups have a white coat and pups are born approximately one meter in length.



Grey Seal, Irish Sea Photo: Dave Wall / IWDC

### Legal Protection

EU Habitats Directive [92/43/EEC] Annex II

• Ten SACs listed • Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000 • OSPAR List of Threatened and Declining Species and Habitats.

### Global Distribution

Grey seals occur in temperate and cold temperate waters of the North Atlantic with major populations in Northeast Canada, Northwest Europe and Iceland (Shirihai and Jarrett 2006).

### Irish Offshore Distribution

Grey seals occurred off all Irish coasts and foraged offshore in Irish Shelf waters. They were recorded at low relative abundances throughout the Irish Sea and over Irish shelf waters, with animals predominantly

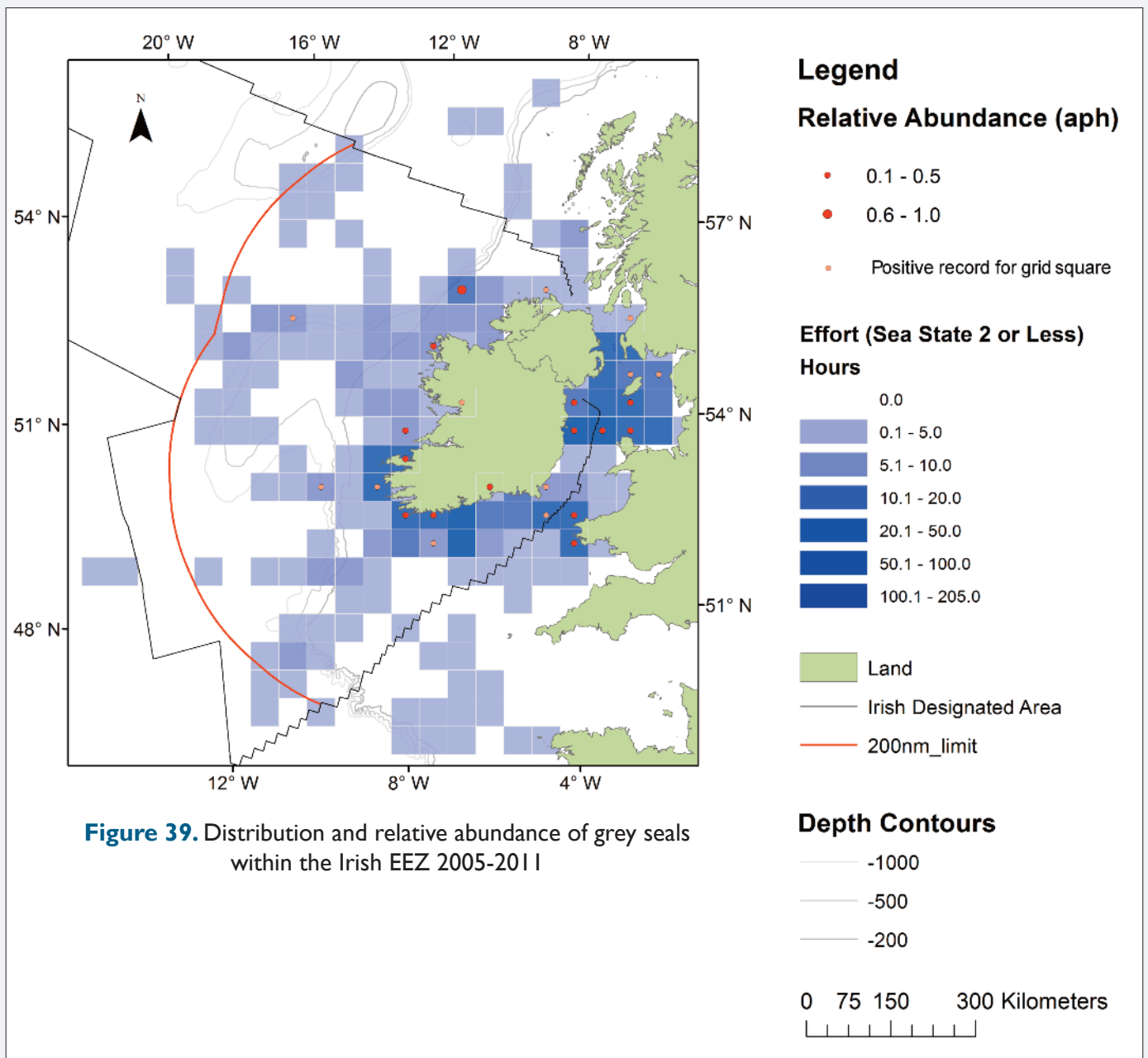
occurring in inshore waters but also occurring as far west as the shelf edge (figure 39).

Occasionally grey seals can venture far offshore to the shallower waters of the Porcupine and Rockall Banks and to deep waters beyond the shelf slopes. Data from satellite tagged animals indicate that animals move between Ireland and the UK (Matthiopoulos *et al.* 2004) and further afield to the Faroe Islands.

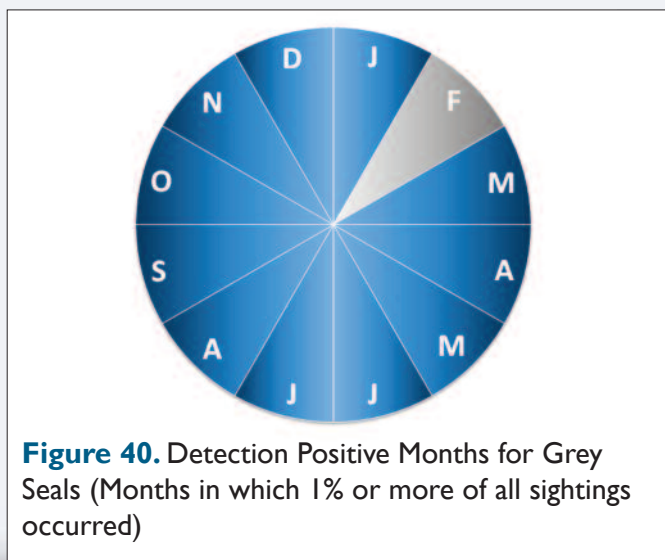
The population estimate for grey seals in Ireland in 2005 was between 5500—7000 animals (Ó Cadhla *et al.* 2005).

### Seasonal and Geographic Variation

Grey seals were recorded year-round in Irish waters (figure 40).



**Figure 39.** Distribution and relative abundance of grey seals within the Irish EEZ 2005-2011



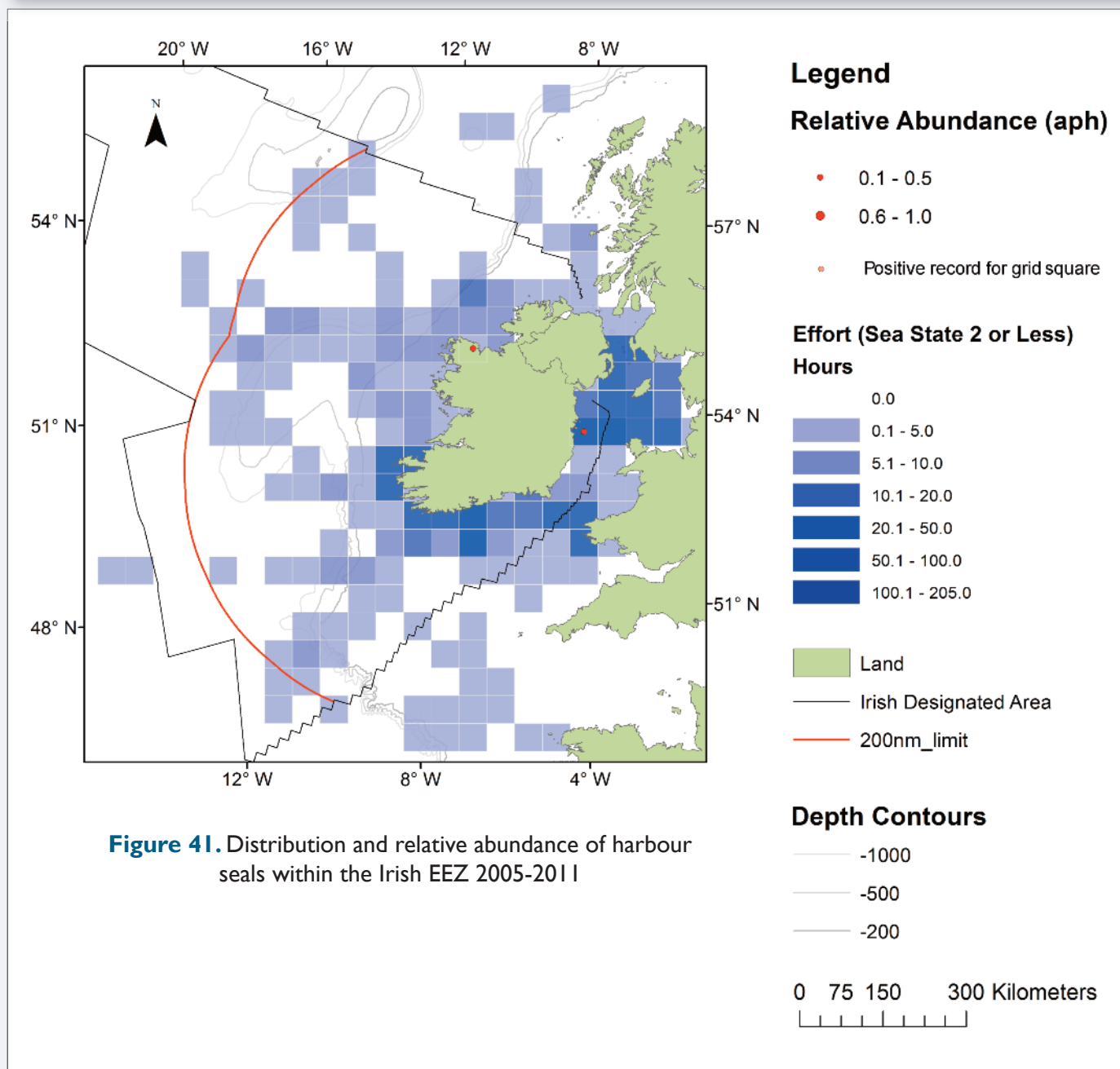
# Harbour Seal / Rón Breacach

*Phoca vitulina*

	Endangered
	Vulnerable
	<b>Least concern</b>
	Data deficient

Harbour seals are smaller than the grey seal, reaching a maximum length of 2 m. They have a shorter muzzle than the grey seal with a more dog-like appearance. Males and females look similar.

Harbour seal coat colour can be light or dark phase, with dark phase animals blotched with pale markings and vice versa.



## Legal Protection

EU Habitats Directive [92/43/EEC] Annex II

- Eleven SACs listed
- Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000.

## Global Distribution

Harbour seals occur in northern temperate and cold temperate waters.

### **Irish Offshore Distribution**

Sightings of harbour seals were rare during ship-based surveys, with just two sightings recorded during the survey period (figure 41). This most likely reflects the tendency of harbour seals to forage within a short distance of their haul-out sites and not to undertake long-range or offshore movements (Tollit *et al.* 1998).

A population of some 2900 harbour seals was estimated for Irish waters in 2007 (Cronin *et al.* 2007).

### **Seasonal and Geographic Variation**

Both sightings of common seals were recorded during May. Insufficient data were available to assess temporal changes in distribution and relative abundance.



**Harbour Seal** Photo: Michelle Cronin / CMRC

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