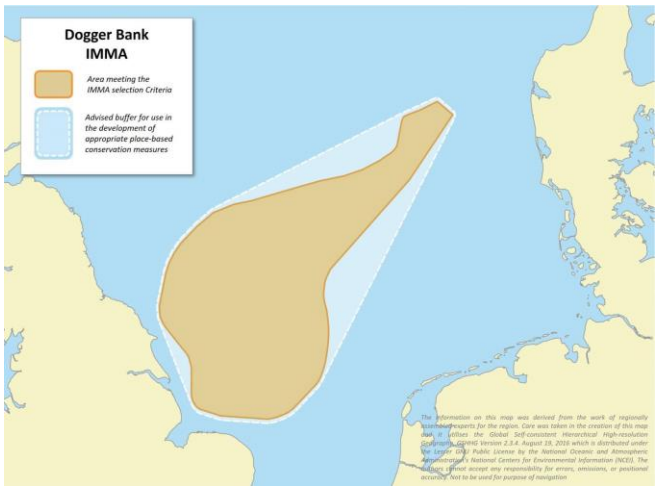

Area Size

67 054 km²

Qualifying Species and Criteria

Harbour porpoise – *Phocoena phocoena*

Criterion B (2); C (2)

Minke whale – *Balaenoptera acutorostrata*

Criterion B (2); C (2)

Grey seal – *Halichoerus grypus*

Criterion B (2); C (2)

Summary

The Dogger Bank is a large shallow bank in the central North Sea. Prevailing currents and a unique bathymetry make this a highly productive area, and an important fishing ground for centuries. Multiple years of survey data show that the Dogger Bank IMMA represents important habitat for harbour porpoises (*Phocoena phocoena*) as well as for common minke whales (*Balaenoptera acutorostrata*). Harbour porpoises occur in the area at higher density than in surrounding waters. The area is also used by white-beaked dolphins (*Lagenorhynchus albirostris*), a substantial proportion of Europe's Atlantic grey seals (*Halichoerus grypus atlantica*), and to a lesser degree, harbour seals (*Phoca vitulina vitulina*).

Dogger Bank IMMA

Description:

The Dogger Bank is the largest sandbank in the North Sea, and is approximately 300 km in length. The Dogger Bank IMMA encompasses the entire shallow water sandbank area, as well as the productive slopes of the bank. The southern part of the bank is covered by water rarely deeper than 20 m (13 m at its shallowest part), while the bank slopes down and the surroundings are deeper than 50-70 m. The Dogger Bank is influenced by Atlantic water masses coming from the north and water inflow through the Channel from the south. The hydrographic regime of the Dogger Bank is characterised by a complicated regime of currents and eddies. The collision of different water masses as well as the distinctness of water circulation (e.g. eddy formation) in concert with the relatively shallow water depth of the Dogger Bank leads to high biological production even close to the bottom. The high biological production is also the result of a front that causes a subtidal current predominantly directed along the isobath and enhanced vertical mixing. Other frontal zones in the region are the Spurn and Flamborough Head fronts which lie to the west.

The Dogger Bank is an area under jurisdiction of the United Kingdom, The Netherlands, Germany and Denmark. The Netherlands, Germany and the UK have allocated their parts of the Dogger Bank as an area important for nature (Natura 2000). The UK Dogger Bank MPA overlaps with a Special Area of Conservation (SAC) that has been identified for the protection of harbour porpoises – the Southern North Sea SAC.

Figure 1: Mother and calf harbour porpoise (*Phocoena phocoena*). Photo credit: Colin Dalton

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

The Dogger Bank, especially the slopes, encompass distinct very high-density areas for harbour porpoises (*Phocoena phocoena*) in all seasons. Data in this area were gathered by means of dedicated line-transect surveys, taking into account the proportion of missed sightings, from national monitoring (e.g. Gilles et al., 2009, 2012; Geelhoed et al., 2014) as well as the large-scale SCANS surveys (Hammond et al., 2013, 2021). Gilles et al. (2016) fitted generalized additive models of harbour porpoise density to 156,630 km of high-quality on-effort survey data with 14,356 sightings of porpoise groups collected over 9 year (2005-2013). Selected predictors included static and dynamic variables, such as depth, distance to shore and to sandeel (*Ammodytes* spp.) grounds, sea surface temperature (SST) and proxies for fronts. Spatial predictions as surface layer output from different species distribution models clearly identify this area as very important habitat for harbour porpoises in the North Sea (Gilles et al., 2011, 2016; Waggitt et al., 2020; Geelhoed et al., 2022; Lacey et al., 2022).

The Dogger Bank IMMA also has particular importance for minke whales (*Balaenoptera acutorostrata*). Visual surveys showed seasonal high densities and habitat preference of minke whales along this offshore bank (de Boer, 2010; Gilles et al., 2012; Geelhoed et al., 2014) and spatial models predicted of species' density hot spots in that area (Paxton et al., 2016; Waggitt et al., 2020; Geelhoed et al., 2022; Lacey et al., 2022).

Figure 2: Minke whale (*Balaenoptera acutorostrata*). Photo credit: PGH Evans

Figure 3: Atlantic grey seal (*Halichoerus grypus atlantica*) surfacing. Photo credit: PGH Evans

The Dogger Bank is of high use for Atlantic grey seals (*Halichoerus grypus atlantica*). Approximately 10% of the UK and Ireland population of grey seals that are at sea at any one time are predicted to be within the IMMA area (Carter et al., 2022), and over 50% of those haul out within the Humber Estuary. This equates to over 15,000 grey seals from the UK predicted to be in that area at any one time. There is also extensive use of the IMMA by grey seals that haul out in the Netherlands.

Criterion C: Key Life Cycle Activities Sub-criterion C2: Feeding Areas

The mixing of waters from the English Channel and the northern North Sea, combined with changes in seafloor topography around the shallow bank, creates an area of eddies that trap nutrients, thereby concentrating many fish species including sandeels (Family Ammodytidae), cod (*Gadus morhua*), herring (*Clupea harengus*), whiting (*Merlangius merlangus*) and sprat (*Sprattus sprattus*), all of which are important harbour porpoise prey. Distribution of harbour porpoises is thought to be prey driven and it is likely that the high densities of harbour porpoises that occur at the Dogger Bank are due to a particularly rich area for feeding (Ransijn et al., 2021).

The observed high densities and aggregations of minke whales around the Dogger Bank in spring and summer were related to meso-scale oceanographic and topographic features which likely link to increased foraging opportunities (Waggitt et al., 2020; Geelhoed et al., 2022; Lacey et al., 2022). Sandeel, shown to be an important food source for minke whales (Olsen & Holst 2001; Pierce et al., 2004), also has important habitats in this IMMA (Jensen et al., 2011). The Dogger Bank was one of the great North Sea fishing grounds in the 19th and 20th centuries, however, landings of the main roundfish species there have declined considerably since the 1980s due to overfishing.

The aggregations of grey seals within the Dogger Bank IMMA (see B2 Aggregations) are likely predominantly associated with foraging. Tracking data shows that for trips encompassing the Dogger Bank, the Dogger Bank is usually the distal area in their foraging trip from a haul out, so most likely corresponding to foraging area (rather than travelling). Furthermore, near or within the IMMA, tracked individuals often switch from directed relatively fast movements to movements that are analogous to Area Restricted Search (foraging; Russell, 2016; Wyles et al., 2022).

Supporting Information

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Acknowledgements

We would like to thank the participants of the 2023 IMMA Regional Expert Workshop for the identification of IMMAs in the North East Atlantic Ocean. Funding for the identification of this IMMA was provided by the Water Revolution Foundation. Other sponsors for the workshop included OceanCare and ORCA (orca.org.uk), and substantial administrative support to the IMMA Secretariat was provided by the Tethys Research Institute and Whale and Dolphin Conservation.

Suggested Citation: IUCN-MMPATF (2024) Dogger Bank IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2024.

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