3. Blue skate (*Dipturus batis*)

Irish name: Sciata coiteann

Figure A10.3.1. Juvenile blue skate (*Dipturus batis*) (photo by D. Quigley. Image must not be reproduced without permission).

Background

The 'common skate complex' was recently delineated as two separate species, the blue skate (*Dipturus batis)* and flapper skate (*D. intermedius*) (Iglésias et al., 2010). Species-specific information is therefore limited. The blue skate is a large cartilaginous fish species in the Class Chondrichthyes. The blue skate can reach a maximum estimated age of 30 years, and a maximum reported length of 143 cm (Last et al., 2016; Ellis et al., 2021). Age of 50% maturity is approximately 11 years, with males and females reaching maturity at ~115 cm and ~123 cm respectively (Iglésias et al., 2010). It is a benthic species with an approximate vertical habitat range between 10 – 600 m depth but is found mainly within the 200 m contour (Ellis et al., 2021). Recorded benthic habitat types include coarse and fine clean sand, mud, muddy gravel, muddy sand, sandy mud, seamounts and hard substrate (Neal & Pizzolla, 2006; Ellis et al., 2021). Juvenile blue skates are benthic specialists, with ontogenetic development leading to large adults specialising on teleost fishes (Brown-Vuillemin et al., 2020). The blue skate is a long-lived, slow maturing species with a low fecundity. Generation length is estimated to be 20 years. It is thought that blue skate females are oviparous and lay approximately 40 eggs (Walker and Hislop, 1998) every other year (Little, 1997) in the spring and summer (Stehmann & Burkel, 1984), however, it is unclear whether these observations hold true after species delineation. Egg cases are large and rectangular (19-24 cm long, 8 cm wide; Gordon et al., 2016), but preferred egg-laying and nursery habitats are unknown. Owing to taxonomic confusion, the true distribution of the blue skate still requires verification owing to confusion with the flapper skate *D. intermedius* (Garbette et al., 2023). However, the common skate complex is thought to have a distribution that extends from Iceland, Faroe Islands, Scotland, and the Celtic Sea to the Bay of Biscay and Northwestern Europe (Griffiths et al., 2010; Frost et al., 2020; Bache-Jeffreys et al., 2021; Delaval et al., 2022). The Greater North Sea/Celtic Sea was thought to be the most important region for the common skate complex, amounting to around 75% of the population in the North Atlantic, but further confirmation is required since formal identification of two *Dipturus* species (Daan, pers comm. from OSPAR Case Report). There was one confirmed egg case report off Mizen Head in 2010 (Varian et al., 2017).

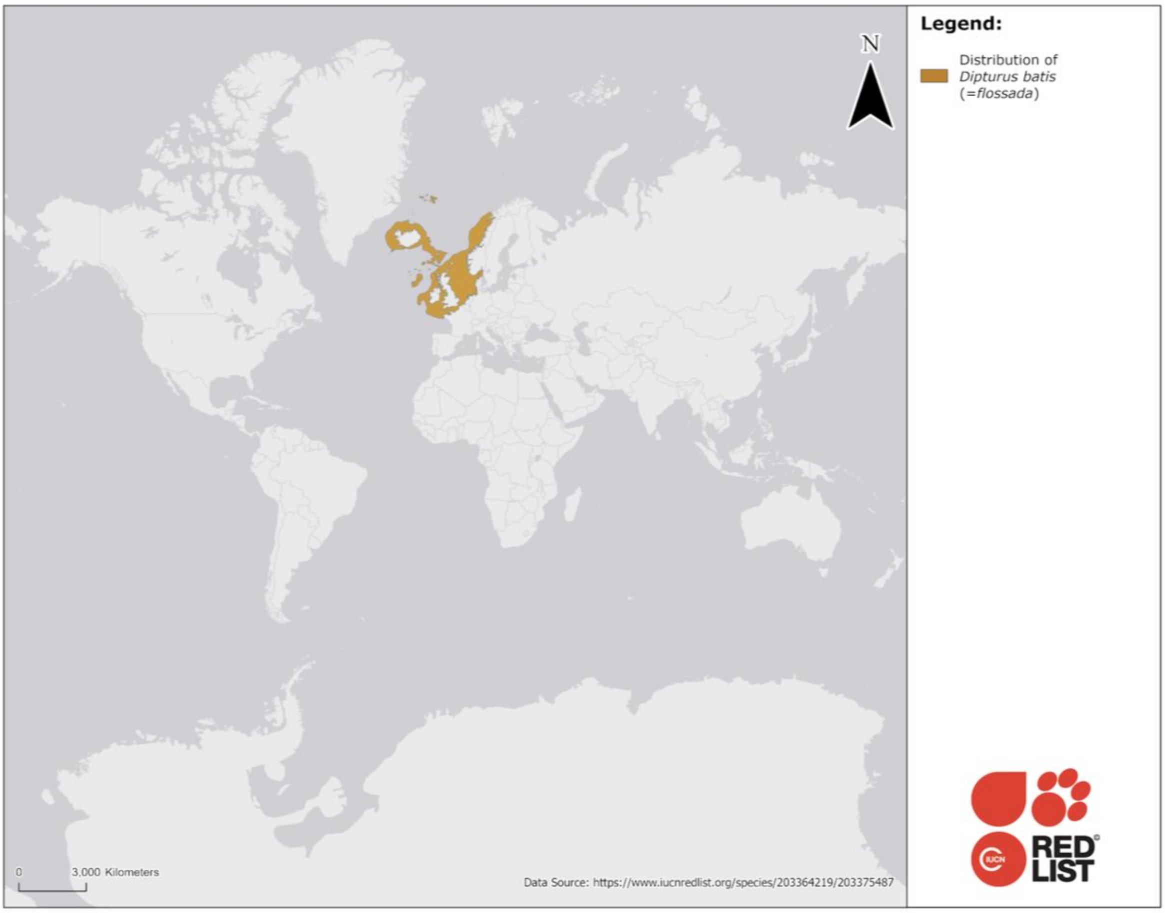

Figure A10.3.2. Global geographic distribution of the blue skate (*Dipturus batis*). From the IUCN Red

List of Threatened Species. Version 2023-1 (Ellis et al., 2021) https://www.iucnredlist.org/species/203364219/203375487

The rationale for spatial protection in the southern Celtic Sea

This species is classified as Critically Endangered in Ireland and globally (not assessed at the European scale) by the IUCN Red List and is listed as a Threatened and/or Declining species on OSPAR. Accurate population data of the blue skate are lacking due to taxonomic confusion with the flapper skate *D. intermedius*, the Norwegian skate *D. nidarosiensis,* and the longnosed skate *D. oxyrinchus*. However, historical exploitation of the common skate complex is thought to have decreased population levels by >80% over the past three generation lengths (60 years; Ellis et al., 2021). Within the Irish Sea, the common skate complex was considered locally extinct in the 1970s due to overfishing (Brander, 1981; Ellis et al., 2002). A recent increase in the catch rates of blue skate in recent trawl surveys off the coasts of Scotland and Ireland (the Porcupine Bank and Celtic Sea) needs to be viewed within the context of long-term declines of this species (ICES, 2020). The stock size of the blue skate is unknown and assessed as the 'common skate complex' by ICES which advises a zero catch in 2023-2024 in divisions 7a-c and 7e-k (ICES, 2022). An unknown stock quantity consequently means that there is insufficient evidence of recovery of the species.

Blue skate distribution appears patchy within the northeast Atlantic, and the distribution within Irish waters appears to follow this with an assumed single population of blue skate off the Porcupine bank (Delaval et al., 2023). Within our study site, trawl data from the French Southern Atlantic Bottom Trawl Survey (ICES-FR-EVHOE), the Irish Anglerfish and Megrim Survey (IE-IAMS), and the Irish Ground Fish Survey (IE-IGFS) suggest a coastal distribution of adults and an offshore early juvenile stage distribution. Early juvenile stage blue skates (≤28 cm total length; Ellis et al., 2024) are thought amenable to spatial protection as they are assumed to stay within a discrete spatial area after hatching (Ellis et al., 2024).

The southern Celtic Sea is a significant part of its range. The current distribution of the blue skate is uncertain, as are the current levels of exploitation within the Celtic Sea (Ellis et al., 2021). Recent genetic research on the blue skate supports earlier suggestions that the common skate complex (assessed as *D. batis*) displays site fidelity to highly localised areas (Delaval et al., 2022), with other genetic data suggesting subpopulations may occur (G.J.P. Naylor pers. comm. 29 April 2021, IUCN Red List Assessment). Additionally, it has been suggested that the Celtic Sea may provide an important reproductive habitat due to high catch rates and site fidelity (Delaval et al., 2022).

Sensitivity assessment

Based on current knowledge, the blue skate is amenable to spatial protection due to its egg-laying reproduction strategy and the assumed residency of early stage juvenile blue skate to discrete areas. A confirmed blue skate egg case was found in 2010 off Mizen Head. A follow up survey of the area resulted in the site being listed as a potential nursery area for the blue skate (Varian et al., 2020). Trawl data showed an offshore distribution of early stage juvenile blue skate.

The highest associated sensitivity scoring for the blue skate was in relation to targeted and non-targeted removal (bycatch) by fishing (high confidence). Although the common skate complex is prohibited from being fished in EU waters, and ICES (2022) recommended no catch, the common skate complex is still caught in gillnets, longlines and bottom trawls and misidentified in reported landings (Williams et al., 2008; Simpson & Sims, 2016). ICES also highlights that accurate recording of bycatch of endangered, threatened, and protected species is difficult to achieve (ICES, 2024). Studies on 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), but mortality events and a reduction in post-release fitness may occur after an exhaustive event. Following a precautionary approach applied by FeAST, the common skate complex was deemed sensitive to transition elements and organo-metal contamination (low confidence), hydrocarbon and PAH contamination (low confidence). The common skate complex was deemed moderately sensitive to heavy smothering and siltation changes linked to fisheries activities (FeAST assessment, low confidence) due to the benthic nature and sessile and slow maturing egg cases which likely require well aerated water for survival.

Following a precautionary principle, the blue skate was identified as sensitive to shipping related pressures including contaminants (following a FeAST assessment for the 'common skate complex', low confidence) but was 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 ability in demersal elasmobranch species seems to be most sensitive to low frequencies (Casper, 2006), suggesting vessel sound may impact the blue skate. Additionally, research on shark species such as tope, has shown that they respond to frequencies within the operational range of wind turbines and shipping (Tougaard et al., 2020; Nieder et al., 2023). However, how less mobile species or sessile egg cases respond is not understood.

Offshore energy impacts on elasmobranchs are poorly understood, however blue skate sensitivity assessments varied to several offshore energy impacts. Physical loss (to land or freshwater habitat) was deemed highly sensitive due to their benthic and sessile egg cases (high confidence). Pressures including water flow changes were deemed low sensitivity (medium confidence) due to information regarding water flow rates of up to 0.2 m s^{-1} being important for the flapper skate (part of the 'common skate complex'; Dodd et al., 2022). Physical change to another seabed type, sediment type, habitat structure change-removal of substratum (extraction), abrasion of seabed, penetration of substratum and barrier to species movement (FeAST, 2023 assessment) were deemed low sensitivity (low confidence) due to knowledge of flapper skate egg cases being benthic, sessile, slow maturing and likely requiring well-aerated water for survival. Given nursery areas for egg-laying have not been delineated 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 may 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.

Circalittoral Rock and Biogenic Reef is highly sensitive to pressures associated with shipping. Circalittoral rock and Biogenic Reef is highly sensitive to the chemical pressures 'transition elements & organo-metal contamination', 'hydrocarbon & PAH contamination', and 'synthetic compound contamination '(Maher et al., 2016), the effects of which are described above in relation to the fishing sector.

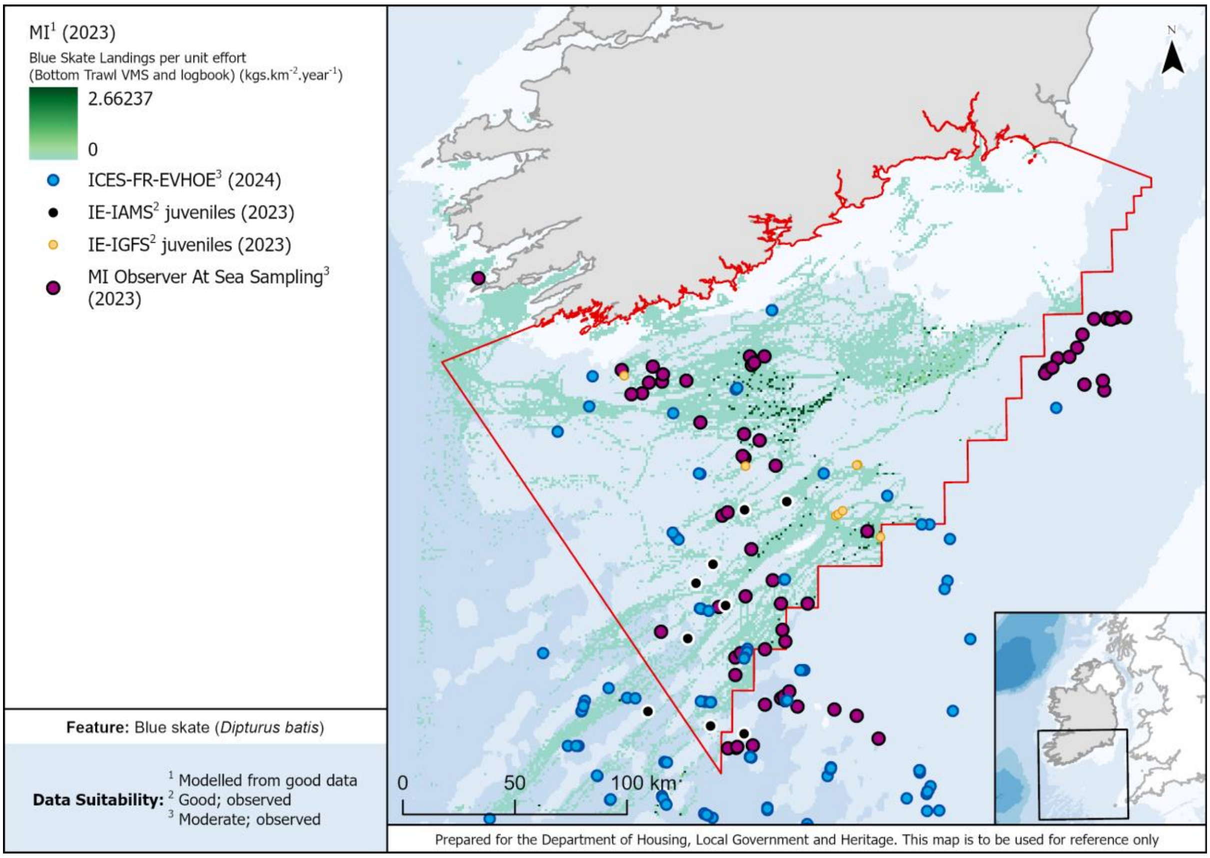

Figure A10.3.3. Data available for blue skate (*Dipturus batis*) in the Celtic Sea.

Further research needs

Key knowledge on the biology, ecology and true distribution of the blue skate is lacking, including basic reproductive information such as sexually mature female site fidelity, lay site distribution and preference, number of eggs laid per female and at what frequency, and the time taken for eggs to mature. Distribution models predict a high suitability for the common skate complex (Bache-Jeffreys et al., 2021) in the southern Celtic Sea, although further study to demonstrate the effectiveness of these models through methods such as biologging is lacking. There remains confusion in the literature regarding which species of the common skate complex has been studied, meaning there are large gaps in information regarding, migration, site fidelity, residency, range, fishery discards and population trends of the blue skate.

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