22. Herring Spawning Areas/Grounds/Beds

Irish name: Beitreach sceathraí scadán

Figure 1. Atlantic Herring, *Clupea harengus* (Linnaeus, 1758), Chile © Gervais et Boulart - Les poissons Gervais, H., Public Domain, https://commons.wikimedia.org/w/index.php?curid=18282630

Background

Herring are a vitally important part of the marine ecosystem, being prey for marine mammals, birds and many predatory fish. They are also a valuable fishery species. Irish Sea herring (CSH) is one of three herring stocks that occurs in Irish waters. The Irish Sea stock encompasses ICES area 7.a North and has been a key fishery for decades. Northern Ireland holds the vast majority of the yearly allowable catch for this stock. In recent years the biomass of the Irish Sea herring stock has been above all reference points. (Main source: Marine Institute Stockbook 2022; Molloy, 2006)

Unusually for a marine fish, herring eggs are deposited on the seabed in discrete gravel beds or flat stone. The herring are completely reliant on these spawning beds for reproduction and individuals return to their natal spawning ground each year. Nearby spawning gravel beds are generally grouped into "spawning grounds", which may contain one or more beds. Spawning grounds are further grouped into "spawning areas". The spawning areas, grounds and beds for herring around Ireland are well known and are located close to the coast. The Irish Sea herring population spawns in two areas: the Isle of Man and the Mourne (Dundalk bay), with the latter being the only herring spawning area inside the area of interest for the current study (Figure 3). (Main sources: O'Sullivan et al., 2013; Breslin, 1998; Frost and Diel, 2022)

Rationale for spatial protection in the western Irish Sea

Herring is not a species listed by OSPAR or IUCN. Fishing restrictions for herring are in place under the Common Fisheries Policy (2015) but these do not relate to the spawning habitat. The spawning areas/grounds/bed were included in the features list as they are an essential part of the life-cycle for this important forage fish species. The western Irish Sea is a significant part of the range of the Irish Sea herring population and the Mourne is the only spawning ground in the area of interest. Based on the discrete and well documented substrate requirements, herring spawning beds are highly amenable to spatial protection.

Sensitivity assessment

The highest associated sensitivity scoring for herring spawning grounds was in relation to physical loss or disturbance to the seabed. Herring spawning beds are vulnerable to anthropogenic disturbance of the seabed including but not limited to dredging, sand and gravel extraction, dumping of dredge spoil and waste from fish cages (high confidence). The International Council for the Exploration of the Seas advice for herring in the Irish Sea has consistently stated (e.g., ICES, 2021):

"*Activities that have a negative impact on the spawning habitat of herring, such as the dumping of dredge spoil, the extraction of marine aggregates (e.g., gravel and sand), and the erection of structures such as wind turbines in the vicinity of spawning grounds are a cause for concern*"

and advises that

"*Activities that have a negative impact on the spawning of herring should not occur unless the effects of these activities have been assessed and shown not to be detrimental to the productivity of the stock*"

Smothering of gravel spawning beds via sediment plumes and noise during works would also cause disruption to herring spawning behaviour (high confidence).

Further research needs

Evidence to identify the potential effect of multiple pressures was insufficient to form an assessment. The potential cumulative effect of multiple ORE installations between herring feeding grounds and spawning grounds (i.e., on the migration route) is poorly understood and could not be assessed. As well as being a possible physical barrier to movement, the effect of underwater noise on herring movement warrants further investigation. Other such pressures included transition elements and organo-metal contamination, hydrocarbon and PAH contamination, synthetic compound contamination and introduction of other substances.

Figure 2. Global geographic distribution of Atlantic herring, *Clupea harengus,* from www.aquamaps.org.

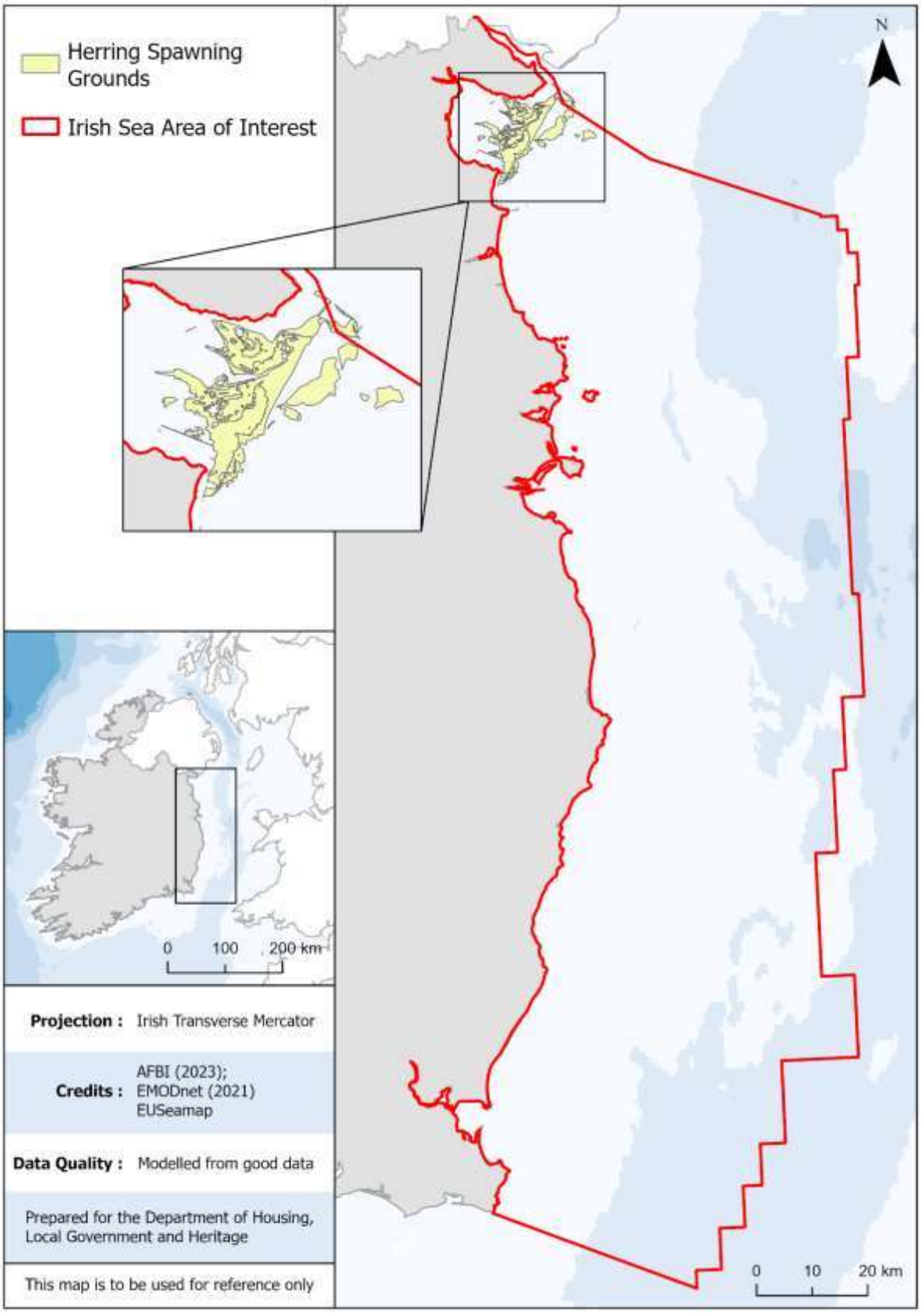

Figure 3. Data available for the course gravel substrate constituting the Mourne herring spawning ground in the western Irish Sea.

Data sources and quality

Dataset Name	Data Owning Organisation	Dataset Quality	Metadata URL	Comments
EUSeaMap EMODnet Benthic Broadscale Habitat Types	EMODnet	Modelled from good data	EUSeamap (2021)	AFBI advised to select areas with coarse sediment as the benthic habitat in the Dundalk Bay area.

References

Breslin J.J. (1998) The location and extent of the main Herring (*Clupea harengus*) spawning grounds around the Irish coast. Masters Thesis: University College Dublin

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O'Sullivan, D., O'Keefe, E., Berry, A., Tully, O., and Clarke, M. (2013). An Inventory of Irish Herring Spawning Grounds. Irish Fisheries Bulletin. 42: 2013. 38 pp.