14. Starry smooth-hound *(Mustelus asterias)*

Irish name: Scoirneach ballach

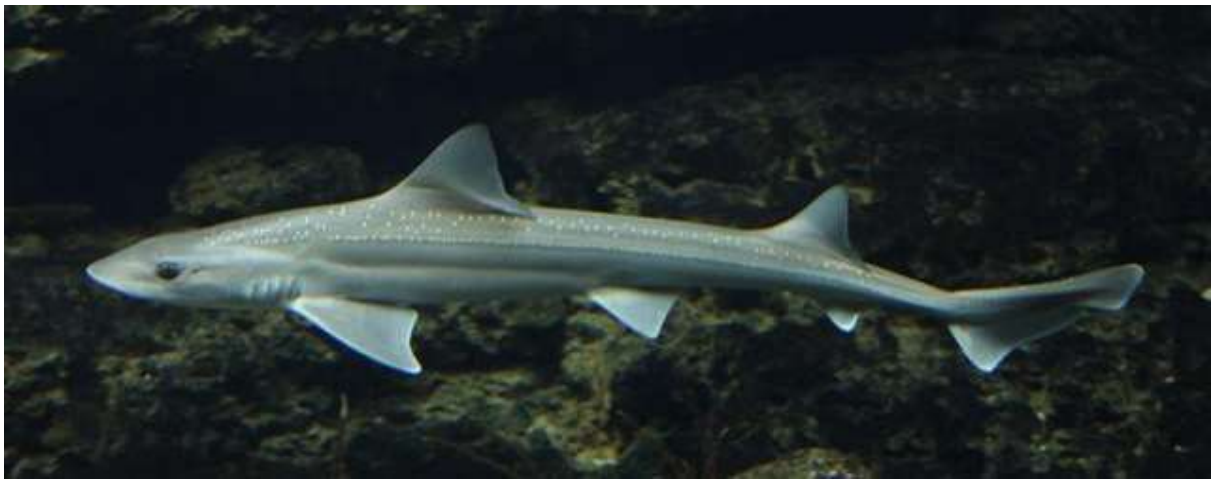

Figure 1: Starry smoothhound shark, *Mustelus asterias* photographed by © Pierre de Chabannes, www.pierrewildlife.com to reproduce permission must be granted from copyright holder.

Background

The starry smooth-hound shark is a relatively small cartilaginous fish species in the Class Chondrichthyes. The starry smoothhound has a max. estimated age of 13 for males, and 18.3 years old for females (Clarke et al. 2016). *M. asterias* have a reported total length of 140 cm total length (Compagno, 1984). In the northeast Atlantic starry smooth-hound reach maturity at around 78 cm total length and 4-5 years for males, and 87 cm total length and 6 years for females (Farrell et al. 2010 a,b). They are a viviparous species that gives birth to live young, with geographic variation in its reproductive traits (Clarke et al. 2016). Gestation lasts for approx 12 months with 6-18 embryos produced, followed by a 12-month resting period (Farrell et al 2010b). There is no published literature on the location of parturition and nursery areas of this species in the Irish Sea, however, neonates and juveniles are periodically abundant in shallow areas of the English Channel, southern North Sea (inc. the Thames Estuary), and Bristol Channel (Ellis et al. 2005). In the eastern Irish Sea (Holyhead, Wales) large pregnant females are seasonally abundant in May (Farrell, 2010c). Starry smooth-hounds are a demersal species with a depth range of 0-350 m (Brito, 1991). In Irish waters they are most commonly encountered in shallow sandy waters, including off the coast of Wicklow and Wexford with a northern expansion in their reported range in recent years (Clarke et al. 2016). Starry smooth-hound sharks have a narrow dietary niche, and are specialised on crustaceans as evidenced by its crushing dentition and species-specific diet studies (Berrow, 1994; Ellis et al. 1996; Phillips, Grant & Ellis, 2019; Biton-Porsmoguer, 2022). *M. asterias* occur in inshore temperature waters of the Northeast Atlantic (Celtic Sea, Irish Sea, North Sea, English Channel, Bristol Channel and Bay of Biscay) and Mediterranean (Compagno, 1984). The ICES Working Group on Elasmobranch Fisheries (ICES WGEF, 2019) considers there one biological stock in the continental shelf of the northeast Atlantic (ICES areas IV, VI-VIII). However, recent tracking work suggests this stock may comprise of at least two sub-populations (Griffiths et al. 2020). One population is thought to spend April to September in coastal waters of the southern North Sea and English

Channel, migrating from October to March to deeper waters in the western English Channel, Celtic Sea and northern Bay of Biscay. The other sub-population appears to reside in the Irish Sea, Celtic Sea and Bristol channel. These findings suggest a degree of philopatry and circannual migration.

Rationale for spatial protection in the western Irish Sea

Starry smooth-hound were nominated for inclusion with particular reference to its IUCN conservation listing as Near Threatened both in Europe and globally. In Irish waters, the population is thought to be stable or increasing over time (abundance trends from International Bottom Trawl Survey data), which led its classification of Least Concern in the Irish Red List (Clarke et al. 2016). ICES species-specific landings are unreliable, with *M. asterias* often reported under generic dogfish and shark landing codes (ICES, 2021). There is also longstanding misidentification of *M. asterias* with the common smooth-hound (*M. mustelus*) and juvenile tope (*Galeorhinus galeus*) (Ferrell, Clarke & Mariani, 2009).

There are currently no management measures in place for this species in Ireland. ICES advice (2021) currently recommends a 4% reduction in landings for 2022-2023 compared to 2020-2021. Discarding and discard survival has yet to be quantified. While deemed a species of Least Concern in Ireland (2016), the inability to quantify landings, discards, and its misidentification with other hounds suggests a precautionary approach is advisable.

The western Irish Sea is likely an important part of its range. Connectivity is not well understood for this species, however, movement data suggests movements of individuals across the Bristol Channel, Irish Sea and Celtic Sea. The western Irish Sea may therefore provide an important area for essential life stages including nursery grounds and breeding, however, further investigation is required.

Based on current knowledge, starry smooth-hound are amenable to spatial protection. Movement data suggests a degree of philopatry and circannual migration (Brevé et al. 2016, Griffiths et al. 2020). However, knowledge on how this species uses the western Irish Sea is limited (e.g., for breeding or nursery areas).

Sensitivity assessment

Several fisheries related activities were related to pressures with medium and high associated sensitivity scorings. Starry smooth-hounds were classed as highly sensitive to direct removal (high confidence). Starry smooth-hound are typically caught using otter trawl and nets, with fewer records for beam trawl and *Nephrops* trawl (Silva & Ellis, 2019). A high degree of smaller individuals are discarded (Silva & Ellis, 2019). Almost all recreational anglers practise catch-and-release for this species (Clarke et al. 2016). Starry smooth-hounds likely play an important role in regulating the inshore food web, therefore unmanaged and poorly quantified commercial landings may affect ecosystem health. *M. asterias* were deemed moderately sensitive to non-targeted removal (high confidence). Additionally, physical loss of habitat (low confidence), physical change of seabed type (moderate confidence), physical change of substrate to another seabed type (moderate confidence) and habitat structures (change or removal of substratum via extraction) (moderate confidence). These habitat-related scorings are related to its specialised diet, whereby functionality of sandy and soft bottom habitats is key to their survival (Biton-Porsomoguer, 2022).

Following a precautionary principle, starry smooth-hounds were deemed sensitive to two shipping related pressures. Elasmobranchs are thought to tolerate high metal levels in their tissues, however, a precautionary approach is applied and *M. asterias* were deemed sensitive to chemical pollutants including transition elements and organo-metal contamination, and hydrocarbon and PAH contamination.

Offshore energy impacts on elasmobranchs are poorly understood, however, based on existing knowledge starry smooth-hounds were deemed sensitive to some of the associated sectoral pressures. As detailed above, a precautionary approach was followed for chemical pollutants therefore this species was deemed sensitive to these associated pressures. *M. asterias* are mobile and demersal (situated in the lower water column), therefore they were not deemed sensitive to underwater noise. Construction activities may displace some elasmobranch species, although quantitative data is absent. There is no species-specific quantitative data on the effects of electromagnetic fields (EMF) from high voltage cables for *M. asterias*. Existing studies suggest EMF 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 (No evidence for this species). 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.

Further research needs

Species-specific landings and discard data is necessary for this species. Equally, how starry smoothhound use the western Irish Sea particularly as nursery and partition areas is a priority. Evidence on the effects of several pressures on this species is limited and requires further research, including; abrasion/disturbance of substratum surface or seabed, penetration or disturbance of substratum subsurface, 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, and organic enrichment.

Figure 2. Geographic distribution of starry smooth-hound (*Mustelus asterias*) from Jabado et al. (2021)

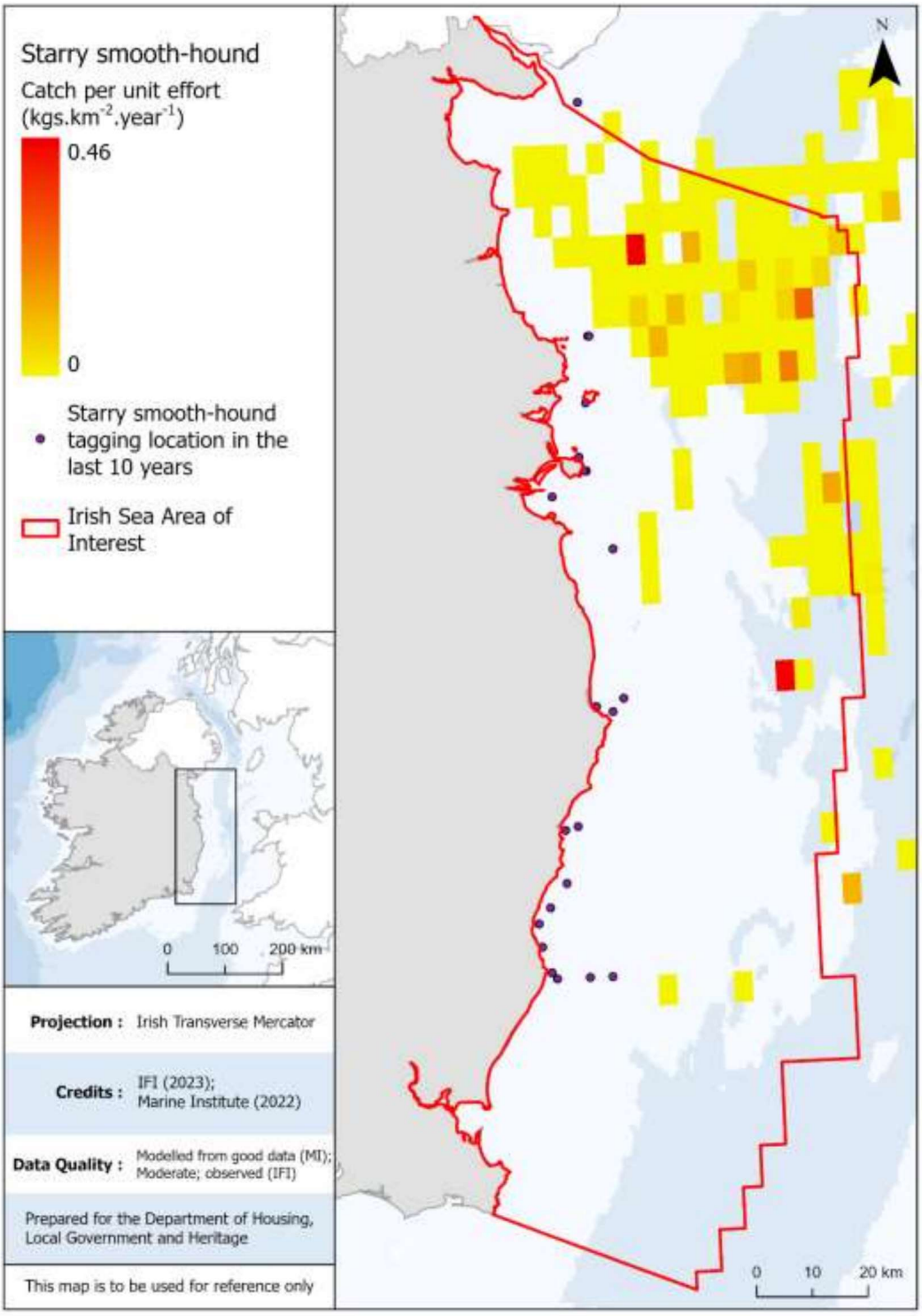

Figure 3. Distribution of starry smooth-hound (*Mustelus asterias*) in the western Irish Sea. Data from Inland Fisheries Ireland tag and recapture data and ICES international fishing effort and swept area ratios and VMS.

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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