

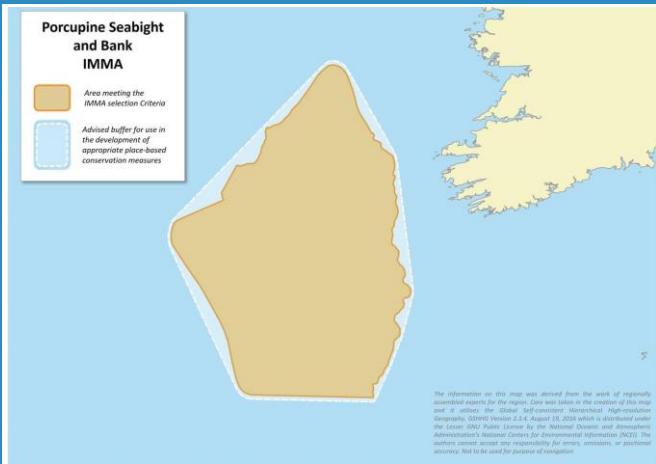
Porcupine Seabight and Bank IMMA

Summary

The Porcupine Seabight and Bank IMMA spans a unique bathymetric feature which leads to a particularly high diversity and dense aggregations of cetaceans. At least 11 cetacean species have been frequently recorded. Of particular interest are large aggregations of common dolphins, bottlenose dolphins, long-finned pilot whales, and fin whales. Small numbers of endangered Sei and blue whales, and significant numbers of sperm whales and beaked whales, particularly Sowerby's beaked whales are noteworthy. The area is an important feeding location for several marine mammal populations with peaks in large baleen whale abundance, principally blue and fin whales, in late summer/autumn concurrent with the arrival of tuna and krill. Dolphin numbers peak earlier in the year and while likely to be food related, little is known about their use of this area. Seasonal prey abundance may change with climate change and human activities such as seismic surveying and fishing.

Description:

The Porcupine Shelf is a steep-sided, north-south trending, elevated plateau area, which constitutes the western margin of the Porcupine Seabight basin. This feature marks the transition from moderate water depths of up to 1,000–2,000 m on the Irish continental shelf and over the Porcupine Seabight in the east to abyssal depths which sometimes exceed 4,000 m in the deep water Rockall Trough in the west. A weak, but very large, deep intermediate nepheloid layer, which is a layer of water in the deep ocean basin that contains significant amounts of



Area Size

87 621 km²

Qualifying Species and Criteria

Blue whale – *Balaenoptera musculus*

Criterion A; D (2)

Fin whale – *Balaenoptera physalus*

Criterion A; B(2)

Sei whale – *Balaenoptera borealis*

Criterion A; D (2)

Sperm whale – *Physeter macrocephalus*

Criterion A; D (2)

Long-finned pilot whale – *Globicephala melas*

Criterion B (2)

Common bottlenose dolphin – *Tursiops truncatus*

Criterion B (2)

Common Dolphin – *Delphinus delphis*

Criterion B (2)

Marine Mammal Diversity

Criterion D (2)

Balaenoptera acutorostrata, *Balaenoptera borealis*, *Balaenoptera musculus*, *Balaenoptera physalus*, *Delphinus delphis*, *Globicephala melas*, *Grampus griseus*, *Mesoplodon bidens*, *Physeter macrocephalus*, *Stenella coeruleoalba*, *Tursiops truncatus*

suspended sediment, occurs above the ocean floor. Mean current vectors at this depth are in the range 1–6 cm s⁻¹, running to the northwest, along the Porcupine Shelf slope. A transmittance minimum at 50 m water depth appears to be associated with a concentration of plankton with the seasonal thermocline.

The Porcupine Seabight is an example of multiple bathymetric zones a) for a deep-diving species expected to use the 0 m - 4000 m depth portion of the water column; b) containing a diversity of near-surface and shallow-diving species observed to use the 0 m - 1000 m depth portion of the water column, c) for a shelf-restricted species known to use both the 0 m-200 m depth portion of the water column and the shelf Epibenthic zone (IMMA Guidance document, p.24). The area contains two Special Areas of Conservation (SAC) designated under the EU Habitats Directive and form part of the Natura 2000 network. These are designated for their particular biodiversity value, which in this case are deep-water corals (Belgica SAC and Hovland SAC) and form a large open bathymetric feature open to the southwest (Huvenne et al., 2002). Warm currents from the North Atlantic and the Mediterranean bring warm water to the shelf break where it mixes with upwellings of colder deeper water resulting in high primary productivity which supports food-rich habitats.

Criterion A: Species or Population Vulnerability

While globally blue whales (*Balaenoptera musculus*) are recognised as Endangered on the IUCN Red List of Threatened species (Cooke, 2018a), numbers in the Canadian North Atlantic may be less than 250 adults (COSEWIC, 2012) with a total number of fewer than 1000 mature adults for the entire North Atlantic (Pike et al., 2009).

The IMMA hosts aggregations of fin whales (*Balaenoptera physalus*), which have been designated as Vulnerable on the IUCN Red List (Cooke, 2018c).

The IMMA also provides important habitat for sperm whales (*Physeter macrocephalus*) (McCauley, 2015), which are listed as Vulnerable on the IUCN Red List of Threatened Species (Taylor et al., 2019).

Sei whales (*Balaenoptera borealis*) are occasionally sighted in this area and four sightings were reported from the Kosmos (2013) seismic survey, and are listed as endangered on the IUCN Red List of Threatened Species (Cooke, 2018b).

Criterion B: Distribution and Abundance Sub-criterion B1: Small and Resident Populations

The Porcupine Seabight provides a range of habitats from abyssal plain to canyon systems, deep water corals and deep shelf systems. The area experiences an influx of krill from July to October each year. Krill is the main prey species of blue and fin whales in this area and both species have been observed feeding (Baines et al., 2017; Wall et al., 2009) and fin whales have been observed displaying breeding behaviours (Baines et al., 2017).

Baines et al. (2017) stated "*the Porcupine Seabight appears to be an important habitat for balaenopterids, providing an opportunity for whales to feed and socialise in the critical period of their annual cycle as they make the transition between summer and winter habitats*".

While data in this offshore area is sparse, marine mammal observations made during frequent seismic surveys in the area have consistently shown a high encounter rate with large whales, especially fin whales (Baines et al., 2017; Lyne et al., 2012, 2013;

Wall et al., 2009; Lipka et al., 2017; Rauh et al., 2017; Kowalik et al., 2017; Wall & Lyne, 2014; Dallas et al., 2014; Kenny et al., 2016; Lyne & Mars, 2014). Blue whales also occur, but in lower numbers (Baines et al., 2017; Lyne et al., 2012; Wall et al., 2009; Lipka et al., 2017; Wall & Lyne, 2014; Vines & Woodcock, 2014). Fin whale sightings increased from June to August with a peak in numbers in September, which is also the month with the most blue whale sightings. Kenny et al. (2016) reported fin whales as the most frequently sighted species (27 sightings) during seismic surveys. Baines et al. (2013) recorded a group of 10 fin whales in one sighting, while Lyne and Comerford (2012) recorded 84 animals on one day on the Eastern Porcupine Seabight shelf break. Wall et al. (2009) noted that fin whales and a single blue whale were observed in the Seabight in 2008 and appeared to be feeding on northern krill (*Meganyctiphanes norvegica*) along with albacore tuna. The arrival of tuna fishery boats into this area coincides with the arrival of fin and blue whales and Wall et al. (2009) describes that tuna with blue and fin whales are recorded as feeding on krill, therefore it is likely that tuna fishing and large baleen whale distribution are aggregating around the same prey (northern krill) at this time. Numbers of large baleen whales which comprise blue, fin, and occasionally sei whales in this area are recorded in aggregations of up to 15 individuals (Lyne & Wall, 2014). OSPAR (2010) recommends regular monitoring of important feeding areas and exposure to human activity for the conservation of blue whales in such critical habitat.

The Porcupine Seabight also supports a variety of dolphin species with concentrations of dolphins occurring particularly along the shelf break where upwellings provide nutrients to rich concentrations of forage fish. High numbers of sightings of common dolphins (*Delphinus delphis*) were recorded from June to September, though this data was primarily recorded during seismic surveys (Baines et al., 2013;

Lipka et al., 2017; Rauh et al., 2017; Kowalik et al., 2017; Wall & Lyne, 2014; Dallas et al., 2014; Kenny et al., 2016; Lyne & Mars, 2014), which may have negatively influenced sighting numbers. Common dolphins were also recorded in significant numbers during baseline surveys in the month of September along the shelf breaks (Lyne et al., 2012; Lyne et al., 2013). Although data from the ObSERVE aerial survey program (Rogan et al., 2018) suggested common dolphins were chiefly neritic, this contradicts Waggitt et al. (2020) which suggests some of the highest concentrations of common dolphins in the North East Atlantic occur on the shelf break of the Porcupine Seabight in July. Distributions may change seasonally and the ObSERVE program was restricted to summer and winter months, which does not represent a complete seasonal overview. Group sizes of up to 1000 common dolphins were reported by Baines et al. (2013) but with largest group sizes typically around 300 (Vines & Woodcock, 2014) or 150 (Lyne & Wall, 2014).

June and July were also the peak months for common bottlenose dolphin (*Tursiops truncatus*) sightings during seismic surveys which typically ran from May to September. Sightings data from the ObSERVE aerial survey program (Rogan et al., 2018) suggests bottlenose dolphins are largely found in the neritic zone and shelf break. However, seismic surveys working chiefly along the shelf break in the Porcupine Seabight report few bottlenose sightings with many not reporting any (Rauh et al., 2017; Dallas et al., 2014; Kenny et al., 2016; Lyne & Daly, 2018). Other surveys (Lipka et al., 2017; Vines & Woodcock, 2014; Kowalik et al., 2017; Wall & Lyne, 2014) with Baines et al. (2013) have documented group sizes of up to 100 animals with groups of 40 on three occasions from July to October 2013. Interestingly, a large number of sightings were reported in the southern Porcupine Seabight in 2016 during aerial surveys (Rogan et al., 2018), while Kenny et al. (2016)

report none in this area between June and September which may reflect seasonal changes in habitat usage. Additionally, Waggitt et al. (2020) indicate that the Porcupine Seabight may represent a winter northward extension from the Bay of Biscay of a high concentration of bottlenose dolphins, which, in combination with the Bay of Biscay shelf break, would appear to represent the highest densities of the species in January in the North East Atlantic. This pattern is repeated in July (Waggitt et al., 2020) but densities are slightly lower.

Long-finned pilot whales (*Globicephala melas*) are frequent and abundant and along with fin whales and common dolphins represent the most frequently recorded species in the Porcupine Seabight. Waggitt et al. (2020) show densities of long-finned pilot whales in the Porcupine Seabight as the highest in the Northeast Atlantic in both months studied, January and July. There is a peak in pilot whale detections in early summer which coincides with the peak breeding period of long-finned pilot whales (Barile et al., 2021), but sightings have occurred in all months. Barile et al. (2021) monitored long-finned pilot whales in the northern section of the Porcupine Seabight using bottom mounted static acoustic monitoring stations between May and September and found detected pilot whales on 53% of the 2410 cumulative days of recordings. Seismic surveys occurred across this period also and groups sizes up to 50 were recorded by Dallas et al. (2014), 25 by Baines et al. (2013) and 20 by Wall and Lyne (2013) across this period. Rogan et al. (2018) recorded the highest numbers of sightings of long-finned pilot whales during winter, with a total abundance estimates for the surveyed area of 9,036 individuals in Irish waters surveyed in winter 2016-17. In comparison SCANS IV surveys covering much of the remaining North East Atlantic found an abundance of 3,314 individuals (Gilles et al., 2023), indicating the importance of Irish waters regionally for long-finned

pilot whales, but also perhaps a worrying decline in numbers.

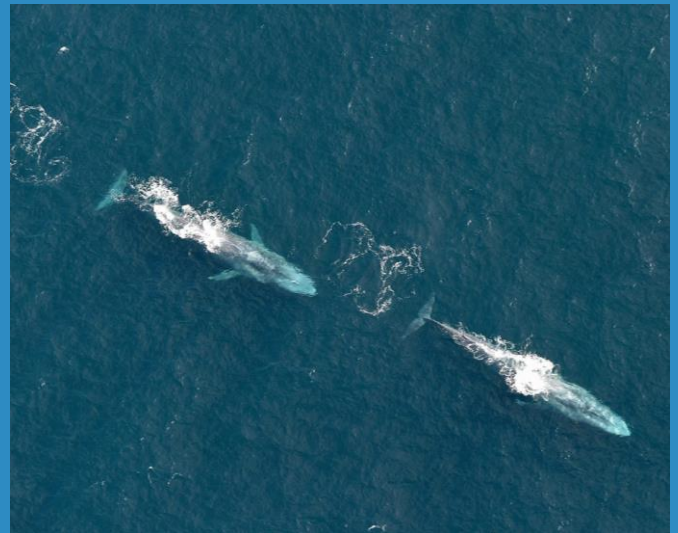


Figure 1: Blue whales (*Balaenoptera musculus*) aerial view. Photo credit: Irish Air Corps



Figure 2: Two fin whales (*Balaenoptera physalus*) blow in this IMMA. Photo credit: Patrick Lyne, IWDG



Figure 3: Long-finned pilot whales (*Globicephala melas*). Photo credit: Patrick Lyne, IWDG

Criterion D: Special Attributes

Sub-criterion D2: Diversity

In addition to the aggregations of fin whales, long-finned pilot whales, common and bottlenose dolphins mentioned above, Wall et al. (2013) demonstrated that the Porcupine Seabight has important concentrations of small but significant numbers of beaked whales, particularly Sowerby's beaked whales (*Mesoplodon bidens*), while sperm whales and striped dolphins (*Stenella coeruleoalba*) are also found along the shelf slope and adjacent shelf waters off the Seabight with lower numbers in the deeper waters of the Seabight (Wall et al., 2013).

Lyne and Comerford (2012) documented limited numbers of blue whales (3) in autumn from sightings recorded during seismic surveys, and in the following year in 2013 included also included significant numbers of blue whales (12 sightings of 16 animals) particularly during August and September (Baines et al., 2017). Evans et al. (2021) describe important population presence of bottlenose dolphins, common dolphins, Risso's dolphins (*Grampus griseus*), long-finned pilot whales, minke whales (*Balaenoptera acutorostrata*) and fin whales, which vary seasonally. Berrow et al. (2018) reported spring to autumn detections of dolphins (acoustics not identified to a species level) and long-finned pilot whales at the entrance to the Seabight during acoustic surveys in 2015 and 2016.

A static acoustic study from March to September 2014 by McCauley (2015) placed two recorders in the Seabight which documented an increasing frequency of fin whale calls from July to the end of the recording period in September, such that the frequency band 18-26 Hz was dominated by fin whale calls. Blue whale calls were detected only to the west of the Seabight. Sperm whales were predominantly detected on the recorder outside the

Seabight but with large numbers also in the Eastern Porcupine Seabight with a large spike in numbers from mid-July to mid-August. McCauley (2015) also noted increasing beaked whale presence towards the end of the monitoring period in September with lower numbers detected in the North Porcupine recorder, while Berrow et al. (2018) noted increased Cuvier's beaked whale (*Ziphius cavirostris*) numbers at the entrance to the Seabight in May. Dolphin detections were also lower in the northern recording site but all recording sites experienced an increase in detections from August onwards and most whistles were assumed to be from common dolphins. Aggregations of up to 100 striped dolphins were recorded by Lyne and Wall (2014) in August and 50 by Baines et al. (2013) in October during seismic surveys in the Porcupine Seabight.

In addition a significant number of sightings of sei whales have been recorded throughout the Porcupine Seabight (Baines et al., 2017; Kenny et al., 2016; Lipka et al., 2017) as well as minke whales (*Balaenoptera acutorostrata*) (Rogan et al., 2018; Kenny et al., 2016; Dallas et al., 2014; Kowalik et al., 2017; Rauh et al., 2017; Lipka et al., 2017).

Sperm whales have not normally been recorded in large numbers but in July 2013 Baines et al. (2013) recorded groups of 9 and 11 on 16 and 22 individuals. Barile et al. (2021) detected sperm whales on fixed hydrophones from May to October in the eastern section of the Porcupine Seabight and similarly in the Eastern Seabight detections were recorded on a towed array in September 2013 (Lyne et al., 2013). Sperm whales have also been recorded during a number of seismic surveys in the area (Rauh et al., 2017; Kowalik et al., 2017; Wall & Lyne, 2014; Kenny et al., 2016; Lipka et al., 2017; Baines et al., 2013). Sightings and detections of sperm whales are largely concentrated along the shelf break but are known to occur year-round though numbers will vary by

location (Barile et al., 2021). No codas have been reported from offshore Ireland and Barile et al. (2021) states that most animals encountered are likely to be mature adult males and chiefly engaged in foraging for prey.

The ObSERVE aerial survey program (Rogan et al., 2018) indicated greatest densities of beaked whales occurred in the Porcupine Seabight and off the North West shelf edge with few animals identified to species level. Most beaked whale sightings recorded by the ObSERVE Aerial Programme (Rogan et al., 2018) occurred in winter, with observations restricted to summer and winter season surveys only.

Sowerby's beaked whales show an apparent preference for the Northern and Eastern Porcupine Seabight and shelf break in this area, while Cuvier's beaked whales are more commonly seen to the southwest and closer to the abyssal plain. Northern bottlenose whales (*Hyperoodon ampullatus*) occur in smaller numbers in the deeper waters of the Seabight. Berrow et al. (2018) positioned two acoustic recorders at the entrance to the Seabight which showed peak beaked whale numbers in May.

Supporting Information

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MARINE MAMMAL PROTECTED AREAS TASK FORCE



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<https://www.marinemammalhabitat.org/factsheets/porcupine-seabight-and-bank-imma/>