5. Bull huss (*Scyliorhinus stellaris*)
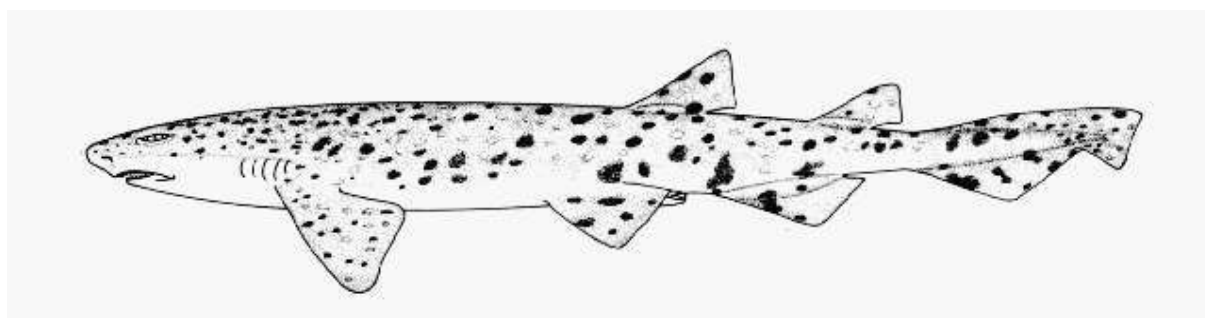
Irish name: Fíogach mór

Figure 1. Bull huss (*Scyliohinus stellaris*) from Compagno (1984)

Background

The bull huss is a medium-sized cartilaginous fish species in the Class Chondrichthyes, and is the largest species of cat shark in Irish waters. The bull huss has a max. reported total length of 170 cm ("www.fishbase.se", n.d.). It is a predominately demersal species with a depth range of 1-400 m (Reiner, 1996), and is usually found between 20 - 63 m (Compagno, 1984). Bull huss are associated with a variety of bottom-types, including rocky or coralline ground, and algal-covered (e.g., kelp forest) bottom types ("www.fishbase.se", n.d.). Bull huss are benthic feeders, and feed on molluscs, crustaceans, and fish, including small sharks. Maximum age and size-at-maturity are unknown, based on the small-spotted catshark (*Scyliorhinus canicula*) females are thought to mature at 9 years and reach a maximum age of 17 years (Rodríguez-Cabello *et al.* 2005). Scyliorhinids are thought to be productive species compared to other demersal elasmobranchs (McCully Phillips et al. 2015), however, information on their exact bull huss life history is limited. Bull huss are oviparous, with two eggs released at a time (one from each oviduct; Compagno, 1984). Eggs are laid in spring and summer in shallow water, with estimates of total eggs laid per year ranging from 9-41 (based on animals kept in captivity; Capapé et al. 2006). Bull huss young hatch from their egg cases after around 9 months (Capape et al. 2006). Bull huss are distributed within the northeast Atlantic (from southern Scandinavia and the British Isles) and the Mediterranean Sea (Morocco) (Compagno, 1984). Its recorded presence in tropical west Africa is uncertain, and may be due to misidentification with the West African catshark (*S. cervigoni*). Migration, dispersal and mixing between populations is unknown. A study of this species in a tidal sea lough suggests it has high site fidelity (Sims et al. 2005).

Rationale for spatial protection in the western Irish Sea

Bull huss was nominated for inclusion with particular reference to its conservation listing by the IUCN as Near Threatened at a European and global scale. In Ireland it is classified as Least Concern (Clarke et al. 2016). Population trends modelled from standard catch-per-unit-effort (CPUE) in the Irish Sea and Bristol Channel suggest an annual increase of 4.7%, consistent with an increasing population over three generation lengths (48 years) (ICES-WGEF, 2019). However, in the Mediterranean Sea where this species was previously common (pre 1940s), recent research surveys and commercial fisheries suggest bull huss are locally extinct in some areas (Aldebert 1997, Ragonese et al. 2013, Ramírez-Amaro et al. 2020). Population recovery is thought to be affected by low levels of interconnectivity

between isolated island-associated populations situated far from the continental coast (Ellis et al. 2009). The latest ICES report (2021) could not quantify landings, catch or discards, and misidentification and categorisation of this species under names such as "dogfish" or "catshark" categories make quantifying landings challenging. Owing to its global population reduction of around 30-49% suspected over three generation lengths (48 years), a precautionary approach is advised.

There are currently no management measures in place for this species in Europe or Ireland. ICES issued a precautionary recommended reduction in landings by 18% for 2022-2023 versus 2018-2020.

The western Irish Sea is an important part of its range. While deemed a species of Least Concern in Ireland (2016), the inability to quantify landings, catch, discards, and its misidentification with other hounds suggests a precautionary approach is followed.

While limited, current knowledge suggests bull huss are amenable to spatial protection. A study of acoustic tracked bull huss in a tidal sea loch suggests refuging behaviour and site fidelity. However, the dispersal and movement ecology of these species is not well understood in an open ocean setting.

Sensitivity assessment

The highest associated sensitivity scoring for bull huss was in relation to its targeted and non-targeted removal (bycatch) by fishing. Bull huss are targeted throughout its range by gill nets, bottom set longlines, bottom trawls, handlines and occasionally pelagic trawls (Shark Trust, 2010). Actual discard quantities are thought to be several times higher than landed quantities (ICES 2021a).

Following a precautionary principle, bull huss were identified as sensitive to some shipping related pressures. While evidence for this species was limited, it is thought that elasmobranchs are vulnerable to environmental pollutants such as transition elements given they are long-lived and consume a range of lower trophic level prey (Dulvy et al. 2017). Elasmobranchs are thought to tolerate high metal levels in their tissues, however, a precautionary approach is applied and bull huss were deemed sensitive to this pressure. The impacts of anthropogenic noise on elasmobranch species are poorly understood. Lab based studies suggest noise can increase swimming activity (de Vincenzi et al., 2021), whereas research in the wild indicates an equivocal response to boat traffic (Rider et al., 2021). Hearing ability in demersal species seems to be most sensitive to low frequencies from nearby sources (Casper, 2006) suggesting bull huss may not be sensitive to vessel-related noise.

Offshore energy impacts on elasmobranchs are poorly understood, however, bull huss were deemed moderately sensitive to several offshore energy impacts. Pressures including physical loss of marine habitat and physical change to another seabed type were deemed moderate sensitivity owing to limited mobility of early life stages. Bull huss were deemed moderately sensitive to heavy smothering and siltation changes due to their sessile and slow maturing egg cases, which likely require well aerated water for survival. Given the nursery areas for egg laying have not been delineated in the western Irish Sea, a precautionary approach is recommended. Construction activities may displace some elasmobranch species, although quantitative data is absent. Electromagnetic fields from high

voltage cables are likely to affect the behaviour of some species (Gill et al., 2009; Hutchison et al., 2020), however, long-term impacts are unknown at present. Post construction, wind farms may provide refugia and artificial reef communities which could prove beneficial to some species of elasmobranch. Construction activities may displace some species, however, quantitative data is absent. Given bull huss are mobile and occupy the lower water column, they were deemed not sensitive to underwater noise.

Further research needs

Key knowledge on the ecology of bull huss including age at maturity, life span, dispersal and population mixing will be necessary to devise an effective management strategy for the species. Identifying nursery areas would help to identify areas of higher perceived sensitivity to pressures including smothering and physical loss of habitat. In addition, evidence to identify the potential effect of multiple pressures was insufficient to form an assessment, or relieved heavily on expert judgement. These pressures included changes in suspended solids (water clarity), light smothering and siltation changes, electromagnetic energy, water flow changes, transition elements and organo-metal contamination, hydrocarbon and PAH contamination, synthetic compound contamination, introduction of other substances, organic enrichment and the introduction or spread of invasive and non-indigenous species.

Figure 2. Geographic distribution of bull huss (*Scyliorhinus stellaris*) from Finucci, Derrick & Pacoureau et al. (2021)
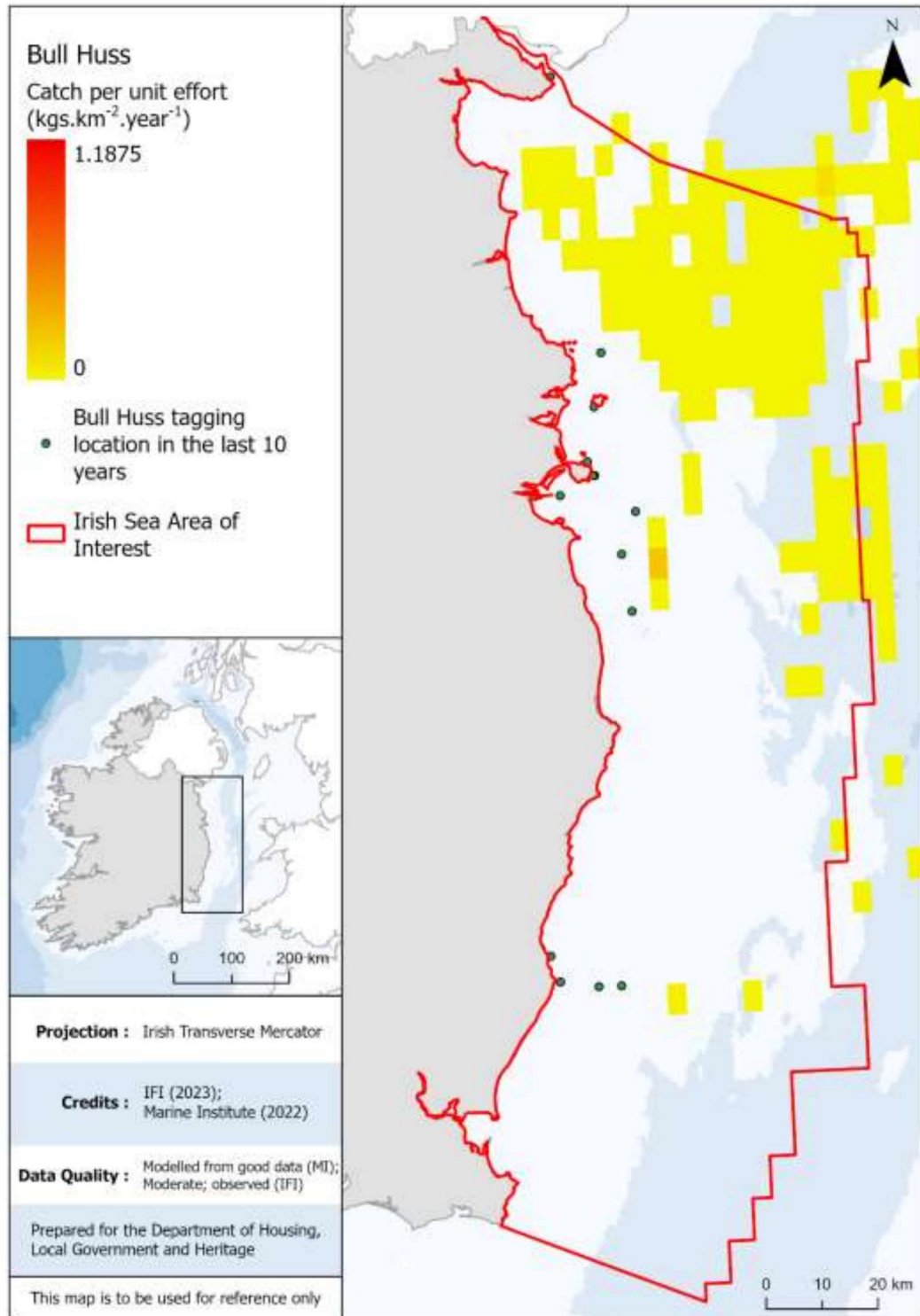
Figure 3. Distribution of bull huss (*Scyliorhinus stellaris*) in the western Irish Sea. Data from Inland Fisheries Ireland tag and recapture data and ICES international fishing effort and swept area ratios and VMS.

Data sources and quality

Dataset Name	Data Owning Organisation	Dataset Quality	Metadata URL	Comments
ICES international fishing effort and swept area ratios; VMS	International Council for the Exploration of the Seas	Modelled from good data		
Inland Fisheries Ireland Tag and Recapture	Inland Fisheries Ireland	Moderate; observed		
International Bottom Trawl Survey (IBTS) Fisheries Database of Trawl Surveys (DATRAS)	International Council for the Exploration of the Seas	Good; observed	IE-IGFS and NIGFS	Data is sparse for this species

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