

9. Tope shark (*Galeorhinus galeus*)

Irish name: Gearrthóir

Also commonly known as the school shark, soupfin shark and vitamin shark



Figure A10.9.1. Tope shark (*Galeorhinus galeus*). Photo: CETUS Project, University College Cork. Do not reuse without permission.

This case report has been updated from the western Irish Sea case report published in 2023. A new Web of Science literature review was conducted to assess whether any new research on the species had been conducted since the western Irish Sea report was published, and used to inform both the report and the sensitivity analysis.

Background

The tope shark is a medium-sized shark in the Class Chondrichthyes. Tope are benthopelagic with a broad habitat range between 0-826 m depth, but are most frequent to depths of 200 m (Walker et al., 2020). The maximum size varies regionally, ranging from 155 cm total length in the Southwest Atlantic (Peres & Vooren, 1991) to 200 cm in the Mediterranean Sea (Capapé & Mellinger, 1998). Size-at-maturity, size-at-birth and reproductive cycle vary regionally but, in total, this is a slow-maturing species that gives birth to live young (litter size averages between 20-35 pups; Walker et al.,

2020). Tope are distributed across the Northeast, Eastern Central, Southwest, and Southeast Atlantic, the Mediterranean Sea, the Eastern Indian, and the majority of the Pacific, except the Northwest Pacific (Walker et al., 2020). Tagging and genetic data suggest up to six subpopulations of tope globally, and while tope exhibit large-scale movements, there is no evidence of population mixing (Walker et al., 2020). In the Northeast Atlantic region, there is believed to be a single stock (ICES, 2012). Inland Fisheries Ireland data suggest wide migrations between the North Sea, west of Scotland, Ireland and south towards the Canary Islands, the Azores, the western Mediterranean and northwest Africa (Fitzmaruice et al., 2003). The Northeast Atlantic and Mediterranean stock is thought to be isolated from other global subpopulations (Chabot and Allen, 2009).

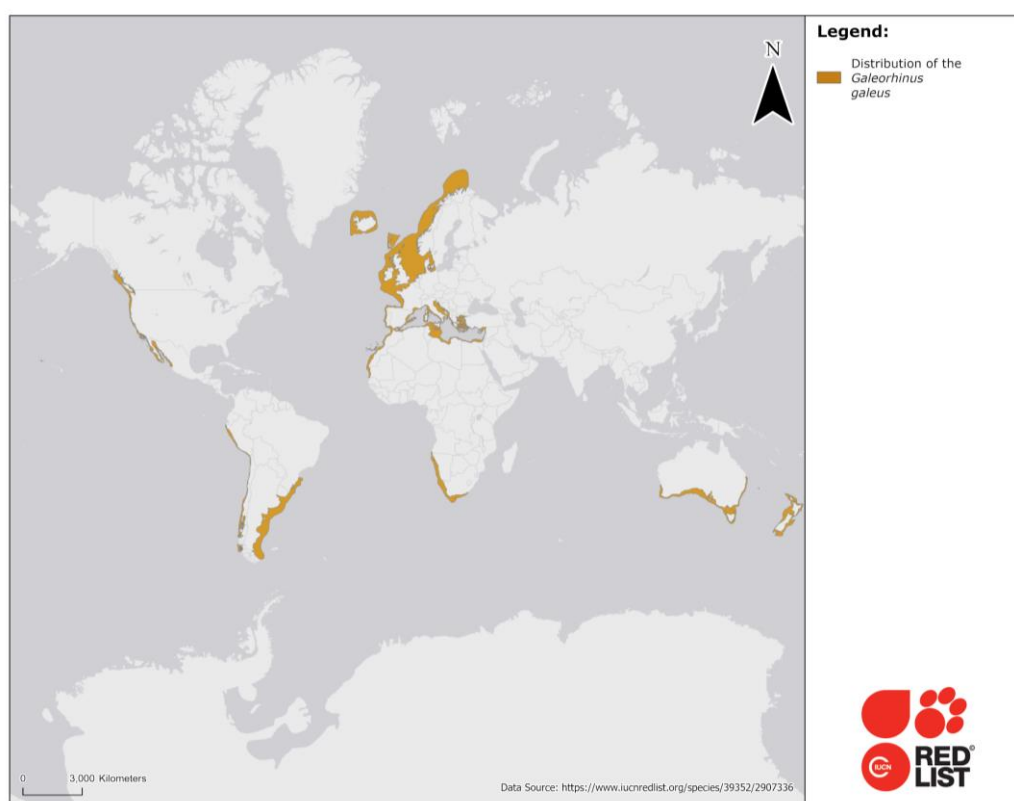


Figure A10.9.2. Global geographic distribution of tope shark (*Galeorhinus galeus*) from Walker et al. (2020). <https://www.iucnredlist.org/species/39352/2907336>

The rationale for spatial protection in the southern Celtic Sea

Tope was nominated for inclusion with particular reference to being listed as Threatened and/or Declining by OSPAR and listed as Vulnerable by the Irish Red List (Clarke et al., 2016) and European Red List (Nieto et al., 2015), and Critically Endangered by the Global IUCN Red List (Walker et al. 2020). Tope are protected under the Common Fisheries Policy (S.I. No. 83/2015), which prohibits longline fishing. Reported catches of tope are often included as “dogfishes and hounds” (Dureuil,

2013) and misidentified as starry smooth-hound (Farrell et al., 2009). Consequently, accurate data on tope are limited. In the Northeast Atlantic, the subpopulation has experienced a 76% decline over the past 79 years (three generation lengths; Walker et al., 2020). There is conflicting evidence as to whether the Northeast Atlantic subpopulation is stable (Walker et al., 2020) or declining (exploratory assessment of catch per unit effort trends from 20 year trawl survey data; Dureuil, 2013). Current ICES advice in subareas 1-10, 12 and 14 suggests a precautionary approach should be applied owing to a lack of current information on abundance or exploitation (ICES, 2023).

It is not known whether the southern Celtic Sea comprises a significant part of its range. Data on the distribution of this species in the southern Celtic Sea are limited, with data primarily from mark-recapture programs led by Inland Fisheries Ireland. Specimen adult tope (over ≥ 155 cm total length and/or ≥ 40 lbs) are caught and released in areas including Dunmore East and Kilmore Quay in Co. Wexford (Irish Specimen Fish Committee, 2022).

Based on current knowledge, tope are amenable to spatial protection. Owing to their documented use of nearshore breeding areas, useful management measures for tope could include closed areas to protect the pupping areas of pregnant females. Tracking data generated in Scottish waters suggest juvenile tope (<40 cm total length) use shallow nearshore areas and displayed residency (Thorburn et al., 2019). This finding is also supported by an energetic study by McMillan et al. (2021), which found long range dispersal of young tope is unlikely due to physiological constraints. These data suggests that females periodically return to nearshore breeding areas, and juvenile sharks may be amenable to spatial protection as they show limited dispersal capability and periods of residency.

Sensitivity assessment

The highest associated sensitivity scoring for tope was in relation to its targeted (medium confidence) and non-targeted removal (high confidence) by fishing. Tope are caught globally as a target species and as bycatch in industrial and small-scale demersal and pelagic gillnet and longline fisheries, and less commonly caught by trawl and hook-and-line fisheries (Walker et al., 2020). Tracking data suggest behavioural plasticity, and potential habitat expansion of adult tope into mesopelagic layers of the high seas, which increases their risk of incidental fisheries capture (Schaber et al., 2022). Tope are not targeted by commercial fisheries in Irish waters and catch-and-release is mandatory in EU waters for line-caught tope (S.I. No. 83/2015). Tope are targeted by sport and recreational fishers in Irish waters, and may be caught as bycatch owing to the use of the lower and mesopelagic layers of the water column. The most recent ICES assessment (2023) covering tope in subareas 1-10, 12 and 14 states that, “Discarding is known to take place but cannot be quantified”.

Tope are regarded as not sensitive to shipping-related activities. Elasmobranchs lack a swim bladder and specialised hearing structures, and therefore are considered to only detect particle motion, and not the pressure component of sound (Banner, 1967; Mickle et al., 2020; Popper & Hawkins, 2021). 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 and benthopelagic elasmobranch species is thought to be most sensitive to low frequencies (Nieder et al., 2023). However, hearing range is species-specific (Popper and Fay, 1999). During a tank-based experimental study, juvenile tope sharks were found to respond to a broad bandwidth of sound (80-600Hz), and were most sensitive to frequencies below 200 Hz (Nieder et al., 2023). This frequency range is within the operational range of both wind turbines and shipping activities (Tougaard et al., 2020). Whether sensitivity translates to turbine and boat avoidance is yet to be determined, but owing to the mobile nature of this species, operational noise is unlikely to result in mortality. Ship strike is deemed not to be a relevant pressure owing to the highly mobile nature of this benthopelagic species.

Offshore energy impacts on elasmobranchs are poorly understood. However, based on existing knowledge, tope were scored as of low sensitivity or not sensitive to the associated pressures.

Construction activities may displace some species. However, quantitative data are absent. Bruce et al. (2018) found that seismic survey sounding in Australia significantly reduced tope catch using demersal gillnets. Given tope are very mobile and can exhibit behavioural plasticity, they were deemed not sensitive to underwater noise (low confidence) or electromagnetic fields (low confidence) produced by offshore cabling.

Data sources available

Data sources for tope shark 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 A10.9.3. Data were not considered suitable for inclusion in prioritization analyses due to sparsity of records and lack of spatial coverage.

Further research needs

Key knowledge on the distributions and population structure of tope in the southern Celtic Sea remains limited and requires further investigation using fisheries-independent sampling methods. In addition, evidence to identify the potential effect of multiple pressures was insufficient to form an assessment. These pressures included chemical (transition elements and organo-metal

contamination, hydrocarbon and PAH contamination, 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).

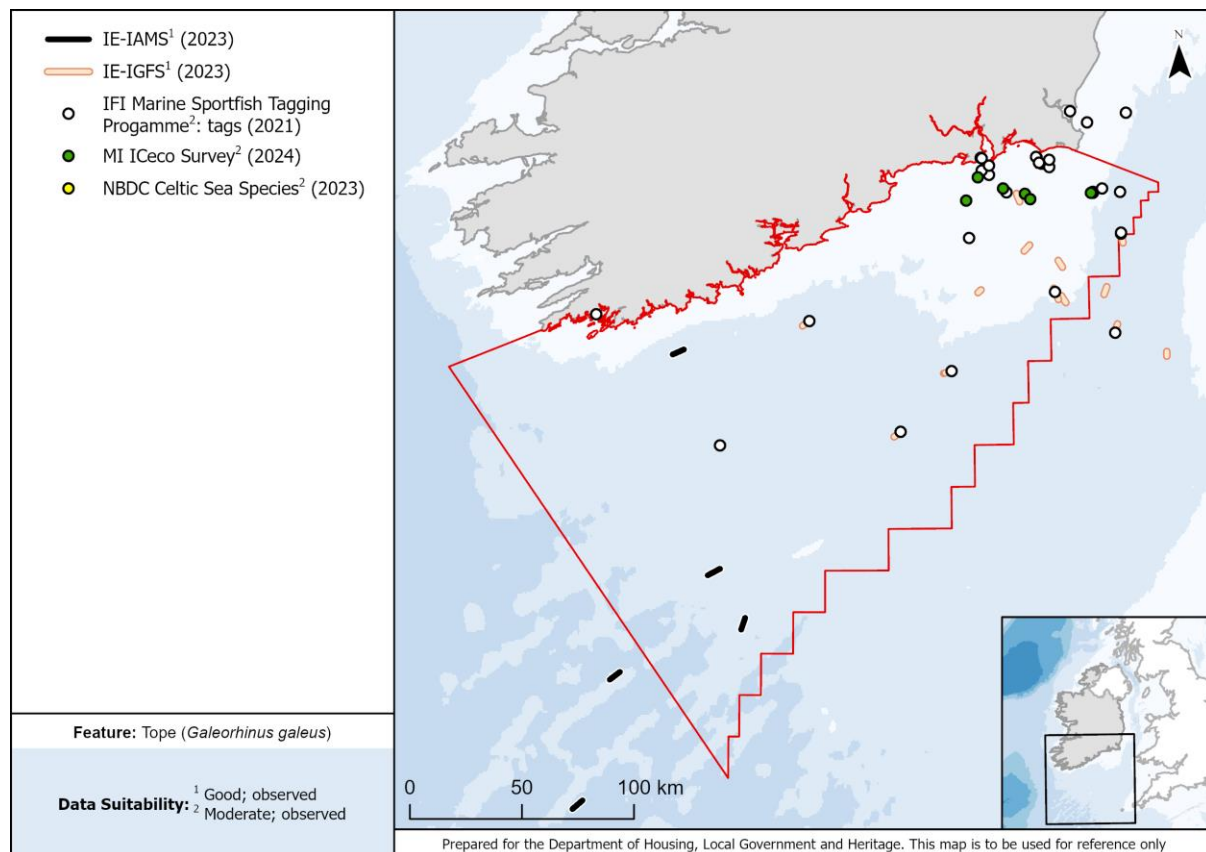


Figure A10.9.3. Data available for tope shark (*Galeorhinus galeus*) in the Celtic Sea.

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