5. Flapper skate (*Dipturus intermedius*)

*Irish name: Sciata coiteann*

Figure A10.5.1. Flapper skate (*Dipturus intermedius*). Photo credit: The CETUS Project, University College Cork.

**Background**

The flapper skate *Dipturus intermedius* (Parnell, 1837) is a large cartilaginous fish species in the Class Chondrichthyes. Formerly grouped under the 'common skate complex', in 2010 it was delineated as two separate species, the blue skate *Dipturus batis* (Linnaeus, 1758), (junior synonym *D. flossada*) and flapper skate *D. intermedius* (Iglésias et al., 2010). Species-specific information is therefore limited. The flapper skate can reach a maximum estimated age of up to 50 years, and a maximum reported total length of 254 cm (Last et al., 2016). The current Irish record weighed 100 kg and was caught in Ballycotton in 1913 (Irish Specimen Fish Committee, 2016). Age of 50% maturity is approximately 20 years, with males and females reaching maturity at 165-185 cm and ~197 cm respectively (Last et al., 2016; Thorburn et al., 2023). The generation length is estimated as 34.5 years (Ellis et al., 2001). It is a benthic species on shelf and slope waters with an approximate vertical habitat range between 10 – 1500 m depth (Stehmann & Bürkel, 1984; Last et al., 2016; Thorburn et al., 2021). Recorded benthic habitat types include subtidal sandy, subtidal sandy mud, subtidal muddy, hard substrate and soft substrate (Ellis et al., 2001). Flapper skate distribution is largely constrained compared to the previous perceived distribution of the 'common skate' (Garbett et al., 2023). The southern limit for the species is thought to be the Azores and Portugal (Bache-Jeffreys,

2019; Bache-Jeffreys et al., 2021; Garbett et al., 2023), with a northerly extent of in the Norwegian Sea (63°N) (Lynhammar et al., 2014; Garbett et al., 2023) and a rare or temporary occurrence in the Western Baltic Sea (Garbett et al., 2023). The flapper skate reproduces by laying eggs, with one or two laid in each lay event (Stehmann & Burkeal, 1986; Thorburn et al., 2023) and up to 40 egg cases laid annually, or biennially (Brander et al., 1981; Little, 1995; Thorburn et al., 2021). Records and observations collected before 2010 are uncertain (e.g. summer lay months reported in Whitehead et al., 1986), as these two species were not yet delineated. The flapper skate egg case incubation time is approximately 18 months in 9-12°C ambient temperature and current speed of up to 0.2 m/s (Benjamins et al., 2021). There are only two published lay sites recorded to date; both are situated off the coast of Scotland (Neat et al., 2014; Benjamins et al., 2021; Thorburn et al., 2023). One of these is a Marine Protected Area focused on protecting an egg nursery designated to aid population recruitment. Based on one of the verified nursery sites off Scotland, nursery habitats are characterised by cobble and boulder habitat in waters 25–58 m deep within a channel (Benjamins et al., 2021). However, expert consensus on whether this holds true for all flapper egg case lay areas has not yet been reached.

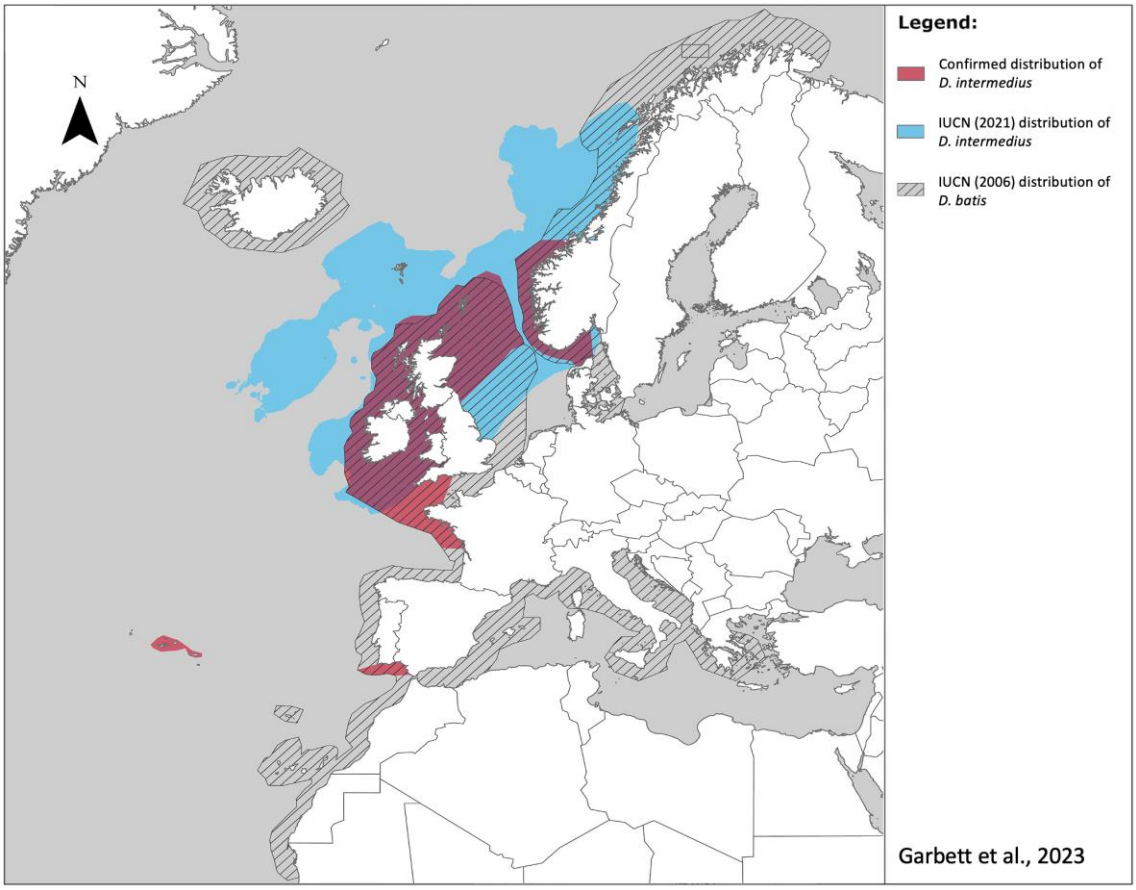

Figure A10.5.2. Verified global distribution of the flapper skate (*Dipturus intermedius*) from genetic databases, fishery trawling surveys and angling. Also depicted is the previous IUCN distribution of the common skate complex, and the current IUCN distribution for the species. From Garbett et al., 2023

**The rationale for spatial protection in the southern Celtic Sea**

Flapper skate was nominated for inclusion with particular reference to their conservation listing under the IUCN Red List as Critically Endangered globally (not assessed at the European scale), as Critically Endangered on the Irish Red List and as a Threatened and/or Declining species by OSPAR. Additionally, since 2009, it has been prohibited to catch and land this species in European waters. Accurate population data on the flapper skate are lacking due to a constrained, fragmented distribution (Garbett et al., 2023) and taxonomic confusion (ICES, 2022; 2024). However, historical exploitation of the common skate complex is thought to have decreased population levels by >80% over the past three generation lengths (104 years, Ellis et al., 2021). Flapper skates are particularly vulnerable to exploitation by fisheries due to their large body size from hatching and their slow life history (Dulvy & Reynolds, 2002; Ellis et al., 2021). Additionally, international data on landings of flapper skate are lacking, but it is suggested the population of the common skate complex is decreasing in other areas such as Iceland (Ellis et al., 2021) where it has not been recorded in recent surveys (Bache-Jeffreys et al., 2021; Garbett et al., 2023). There is precautionary advice from ICES of zero catch in 2023-2024 in division 7a-c and 7e-k as the stock size of the common skate complex is unknown (ICES, 2022).

**The southern Celtic Sea is a significant part of its range**. The south coast of Ireland is host to several perceived 'hotspots' of flapper skate based on angling records (Casserly & Roche, 2023). Within the Celtic Seas study area, specimen-size skate (≧185cm) have been tagged and released in areas near Cork Harbour, Kinsale, Courtmacsherry and Baltimore (Irish Specimen Fish Committee Annual Report, 2023). Since the relisting of this species as a 'specimen fish' in 2016, the majority of verified claims have come from anglers out of Union Hall, Co. Cork (Casserly & Roche, 2023). Species distribution modelling demonstrates a suitable habitat in the coastal areas of the Celtic Sea (Bache-Jefferys et al., 2021). Flapper skate mark-recapture and electronic tagging data suggest this species is capable of both long-range dispersal and high seasonal site fidelity. For example, Little (1995) found that of 219 fish mechanically tagged, 54 (28%) were recaptured and were caught at or near the release site in the Sound of Mull, Scotland. Similarly, Neat et al. (2014) found that of 280 tagged flapper skates between 2009 and 2021 in the Sound of Mull, 74 (26%) were recaptured, and 33 (12%) were recaptured on multiple occasions.

**Based on current knowledge, the flapper skate is amenable to spatial protection.** This species displays high inter-annual seasonal site fidelity, and has a sessile egg-laying reproductive strategy (Clarke et al. 2016). Mature reproductively active females have been observed to stay in shallow waters of <50 m during the potential egg-laying period (Thorburn et al., 2021). Egg-laying rates for Rajidae range from 0.23-1 egg per day (Holden et al., 1971; Concha et al., 2012); it has been suggested that owing to these slow rates of laying, mature female flapper skate may remain in shallow coastal nursery grounds for 40-160 days (Thorburn et al., 2021). Although nursery areas have not been identified in the Celtic Sea, a shallow bedrock within a water channel was identified as being a preferred egg-laying habitat (Dodd et al., 2022). Such habitat is found across several areas along the south coast, including, but not limited to, Courtmacsherry Bay off Co. Cork. In the vicinity of Courtmacsherry Bay, eight flapper skate egg cases have been recorded between 2013 - 2024 (Varian et al., 2020; Orrell *pers. comm.* 22nd March 2024). Given the site fidelity of reproductive females, protecting egg nurseries could safeguard reproductively active females as-well-as the sessile egg case life stage of this species (Frisk et al., 2001).

**Sensitivity assessment**

**The highest associated sensitivity scoring for flapper skate was in relation to targeted and non-targeted removal (bycatch) by fishing (high confidence).** EU fishing regulations have prohibited landings of flapper skate since 2009, however, the species may be accidentally caught in gillnet, longlines and bottom trawls (Williams et al., 2008). The effects of capture in fisheries are conflicting and highly species-specific and fisheries method-specific (see Cameron et al., 2023 and Horton et al., 2023 for a review of catch-and-release studies), however, a reduction in post-release fitness may occur after an exhaustive event. Following a precautionary approach, flapper skate were deemed sensitive to transition elements and organo-metal contamination given their long life-span and potential for bioaccumulation (low confidence), hydrocarbon and PAH contamination (low confidence). Flapper skate were deemed moderately sensitive to heavy smothering and siltation changes linked to fisheries activities (low confidence); this perceived sensitivity is owing to their benthic, sessile and slow maturing egg cases, which likely require well aerated water for survival (Phillips et al., 2021).

**Following a precautionary principle, flapper skate were identified as sensitive to shipping related pressures including contaminants (low confidence) and were regarded as not sensitive to underwater noise**. The impacts of vessel 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 unclear response to boat traffic (Rider et al., 2021). Hearing in

demersal elasmobranch species seems to be most sensitive to low frequencies, which are associated with offshore wind and shipping (Casper, 2006; Nieder et al., 2023), however, the direct impacts are unknown for species such as the flapper skate and their egg cases. Flapper skate are mobile and capable of long-range dispersal, and are therefore unlikely to be fatally impacted by underwater noise.

**Offshore energy impacts on elasmobranchs are poorly understood, however flapper skate sensitivity assessments varied to several offshore energy impacts.** Flapper skate were deemed highly sensitive (low confidence) to pressures including physical loss (to land or freshwater habitat; high confidence) and physical change to another seabed type owing to the benthic nature of egg cases and perceived preferred egg-laying habitat for nurseries. Flapper skate were deemed moderately sensitive to heavy smothering (low confidence) due to their sessile and slow maturing egg cases, which likely require well aerated water for survival. Flapper skate were given a low sensitivity scoring for water flow changes (low confidence). Given nursery areas for egg-laying have not been verified in the Celtic Sea, a precautionary approach is recommended. Construction activities may displace some elasmobranch species, although quantitative data are 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.

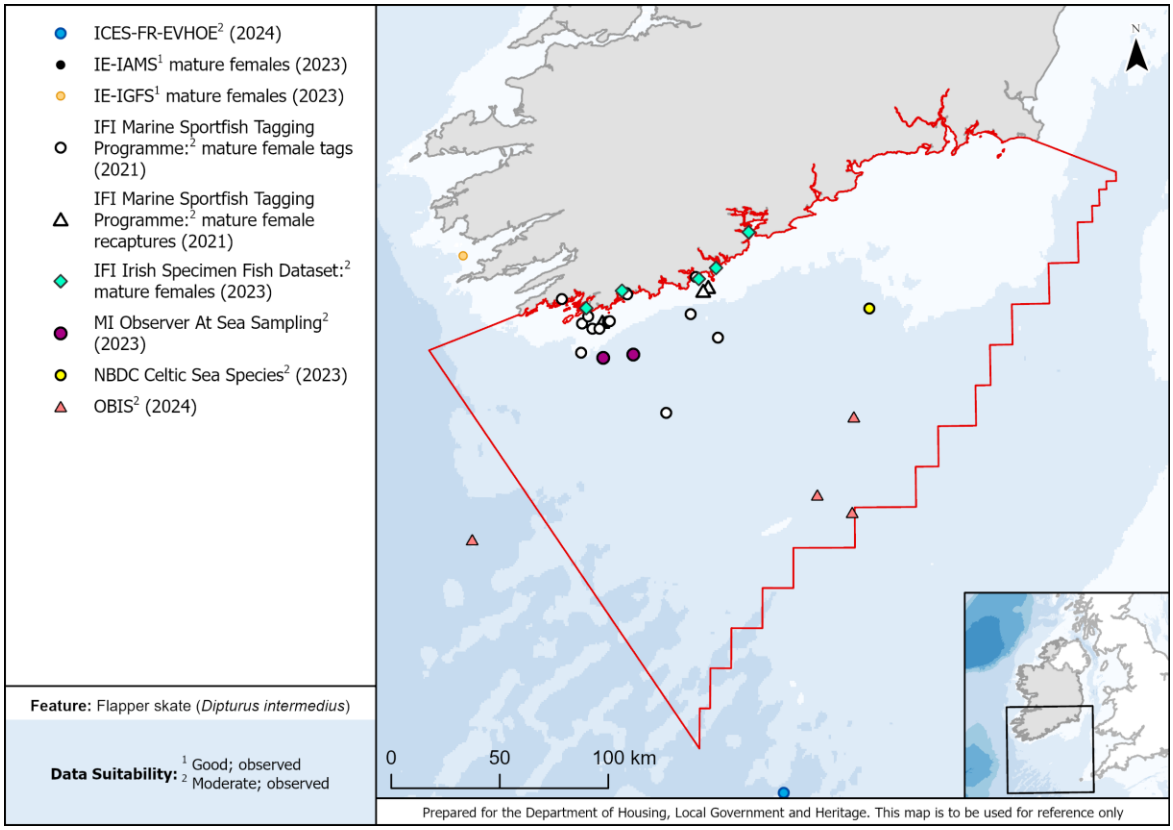


Figure A10.5.3. Data available for flapper skate (*Dipturus intermedius*) in the Celtic Sea.

**Data sources available**

Data sources for flapper skate in the Celtic Sea AOI that were available to the MPA Advisory Group, and the quality / suitability of those data for conservation prioritization analyses (See Table 3.2.1 Main Report), are shown in Figure A10.5.3. For information on how data were prepared for use in prioritization analyses, and for a visualisation of layers used, see Appendix 5e, section 5e.4.

**Further research needs**

Key knowledge on the distributions of the flapper skate in the southern Celtic Sea remains limited, although models predict a high suitability for the common skate complex (Bache-Jeffreys et al., 2021). Systematic egg case surveys of the coastline will also aid in identifying potential egg-laying sites in the area. In addition, evidence to identify the potential effects of multiple pressures was insufficient to form an assessment based on literature (apart from fisheries pressures) and relied on expert judgement. These pressures included chemical (synthetic compound contamination and introduction of other substances) and physical pressures (abrasion/disturbance of substratum

surface or seabed, penetration or disturbance of substratum subsurface and barriers to species movement).

There remains taxonomic confusion in the early literature meaning there are large gaps in information regarding migration, range, fishery discards and population trends. Despite the southern Celtic Sea housing one of few remaining hotspots for this species in the world, there is no published high resolution fisheries-independent knowledge on its spatial ecology within the focal area (site fidelity, residency, dispersal routes etc.). Equally, species-specific information on the space use and survivability of juveniles is limited, which may be a critical survival bottleneck. Additionally, there are no verified and published egg-laying sites identified within the focal area, or in Irish waters. Targeted egg case surveys are critically needed to identify lay sites, which could contribute to population recovery (Regnier et al., 2024).

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