

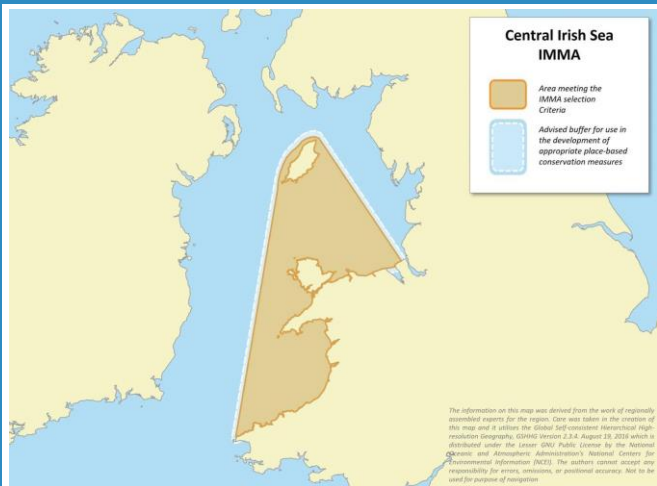
# Central Irish Sea IMMA

## Summary

The waters of the central Irish Sea IMMA entirely overlie the European continental shelf. While twenty marine mammal species have been recorded in the area, six species meet the IMMA criteria. The main species inhabiting the area is the coastal ecotype of the common bottlenose dolphin (*Tursiops truncatus*) with a semi-resident population of between 200 and 300 animals, for which two Special Areas of Conservation have been designated. No individuals from this population have been photo-identified outside the Irish Sea. Harbour porpoises (*Phocoena phocoena*), common dolphins (*Delphinus delphis*), and common minke whales (*Balaenoptera acutorostrata*) are all widely distributed throughout the area. Harbour porpoises are more frequently observed near shore, particularly in areas with high-energy currents, while common dolphins and minke whales are more common offshore in waters >50 m depth. Risso's dolphins (*Grampus griseus*) occupy both habitats with some indication of seasonal movements to shallower coastal waters during late summer and autumn. Several cetacean species use the area for both feeding and breeding. The grey seal (*Halichoerus grypus*) is the main seal species occurring in the region although numbers here are much lower than in Scottish seas.

## Description:

The central Irish Sea is relatively shallow (less than 100 m deep in most places, with very shallow bays such as Cardigan Bay with depths of less than 50 m and for the most part less than 20 m). It is largely sheltered from the winds and currents of the North Atlantic although its relatively high salinity indicates the influence of oceanic water from the south. The



## Area Size

17 610 km<sup>2</sup>

## Qualifying Species and Criteria

Common bottlenose dolphin – *Tursiops truncatus*

Criterion B (1)

Harbour porpoise – *Phocoena phocoena*

Criterion B (2); C (1,2)

Risso's dolphin – *Grampus griseus*

Criterion B (2); C (1,2)

Grey seal – *Halichoerus grypus*

Criterion B (2); C (1,2)

## Marine Mammal Diversity

Criterion D (2)

*Balaenoptera acutorostrata*, *Delphinus delphis*,

*Grampus griseus*, *Halichoerus grypus*,

*Phocoena phocoena*, *Tursiops truncatus*

inshore Coastal Current carries water from the St George's Channel northwards. It is generally characterised by large tidal energy input from the Atlantic with tidal currents providing much of the energy of the region.

To the west of the Isle of Man, a large channel up to 150 m deep stretches from north to south. To the southwest, a dome of thermally stratified waters forms over this channel during spring due to the seasonal warming of the surface waters. South of the Isle of Man, the sea is shallower and tidal currents are strong enough to mix the water column, thereby preventing stratification.



Figure 1: Cardigan Bay. Photo credit: PGH Evans



Figure 2: Calf of Man, Isle of Man. Photo credit: PGH Evans

At the boundary between the fast-moving mixed water of the tidal stream and the stratified slack water, the Irish Sea Front forms between the south

coast of the Isle of Man and the coast of County Dublin (Simpson & Hunter, 1974; Pingree & Griffiths, 1978). In spring, this front forms mainly south and east of the stratified waters; it establishes over the summer, exhibits little variability in either position or structure, and is particularly well-developed in August, disintegrating again in late summer when the air temperature cools (Simpson & Hunter, 1974; Simpson, 1981; Huang et al., 1991).

Such tidal mixing fronts are often zones of high biological activity (Pingree et al., 1978), where plankton growth and activity can be much higher than in adjacent stratified and mixed zones, due to elevated nutrient levels. Waters immediately to the north of the front can hold seasonally high concentrations of zooplankton, seabirds and marine mammals (Scrope-Howe & Jones, 1985; Baines & Evans, 2012; Evans & Waggitt, 2023).

Some cetacean species forage mainly in deeper waters (for example, common dolphin and minke whale), whereas other species forage mainly in shallow waters near the coast (for example, coastal populations of common bottlenose dolphins). Variation in bathymetry often results in reefs or banks, and shelf slopes that are favoured by fish and invertebrate prey.

Several marine protected areas (Special Areas of Conservation and Special Protection Areas) have been established in the region. Those within the UK have been incorporated into national law and so, despite Brexit, remain as Marine Protected Areas under the Conservation of Species and Habitats Regulations (2017). The two SACs with the bottlenose dolphin as a qualifying feature are Cardigan Bay and Pen Llŷn a'r Sarnau whilst for the harbour porpoise, the UK recently established the North Anglesey Marine SAC and the West Wales Marine SAC within the IMMA.



Figure 3: Common bottlenose dolphin (*Tursiops truncatus*) in north Cardigan Bay. Photo credit: P Anderwald

## Criterion B: Distribution and Abundance

### Sub-criterion B1: Small and Resident Populations

Several species (e.g. harbour porpoise, bottlenose dolphin, common dolphin, Risso's dolphin, and grey seal) have been recorded in the IMMA in every month of the year, but the only species that is known to have a small and truly resident population is the common bottlenose dolphin (*Tursiops truncatus*). Mark recapture estimates indicate that a population of between 200 and 300 animals inhabit the central Irish Sea, particularly Cardigan Bay, where the population has been monitored annually since 2001 (Pesante et al., 2008; Baines & Evans, 2009, 2012;

Feingold & Evans, 2012, 2014a, b; Lohrengel et al., 2017; Evans & Waggitt, 2023). The great majority of sightings of photo-identified individuals have been confined to the area of the IMMA with many re-sightings in multiple years since the late 1990s, whilst no individuals have been photo-identified outside the Irish Sea (Feingold & Evans, 2012; Lohrengel et al., 2017). Over the last twenty years, this has been the largest documented coastal population of bottlenose dolphins within the British Isles, although numbers regularly inhabiting Cardigan Bay have decreased since 2008-12 (Lohrengel et al., 2017). Two Special Areas of Conservation (Cardigan Bay SAC and Pen Llŷn a'r Sarnau SAC) have been designated for the species within the IMMA.

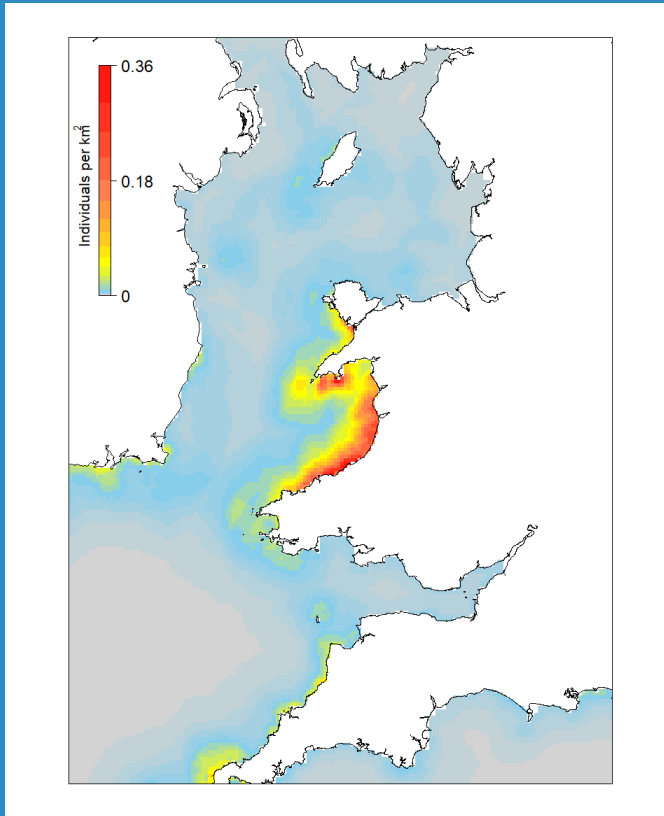


Figure 4: Density distribution on bottlenose dolphin (*Tursiops truncatus*) in the Irish Sea. Excerpt from Evans & Waggitt (2023).

Bottlenose dolphins occur regularly in coastal areas of Cardigan Bay, particularly around headlands and reefs over seabed substrates of mixed sand and rocks (Pesante et al., 2008a; Feingold & Evans, 2014; Lohrengel et al., 2017; Evans & Waggitt, 2023). This has also been confirmed by year-round acoustic monitoring (Simon et al., 2010; Nuuttila et al., 2017). Group sizes during summer in Cardigan Bay are usually fewer than 12 individuals but in winter months off north Anglesey and around the Isle of Man, temporary aggregations of between 30 and 150 have been recorded (Pesante et al., 2008b; Feingold & Evans, 2014b; Lohrengel et al., 2017; Howe, 2018; Manx Whale & Dolphin Watch, unpublished data). Most dedicated survey effort has been within Cardigan Bay, particularly for photo-ID. However, opportunistic surveys and shore watches in the Isle of Man have revealed frequent visits from bottlenose dolphins often in large groups, mainly during winter, and several dolphin individuals have been matched to animals photo-identified during summer in

Cardigan Bay (Pesante et al., 2008a; Feingold & Evans, 2012, 2014a; Lohrengel et al., 2017). The seasonal movement generally northward coincides with concentrations of whiting (*Merlangius merlangus*), plaice (*Pleuronectes platessa*), sole (*Solea solea*), and sandeel (Ammodytidae) that spawn east of the Isle of Man between November and April (Ellis et al., 2012).



Figure 5: Common bottlenose dolphin (*Tursiops truncatus*) in south Cardigan Bay. Photo credit: PGH Evans

Adults with dependent neonates / calves have also been observed regularly in groups of bottlenose dolphins, and birth rates of individually identifiable females have been routinely calculated since annual monitoring started in 2002 (Pesante et al., 2008a; Feingold & Evans, 2012, 2014a; Lohrengel et al., 2017). Most breeding in Cardigan Bay occurs in July to September although births occur in any months of the year.



Figure 6: Common bottlenose dolphins (*Tursiops truncatus*) mother and calf off Anglesey. Photo credit: PGH Evans

The coastal population of bottlenose dolphins has been shown to favour headlands and reefs over seabed substrates of mixed sand and rock inshore of Cardigan Bay (Pesante et al., 2008a; Feingold & Evans, 2014; Lohrengel et al., 2017; Nuuttila et al., 2017; Evans & Waggitt, 2023). Experimental beam trawls at 46 sites along the coast within Cardigan Bay SAC resulted in 37 fish and 63 invertebrate species identified, with highest species diversity near the coast and in shallow waters, coinciding with the main areas where bottlenose dolphins occur. The six most important fish species in terms of biomass were: poor cod (*Gadus morhua*), plaice, dragonet (*Callionymus lyra*), spotted ray (*Raja montagui*), solenette (*Buglossidium luteum*), and lesser spotted dogfish (*Scyliorhinus canicula*) (Evans et al., 2000). Although very few bottlenose dolphins strand in the region, dietary studies including direct observation show the following species taken as prey: Atlantic salmon (*Salmo salar*), trout (*Salmo trutta*) and eel (*Anguilla anguilla*) from around estuaries; sole, plaice, brill (*Scophthalmus rhombus*) and red gurnard (*Chelidonichthys cuculus*) that are benthic species; sandeel (Ammodytidae), whiting, and tope (*Galeorhinus galeus*) which are benthic-pelagic species; and sea bass (*Dicentrarchus labrax*), smooth-hound (*Mustelus mustelus*), and garfish (*Belone belone*) in relatively shallow waters (Sea Watch Foundation, unpublished data).



Figure 7: Common bottlenose dolphins (*Tursiops truncatus*) in Cardigan Bay. Photo credit: P Anderwald

Although the bulk of the population inhabits Cardigan Bay on a regular basis, there are seasonal movements between Cardigan Bay and other areas within the Irish Sea, notably the north coast of Wales east to the Dee Estuary and around the Isle of Man (Pesante et al., 2008b; Feingold & Evans, 2014b; Lohrengel et al., 2017; Howe, 2018). Some individuals also live mainly outside Cardigan Bay, but photo-identified mature females are significantly more likely to move into Cardigan Bay to give birth and remain there with their calf during the year after giving birth (Duckett, 2018).

## Sub-criterion B2: Aggregations

Collating 443,509 km of dedicated survey effort (both aerial and vessel surveys) undertaken within the Irish Sea between 1990 and 2020 (including SCANS surveys), modelled density distributions were determined for all cetacean species regularly occurring in the region (Evans & Waggitt, 2023).

Seasonal aggregations of harbour porpoises (*Phocoena phocoena*) have persisted in several, mainly coastal, areas of the central Irish Sea, including north Anglesey, and western Llŷn Peninsula, particularly between June and September (Evans & Wang, 2003; Evans et al., 2003; Baines and Evans, 2009, 2012; Evans & Waggitt, 2023). As a result of an earlier analysis of harbour porpoise densities from surveys undertaken around the UK (Heinänen & Skov, 2015), two Special Areas of Conservation have been designated for the harbour porpoise (North Anglesey Marine and West Wales Marine) within the boundaries of the IMMA. Porpoise abundance estimates for the whole Irish Sea during July SCANS surveys have declined in the last twenty years from 15,230 in 2005 to 9,376 in 2016 (Hammond et al., 2013, 2021).

Strong associations have been observed between

porpoise concentrations and high energy sites where strong currents flow (Pierpoint, 2008; Shucksmith et al., 2009; Isojunno et al., 2012; Evans et al., 2014; Waggitt et al., 2017; Evans & Waggitt, 2023).



Figure 8: Harbour porpoises (*Phocoena phocoena*). Photo credit: PGH Evans

Risso's dolphins (*Grampus griseus*) are generally present in low numbers in UK waters but in several areas within the IMMA, they occur at elevated densities. This includes the waters around Bardsey Island off the western end of the Llŷn Peninsula, the Holyhead Deep and north Anglesey, and around the Isle of Man (Baines & Evans, 2009, 2012; De Boer et al., 2013; Evans & Waggitt, 2023). A photo-identification catalogue has been assembled from vessel surveys conducted between 2008 and 2023, comprising 308 identifiable individuals, eighty-five of which have been re-sighted in subsequent years (Smith, 2023). Although individuals have been recorded repeatedly in the same areas across multiple years (De Boer et al., 2013; Stevens, 2014; Mandlik, 2021), they have also been re-sighted at widely separated locations both within (Isle of Man, Anglesey, Bardsey Island, and Pembrokeshire), and beyond the Irish Sea (Hebrides, Cornwall) (Stevens, 2014; Mandlik, 2021). Risso's dolphin groups can sometimes number around one hundred individuals (Sea Watch Foundation sightings database; P.G.H. Evans, *pers. observ.*), numbers that exceed any aggregation recorded around the British

Isles. The SCANS survey in July 2016 estimated 1,090 Risso's dolphins, the second largest number of any survey block in the ASCOBANS Agreement Area (from Norway to the southern end of the Iberian Peninsula) (Hammond et al., 2021).



Figure 9: Risso's dolphin (*Grampus griseus*) off Anglesey. Photo credit: PGH Evans

Habitat utilisation models from grey seal (*Halichoerus grypus*) tracking data identify the importance of the waters between Anglesey and the Wirral Peninsula where the largest haul-out site in the Irish Sea occurs (Carter et al., 2022).



Figure 10: Grey seal (*Halichoerus grypus*). Photo credit: PGH Evans

## Criterion C: Key Life Cycle Activities

### Sub-criterion C1: Reproductive Areas

Small harbour porpoise calves are regularly observed in summer throughout the region, and mating has been observed on several occasions (Evans & Wang, 2003; Shucksmith et al., 2009; Baines & Evans, 2009, 2012; Evans & Waggitt, 2023);

neonates also frequently occur in the region amongst strandings (UK Cetacean Strandings Investigation Programme reports, 1990-2020).



Figure 11: Harbour porpoises (*Phocoena phocoena*) mating at Point Lynas, Anglesey. Photo credit: S Benson

Neonates are also seen within Risso's dolphin groups in Manx waters and in North Wales off Anglesey and around the Llŷn Peninsula, suggesting that parturition has taken place in the area (Baines & Evans, 2009, 2012; De Boer et al., 2013, 2014; Stevens, 2014; Mandlik, 2021; Evans & Waggitt, 2023; Sea Watch Foundation sightings database).



Figure 12: Risso's dolphins (*Grampus griseus*) adult and young in Anglesey. Photo credit: PGH Evans

The main breeding colonies of grey seals occur around the Llŷn Peninsula (notably Bardsey Island) and north Anglesey, mainly on offshore islands, on relatively inaccessible beaches, and in caves within the IMMA (Westcott, 2002; Westcott & Stringell, 2003, 2004; McMath & Stringell, 2006; Stringell et al., 2014; Robinson et al., 2020).

Grey seal abundance in the UK is largely derived from pup production estimates. A major challenge in estimating abundance and trends for the region of interest is that pup surveys have tended not to be undertaken systematically but at different times in different regions (see Baines et al., 1995; Westcott, 2002; Westcott & Stringell, 2003, 2004; McMath & Stringell, 2006; Stringell et al., 2014; Robinson et al., 2020). SCOS (2022) has estimated pup production for Wales as 2,250 per year. In North Wales, the main breeding colonies are on Bardsey Island (127 pups in 2017), at the west end of the Llŷn Peninsula, and the Skerries (48 pups in 2017) and Carmel Head (35 pups in 2017), in north-west Anglesey, with small numbers breeding in caves and on offshore rocks in Anglesey, the mainland coast of North Wales and in Cardigan Bay (Stringell et al., 2014; Robinson et al., 2020). The main non-breeding haul-out site is on Hilbre Island in the Dee Estuary (maximum count in August 2020 was 579; Cheshire Wildlife Trust, *pers. comm.*).



Figure 13: Grey seals (*Halichoerus grypus*) haul-out. Photo credit: PGH Evans

## Sub-criterion C2: Feeding Areas

Variation in bathymetry often provides reefs or banks, and shelf slopes are favoured by fish and invertebrate prey. The mixing of different water masses caused by tidal currents or changes in bathymetry can lead to frontal systems developing, as observed at the Irish Sea front that runs southwest from the southern tip of the Isle of Man, with stratified

regions adjacent to these (Pingree et al., 1978; Savidge & Foster, 1978; Simpson, 1981; Miller et al., 2014).

The Irish Sea is greatly influenced by strong currents from the Atlantic, generating tidal energy, which may be enhanced by the prevailing south-westerly winds. Harbour porpoise concentrations are strongly associated with high-energy sites where strong currents flow (Pierpoint, 2008; Shucksmith et al., 2009; Isojunno et al., 2012; Evans et al., 2014; Waggitt et al., 2017; Evans & Waggitt, 2023). The shelf seas of the Irish Sea offer important feeding grounds for harbour porpoises with significant quantities of sandeels (family Ammodytidae) and sprat (*Sprattus sprattus*), as well as whiting (*Merlangius merlangus*) and herring (*Clupea harengus*), all known to be important prey for this species, with herring stocks showing signs of recovery following overfishing in the latter half of the last century (Evans, 1990; Santos & Pierce, 2003; Evans & Waggitt, 2020a, 2023).

Although diet data are not available for Risso's dolphins in the area, the locations where they particularly occur coincide with areas where cephalopods such as common squid (*Loligo vulgaris*), cuttlefish (*Sepia officinalis*) and octopus (*Eledone cirrhosa*) have been sampled from catch surveys (Stevens, 2012; Mandlik, 2021, Bangor University School of Ocean Sciences data).

Habitat use models developed from tracking data (Carter et al., 2017, 2022) identify several areas within the IMMA as important for grey seals, both adults and pups. Although scat analysis has not been undertaken in the region, several fish species known to be prey of grey seals (Hammond & Wilson, 2016; Wilson & Hammond, 2019) are common in the Irish Sea. Direct observations have revealed grey seals taking a variety of flatfish, for example sole, plaice, dab (*Limanda limanda*), flounder (*Platichthys flesus*).

## Criterion D: Special Attributes

### Sub-criterion D2: Diversity

Twenty-two marine mammal species (20 cetaceans and 2 seal species) have been recorded in the proposed area (Evans & Waggitt, 2020b, 2023), of which six species occur with enough regularity to be considered for IMMA criteria: harbour porpoises, bottlenose dolphins, common dolphins, Risso's dolphins, minke whales, and grey seals.

In addition to the species described under various criteria above, the area hosts elevated densities of both minke whales and common dolphins, which occur in waters with depths greater than 50 m particularly in the St George's Channel northwards towards the Irish Sea front, partially included within the boundaries of this IMMA (Evans et al., 2007; Baines & Evans, 2009, 2012; Evans & Waggitt, 2023). In those areas, common dolphin groups sometimes number several hundred individuals, the highest group sizes recorded anywhere in the British Isles (Evans et al., 2003, 2007). Peak numbers occur in late summer (August – September). Groups of common dolphins with small young are frequently observed in a range of locations within the area, but particularly in the St George's Channel and south and west of the Isle of Man (Baines & Evans, 2009, 2012; Evans et al., 2007; Tintoré Pujol-Soliano, 2018; Sea Watch Foundation Sightings Database).



Figure 14: Common dolphins (*Delphinus delphis*) breaching offshore Cardigan Bay. Photo credit: K Lohrengel





Figure 15: Minke whale (*Balaenoptera acutorostrata*) in Cardigan Bay. Photo credit: K Lohrengel / Sea Watch Foundation

In UK waters, aggregations of minke whales rarely exceed ten individuals. However, in the central Irish Sea between Anglesey and the Isle of Man, aggregations of up to seventeen have been recorded (Evans & Waggitt, 2023; Sea Watch Foundation sightings database). Minke whales have been observed lunge feeding on shoals of fish on the northern edge of the Celtic Deep and also south of the Isle of Man (P.G.H. Evans, *pers. observ.*). Stomach contents analysis of minke whales from the UK has shown that they commonly feed upon sandeel, herring and sprat (*Sprattus sprattus*) (Pierce et al., 2004), all three species of which have spawning grounds in the region (Pingree et al., 1978; Simpson, 1981; Miller et al., 2014; Evans et al., 2007; Evans & Waggitt, 2023).

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