

Area Size

33,195 km²

Qualifying Species and Criteria

Sperm whale – *Physeter macrocephalus*

Criterion A; B (2); C (2)

Sei whale – *Balaenoptera borealis*

Criterion A

Blue whale – *Balaenoptera musculus*

Criterion A; B (2)

Fin whale – *Balaenoptera physalus*

Criterion A; B (2)

Common bottlenose dolphin – *Tursiops truncatus*

Criterion B (2)

Atlantic white-sided dolphin - *Leucopleurus acutus*

Criterion B (2)

Northern bottlenose whale –

Hyperoodon ampullatus

Criterion C (2)

Cuvier's beaked whale – *Ziphius cavirostris*

Criterion C (2)

Sowerby's beaked whale – *Mesoplodon bidens*

Criterion C (2)

Criterion D (2)- Marine Mammal Diversity

Balaenoptera borealis, *Balaenoptera physalus*,

Balaenoptera musculus, *Globicephala melas*, *Hyperoodon*

ampullatus, *Leucopleurus acutus*, *Mesoplodon bidens*,

Physeter macrocephalus, *Tursiops truncatus*, *Ziphius*

cavirostris

Other Marine Mammal Species Documented

Balaenoptera acutorostrata, *Delphinus delphis*,

Eubalaena glacialis, *Lagenorhynchus albirostris*,

Megaptera novaeangliae, *Orcinus orca*, *Phocoena*

phocoena, *Pseudorca crassidens*, *Stenella coeruleoalba*

Southeastern Rockall Slope and Canyons IMMA

Summary

The Southeastern Rockall Slope and Canyons IMMA is a deep-water habitat that supports high concentrations of sperm whales (*Physeter macrocephalus*), beaked whales and long-finned pilot whales (*Globicephala melas*). The beaked whales in this area are principally Sowerby's (*Mesoplodon bidens*) and to a lesser extent Cuvier's beaked whales (*Ziphius cavirostris*) but northern bottlenose whales (*Hyperoodon ampullatus*) and a sighting of Blainville's beaked whale (*Mesoplodon densirostris*) (Richardson et al., 2018) have also been reported. Long-finned pilot whales are present year-round and sperm whales occur at high densities and the area is indicated as likely to have higher densities of sperm whales than others in the North East Atlantic. Common bottlenose dolphins (*Tursiops truncatus*) and Atlantic white-sided dolphins (*Leucopleurus acutus*) are found in high numbers with a marked reduction in sightings in the winter months. Fin whales (*Balaenoptera physalus*), and to a lesser extent blue whales (*Balaenoptera musculus*), occur along the shelf edge.

Description:

The IMMA (Important Marine Mammal Area) encompasses shelf-edge habitat with several bisecting canyons. The deep abyssal waters of the South Eastern Rockall Slope and Canyons are flanked by the shallow offshore banks of the Porcupine, Hatton and Rockall Banks, which rise to a depth of 160 m. The Rockall Trough is a 1000 km long depression alongside Ireland's continental shelf



Figure 1: Sperm whale (*Physeter macrocephalus*) in Rockall Trough. Photo credit: Niall T. Keogh

edge, lying on the northwestern margin of the Irish EEZ. Along the shelf edge, a range of canyon systems occur (Harris & Whiteway, 2011). The Rockall Trough to the west is characterised by the presence of a strongly stratified water column where the surface layer is underlain by Gibraltar water at 800–1,200 m depth, with a distinct salinity maximum and oxygen minimum evident. This, in turn, is underlain by oxygen-depleted, high-salinity Labrador Sea water, extending from 1,200 m to 2,000 m in depth. The basal water layer is the Northeast Atlantic deep water which has a deep salinity maximum at the top due to the presence of the Norwegian Sea overflow component.

There are two Natura 2000 sites for deep-water corals - the Porcupine Bank Canyon and Southwest Porcupine Bank SACs (Special Areas of Conservation). A temporary protected area was established for beaked whales to mitigate the potential impacts of offshore oil and gas exploration between 2013 and 2016 on the Western shelf edge from Donegal to the Whittard Canyons. Further details are available in environmental assessments of that period and some MMO (Marine Mammal Observer) reports (e.g. Dallas et al., 2015).

Criterion A: Species or Population Vulnerability

The area is identified on the basis of important habitat for sperm whales (*Physeter macrocephalus*) and fin whales (*Balaenoptera physalus*) which are both assessed as vulnerable in the IUCN Red List of Threatened Species (Taylor *et al.* 2019, Cooke, 2018a).

The IMMA also hosts sei whales (*Balaenoptera borealis*) and blue whales (*Balaenoptera musculus*), which are listed as Endangered on the IUCN Red List of Threatened Species (Cooke, 2018b, 2018c).

Criterion B: Distribution and Abundance

Sub-criterion B2: Aggregations

The IMMA hosts high densities of sperm whales; sightings were distributed throughout the area with concentrations on the shelf edge, with a density of 0.09/100 km² in the Rockall Trough (Berrow *et al.*, 2018; Rogan *et al.*, 2018). Rogan *et al.* (2018) recorded more sperm whale sightings in the Eastern Rockall Slopes and Canyon IMMA during aerial surveys, mainly during the summer, than any other area in the Irish EEZ, while Waggitt *et al.* (2020) indicate that the highest densities of sperm whales in the North East Atlantic occur in the Rockall Trough and around the Hatton Bank.

Evidence for the presence of fin and blue whales in the Eastern Rockall shelf and slope dates back to the turn of the 20th century whaling data, in which large numbers of fin whales and some blue and sei whales during summer months were documented (Fairley, 1981). Fin whales are distributed throughout the site but in higher numbers during summer months. Berrow *et al.* (2018) acoustically detected this species at all monitoring stations in the IMMA during spring, summer and autumn, presumably corresponding to feeding and/or migration. Rogan *et al.* (2018) also

reported high numbers of fin whales off the continental slope and nearby deep waters during aerial surveys.

Densities of pelagic dolphins are high compared to other offshore areas to the west of Ireland (Wall *et al.*, 2013; Oudejens *et al.*, 2015). The highest densities of common bottlenose dolphins (*Tursiops truncatus*) occurred along the shelf edge (2/100 km²). These offshore bottlenose dolphins are genetically distinct from coastal dolphins (Mirimin *et al.*, 2011; Louis *et al.*, 2014). The highest density of Atlantic white-sided dolphins (*Leucopleurus acutus*) (2.5/100 km²) were recorded east of this site in the Erris Basin, with group sizes reaching 250 individuals (Evans *et al.*, 2021). Common dolphins (*Delphinus delphis*) were the most abundant pelagic dolphin and occurred throughout the site (Berrow *et al.*, 2018).



Figure 2: Offshore bottlenose dolphins (*Tursiops truncatus*).
Photo credit: Joanne O'Brien / IWDG

Long-finned pilot whales (*Globicephala melas*) are frequent and abundant throughout the site with highest densities (1.56/100 km²) along the shelf edge. They are observed and acoustically detected year-round (Wall et al., 2013; Berrow et al., 2018; Breen et al., 2020). Long-finned pilot whale whistles were detected by static acoustic monitoring on 70% to 83% of the days monitored by Barile et al. (2021a, 2021b). Pilot whale whistles were detected in all seasons with a considerable temporal variability in the proportion of recordings per day with detections.



Figure 3: Long-finned pilot whales (*Globicephala melas*) spotted offshore, west of Ireland. Photo credit: Simon Berrow



Figure 4: Long-finned pilot whales (*Globicephala melas*) in Rockall Trough. Photo credit: Niall T. Keogh



Figure 5: Long-finned pilot whales (*Globicephala melas*) adult and calves. Photo credit: Simon Berrow

Barile et al. (2021a) confirmed that the slopes over the Donegal, Erris, Colm, Fursa and Macdara Basins along with the Eastern Rockall Slope and Canyons area provide particularly important habitat for this species. Rogan et al. (2018) recorded more long-finned pilot whale sightings in the Eastern Rockall Slopes and Canyon IMMA during aerial surveys than in any other area in the Irish EEZ with highest numbers 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.

Criterion C: Key Life Cycle Activities

Sub-criterion C2: Feeding Areas

Acoustic detection is largely used to identify sperm whales engaged in foraging and long-range echolocation and selection of prey (Tønnesen et al., 2020). Breen et al. (2020) detected sperm whales acoustically particularly along the 1000 m–2000 m contour, suggesting that this slope region provides important feeding habitat with sperm whales preferring large-to medium-sized squid. Barile et al. (2021a) detected sperm whale clicks at fixed stations in the area on at least 60% of the recording days, providing robust evidence of the crucial importance of Irish offshore waters for sperm whales in the northeast Atlantic, while Berrow et al. (2018) used acoustic surveys in 2014 and 2015 to estimate sperm whale abundance to be 344 in the area approximately covered by this IMMA. This compares with 148 individuals estimated for SCANS IV for the Bay of Biscay and Iberian coast (Gilles et al., 2023).

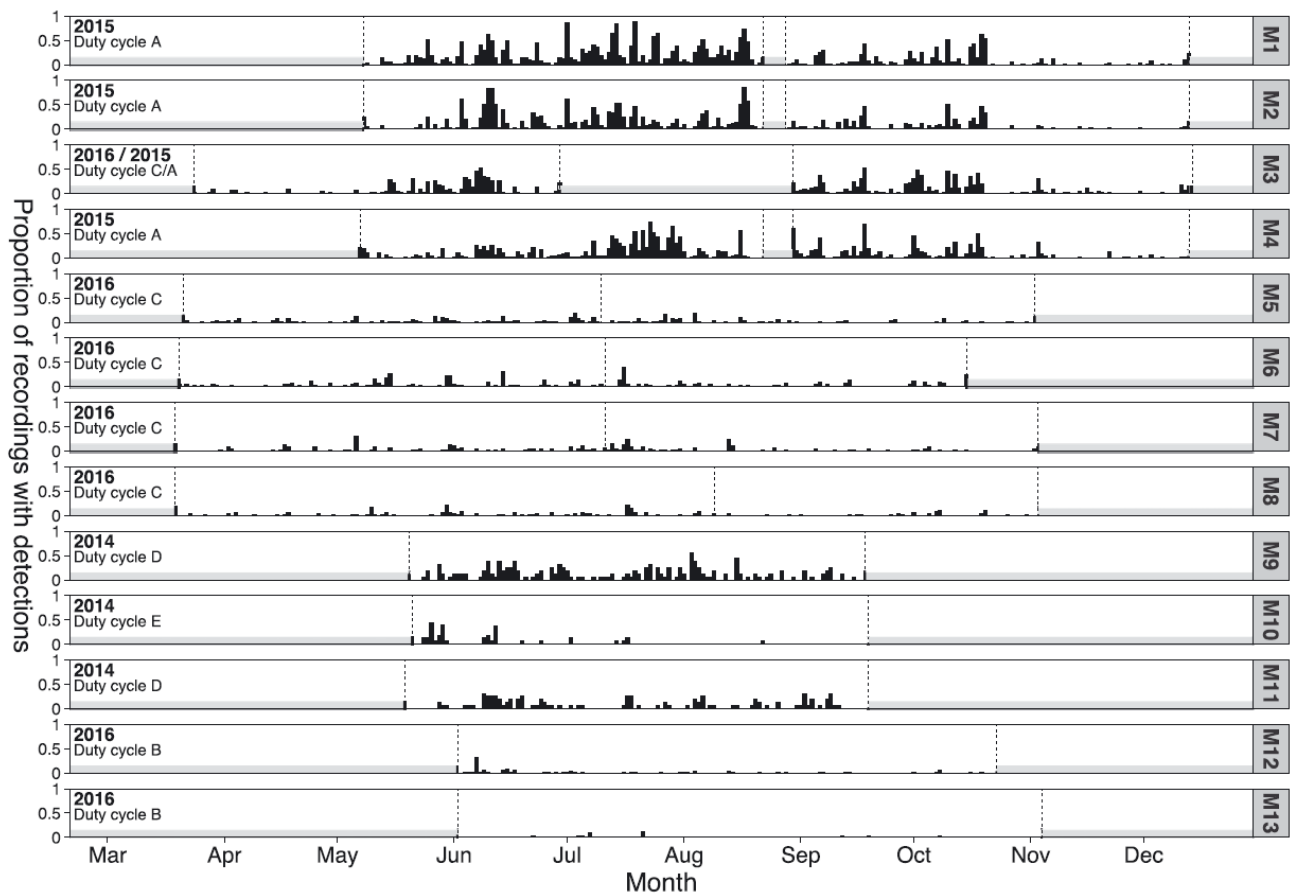


Figure 6: Temporal occurrence of long-finned pilot whale (*Globicephala melas*) whistles across all recording periods at 13 recording sites off western Ireland. Excerpt taken from Barile et al. (2021a).

The area also provides significant feeding habitat for Sowerby's beaked whales (*Mesoplodon bidens*) and Cuvier's beaked whales (*Ziphius cavirostris*) (Berrow et al., 2018; Kowarski et al., 2018; Breen et al., 2020). Rogan et al. (2018) recorded more beaked whale sightings in the Eastern Rockall Slopes and Canyon IMMA during aerial surveys than any other area in the similarly surveyed in the Irish EEZ. Furthermore, this area alone yielded a similar number of sightings of Sowerby's, Cuviers and all beaked whales as the entire SCANS IV survey of NE Atlantic waters (Gilles et al., 2023). Breen et al. (2020) also confirmed high acoustic encounter rates with Sowerby's beaked whales in the area. Kowarski et al. (2018) showed there was a significant effect of month and station

(latitude) on the mean daily number of click detections for both beaked whale species. Cuvier's clicks were more abundant at lower latitudes while Sowerby's were greater at higher latitudes, particularly in the spring, suggesting a spatial segregation between species, possibly driven by prey preference. An extensive North-East Atlantic visual survey also suggested that Sowerby's were more prominent north of 57°N (Rogan et al., 2017). Oceanographic variables significantly contributed to the occurrence of Cuvier's and Sowerby's beaked whales (Barile et al., 2021b). Breen et al. (2020) suggested Sowerby's were targeting mesopelagic prey species of fish and small squid.

Criterion D: Special Attributes

Sub-criterion D2: Diversity

This is an important area for both the aggregations and foraging of species listed above but also for other species including harbour porpoises (*Phocoena phocoena*), white-beaked dolphins (*Lagenorhynchus albirostris*), and striped dolphins (*Stenella coeruleoalba*). In total, 19 species have been observed in this proposed area, of which ten occur on a regular basis. The Southeastern Rockall slope edge constitutes important habitat for deep-diving cetaceans (sperm whales, beaked whales, long-finned pilot whales). Continental Slope and canyon systems provide particularly important features for beaked whales with Sowerby's, Cuvier's and Northern bottlenose whales all recorded in this area (Berrow et al., 2018). Upwelling along the shelf edge often results in high zooplankton abundance which encourages foraging by migratory baleen whales (e.g. blue, fin, sei, right). Higher trophic - level fish populations provide prey for dolphins, and deep-sea squid and mesopelagic fish are targeted by deep-diving species such as sperm and beaked whales. In terms of overall species richness, this site is considered the most species-rich zone along the shelf edge off western Ireland and the NE Atlantic (Berrow et al., 2018; Breen et al., 2021; Barile et al., 2021b; Evans et al., 2021; Rogan et al., 2017).

Passive acoustic monitoring with a towed hydrophone showed this area to be the most important zone for cetaceans surveyed acoustically off western Ireland between 2015-2016 (Berrow et al., 2018). Click detections from beaked whales and sperm whales were frequent and common dolphin and long-finned pilot whale whistles were abundant.



Figure 7: Sowerby's beaked whale (*Mesoplodon bidens*) spotted leaping out of the water, offshore west of Ireland. Photo credit: Rossa Meade / IWDG



Figure 8: Sowerby's beaked whales (*Mesoplodon bidens*) spotted offshore west of Ireland. Photo credit: Simon Berrow / IWDG

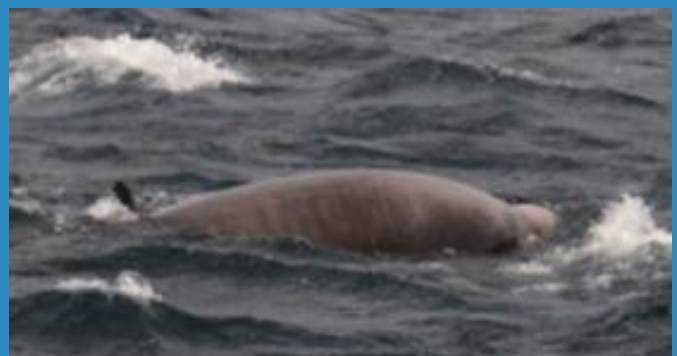


Figure 9: Cuvier's beaked whale (*Ziphius cavirostris*) spotted offshore, west of Ireland. Photo credit: Simon Berrow / IWDG



Figure 10: Striped dolphin (*Stenella coeruleoalba*) spotted offshore, west of Ireland. Photo credit: Simon Berrow / IWDG

Supporting Information

Barile, C., Berrow, S., Parry, G., and O'Brien, J. 2021a. Temporal acoustic occurrence of sperm whales (*Physeter macrocephalus*) and long-finned pilot whales (*Globicephala melas*) off western Ireland. Marine Ecology Progress Series Vol. 661: 203–227, 2021 <https://doi.org/10.3354/meps13594>.

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