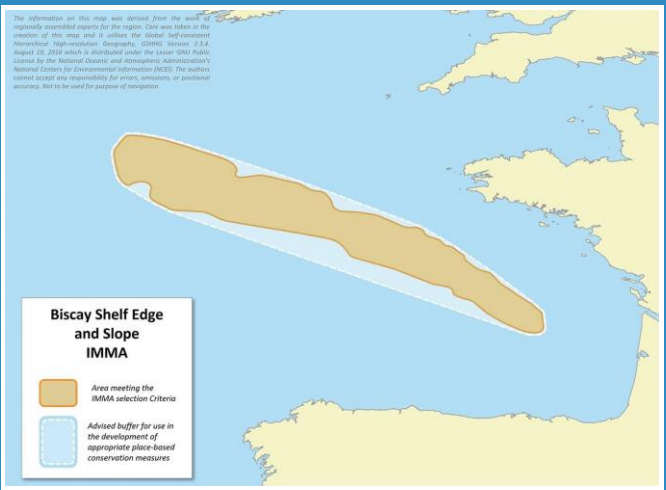

Area Size

70 042 km²

Qualifying Species and Criteria

Sperm whale – *Physeter macrocephalus*

Criterion A; B (2)

Fin whale – *Balaenoptera physalus*

Criterion A; B (2)

Blue whale – *Balaenoptera musculus*

Criterion A

Sei whale – *Balaenoptera borealis*

Criterion A

Common bottlenose dolphin – *Tursiops truncatus*

Criterion B (2)

Striped dolphin – *Stenella coeruleoalba*

Criterion B (2)

Long-finned pilot whale – *Globicephala melas*

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 macrorhynchus, Globicephala melas, Grampus griseus, Orcinus orca, Phocoena phocoena, Physeter macrocephalus, Stenella coeruleoalba, Tursiops truncatus, Ziphius cavirostris

Biscay Shelf Edge and Slope IMMA

Summary

The Biscay shelf edge and slope IMMA is characterised by a continental slope where the seafloor descends from 200 m to over 4,000 m depth over a short distance and is punctuated by many submarine canyons and other topographic features, that then give way to the abyssal plain. The oceanic processes and bathymetry in this area drive productivity and create diverse habitats for at least 14 regularly occurring cetacean species, each with distinct habitat preferences. Of particular interest are the large aggregations of common dolphins (*Delphinus delphis*), striped dolphins (*Stenella coeruleoalba*), common bottlenose dolphins (*Tursiops truncatus)*, long-finned pilot whales (*Globicephala melas*), fin whales (*Balaenoptera physalus*) and sperm whales (*Physeter macrocephalus*).

Description:

This area encompasses a large section of the continental shelf edge and slope in the north and northeastern Bay of Biscay. The continental slope is steep with a gradient of 10-12% and is punctuated by a large number of submarine canyons and other topographic features (Borja et al., 2018). Canyons are the main sediment transport pathways between the shelf and the deep sea, with processes including the capture of along-shelf sediment transport, resuspension by internal waves and tides, dense shelf water cascading and turbidity currents, which may result in either canyon flushing or focussed deposition of sediments and organic matter (Amaro et al., 2016).

Figure 1: Blue whales (*Balaenoptera musculus*) offshore South West of Ireland. Photo credit: AirCorp / IWDG

Figure 2: Fin whale (*Balaenoptera physalus*) in Biscay shelf edge and slope IMMA. Photo credit: ORCA

The Bay of Biscay continental shelf is up to 150 km wide off the coast of Brittany and is characterised by a gentle depth gradient (from 100 m to 200 m), in contrast the shelf edge and continental slope descends from 200m to over 4,000 m depth over a short distance. These distinct topographic features of the continental slope are areas of increased biological productivity and diversity, enhancing all levels of the food web (Hickey, 1995; Smith et al., 2010). The shelf edge corresponds to a region of tidal mixing, high phytoplankton abundance and cool water near the surface (New & Pingree, 1990), making the area highly productive.

Criterion A: Species or Population Vulnerability

This IMMA provides habitat for fin whales (*Balaenoptera physalus*), which are listed as Vulnerable on the IUCN Red List of Threatened Species (Cooke, 2018a).

The area also provides habitat for sperm whales (*Physeter macrocephalus*), which are listed as Vulnerable on the IUCN Red List (Taylor et al., 2019).

Sei whales (*Balaenoptera borealis*) are regularly observed in this area, and they are listed as Endangered on the IUCN Red List (Cooke, 2018b).

Blue whales (*Balaenoptera musculus*) have also been recorded in this area (James Cook survey in August and September 2015). The blue whale is listed as Endangered on the IUCN Red List (Cooke, 2018c), and population estimates for the species in the North Atlantic range from 250 adults (DFO, no date) to 1000 individuals (Pike et al., 2009).

Criterion B: Distribution and Abundance Sub-criterion B2: Aggregations

The continental shelf edge and slope in the Bay of Biscay has underlying habitat qualities that support concentrations of a variety of cetacean species well described by various large scale dedicated surveys, such as SCANS II,III, and IV (Hammond et al., 2021; Lacey et al., 2022; Gilles et al., 2023) and the large aerial survey SAMM (Suivi Aérien de la Mégafaune Marine, Aerial Census of Marine Megafauna) (Laran et al., 2017, 2022).

A recent OSPAR assessment (Geelhoed et al., 2023) and the compilation of a complex data set (Waggitt et al., 2020) including aerial/vessel platforms, revealed high densities of common dolphins (*Delphinus delphis*), striped dolphins (*Stenella coeruleoalba*), common bottlenose dolphins (*Tursiops truncatus*), long-finned pilot whales (*Globicephala melas*), sperm whales and fin whales in this IMMA.

Figure 3 : Striped dolphins (*Stenella coeruleoalba*) observed and leaping out of the water in Biscay shelf edge and slope IMMA. Photo credit: ORCA

Figure 4: Common dolphins (*Delphinus delphis*) leaping out of the water in South West of Ireland. Photo credit: Hannah Keogh / IWDG

Figure 5 : Common dolphins (*Delphinus delphis*) leaping out of the water in Biscay shelf edge and slope IMMA. Photo credit: ORCA

Figure 6: Long-finned pilot whale (*Globicephala melas*) with calf from the Whittard Canyon section. Photo credit: Patrick Lyne / IWDG

The SAMM over the Bay of Biscay and English Channel conducted in winter 2011–2012 and summer 2012, detected high densities of common dolphins on the shelf during winter months and a movement to the shelf edge, slope and oceanic areas during the summer (Laran et al., 2017, 2022; Blanchard et al., 2021).

High densities of striped dolphins have also been recorded in this area (Certain et al., 2008). Long-term citizen science surveys from platforms of opportunity in the Bay of Biscay (2006-2022) have also recorded consistent sightings and higher encounter rates along the shelf edge and slope in all months surveyed (March to October, with 0.003 sightings/km within the proposed area vs 0.002 sightings/km in the neighbouring areas) (ORCA sightings databases).

Griffiths (2015) analysed ten years of survey data, collected from platforms of opportunity crossing both the English Channel and Bay of Biscay, and predicted greater abundance of common bottlenose dolphins along and over the continental shelf edge (Geelhoed et al., 2022). Certain et al. (2008) linked the high density of common bottlenose dolphins at the shelf edge to the availability of fish prey. Long-term citizen science surveys from platforms of opportunity in the Bay of Biscay (2006-2022) recorded encounter rates of 0.001 sightings/km within the IMMA vs 0.0008 sightings/km outside the proposed area along the shelf edge and slope for common bottlenose dolphins (ORCA sightings databases).

Dedicated aerial and boat-based surveys have shown that long-finned pilot whales have a strong preference for the continental shelf edge and slope (as is typical for the species) with evidence for both summer (Geelhoed et al., 2023; Waggitt et al., 2020; Pelagis, 2021) and winter presence in the area (Blanchard et al., 2021; Laran et al., 2017). Data analysed from citizen science surveys from platforms of opportunity yield a long-finned pilot whale

Figure 7: Fin whale (*Balaenoptera physalus*) in West Cork. Photo credit: Padraig Whooley / IWDG

encounter rate of 0.002 sightings/km within the IMMA compared to 0.0006 sightings/km outside the IMMA (ORCA sightings databases).

Fin whales have also been consistently observed along the continental shelf edge and on the slope in Biscay (Waggitt et al., 2020; Pelagis, 2021; Hammond et al., 2021; Lacey et al., 2022; ORCA unpublished data). Habitat modelling studies suggest that the slope supports high densities of fin whales, with habitat suitability peaking around the 2,000 m isobath (Garcia-Baron et al., 2018). SAMM surveys conducted in winter 2011–2012 and summer 2012 also reported that fin whales were frequently sighted in waters 2,000 m deep with an oceanic distribution in the summer. Fin whale density on the slope was estimated as 0.002 individual/km^2 (CV=65%; corrected for availability bias) in summer and decreased in winter (Laran et al., 2017).

Sperm whales are distributed throughout the deep waters of the Bay of Biscay with high densities along the slope from April to December (Waggitt et al., 2020). SAMM surveys estimated sperm whale densities as 0.005 individual/km^2 (CV=69%; corrected for availability bias) in summer along the Biscay slope strata and decreased in winter (Laran et al., 2017).

Criterion D: Special Attributes Sub-criterion D2: Diversity

The continental shelf edge and slope in the Bay of Biscay offers varied topography and a wide range of habitats that supports multiple cetacean species with distinct habitat preferences (Kiszka et al., 2007; Borja et al., 2018). At least 14 different species of cetacean regularly occur in this area, ranging from small dolphin species to large baleen whales and deep divers (Pelagis, 2021; Matear et al., 2019; Waggitt et al., 2020; ORCA, unpublished data).

Of particular interest are the large aggregations of several dolphin species, specifically common dolphins, striped dolphins, common bottlenose dolphins and long-finned pilot whales, as well as sperm whales, beaked whales and fin whales. Bathymetry has been identified as a key factor influencing species distribution and habitat preferences of toothed cetaceans within the Bay of Biscay (Kiszka et al., 2007). Sperm whales are sighted on the shelf edge and slope area (Waggitt et al., 2020; Pelagis, 2021), along with beaked whales, particularly Cuvier's beaked whales (*Ziphius cavirostris*) (Pelagis, 2021). Baleen whales are also sighted regularly on the slope, but in particular, fin whales are sighted frequently in waters 2,000 m deep. Common minke whales are seen in the winter (Blanchard et al., 2021; Pelagis, 2021; Laran et al., 2017).

Supporting Information

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