

Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

MARMARA SEA SHELF ISRA

Mediterranean and Black Seas Region

SUMMARY

Marmara Sea Shelf is located in Türkiye, in the inland sea connecting the Black Sea and the Mediterranean Sea. The northern coastline is characterised by a narrow continental shelf and steep slope. The area consists mostly of sandy and muddy substrates. This area overlaps with three Key Biodiversity Areas. Within the area there are: **threatened species** (e.g., Common Smoothhound *Mustelus mustelus*) and **feeding areas** (e.g., Starry Smoothhound *Mustelus asterias*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C2 - Feeding Areas

— TÜRKIYE —

— 0-200 metres —

— 1,142.2 km² —





DESCRIPTION OF HABITAT

Marmara Sea Shelf is located in Türkiye. The Marmara Sea is a small basin connecting the Mediterranean Sea and the Black Sea, through the Dardanelles and the Bosphorus Straits. In the southeastern part of the area there is the Marmara Archipelago, which includes Marmara, Avşa, Paşalimanı, and Ekinlik Islands. In addition, there are 17 other islands in the southern part of the area. The northern coastline is characterised by a narrow continental shelf and a steep slope, while the southern continental shelf is wide and reaches almost the centre of the area (Kabasakal 2023; Kabasakal et al. 2023).

The area is characterised by sandy and muddy substrates (Kabasakal & Karhan 2015; Kabasakal 2022). It shows a two-layer circulation pattern with opposite-flowing water masses. The upper layer is less saline and transports the water surplus of the Black Sea towards the Mediterranean Sea, whilst the lower more saline layer transports Aegean Sea water towards the Black Sea (Poulos 2020). Due to input from land sources, the area has high eutrophication and, below the haloclines, deoxygenation of the water occurs (Yalcin et al. 2017).

The area overlaps with three Key Biodiversity Areas: Marmara Islands, Kocaçay Delta, and Armutlu Peninsula (KBA 2023a, 2023b, 2023c).

This Important Shark and Ray Area is benthopelagic and is delineated from surface waters (0 m) to 200 m, based on the distribution of the Qualifying Species in the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Two Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in the area. The Common Smoothhound is assessed as Endangered (Jabado et al. 2021) and the Starry Smoothhound as Vulnerable in a regional Mediterranean Sea assessment (Farrell et al. 2016).

SUB-CRITERION C2 – FEEDING AREAS

Marmara Sea Shelf is an important feeding area for two shark species. Stomach content analysis and stable isotope analysis revealed the importance of the area, with $\delta^{15}\text{N}$ values for both species enriched compared with values reported for the Mediterranean Sea, confirming that feeding occurs within the Marmara Sea (Gül & Demirel 2021).

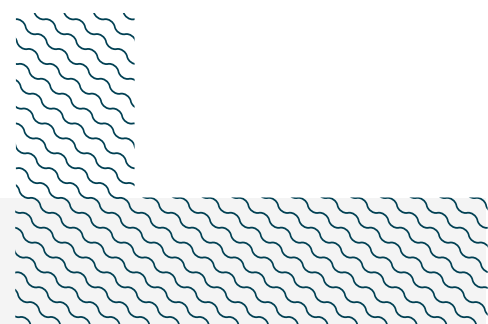
Between 2017–2018, 18 Starry Smoothhounds were caught in benthic trawl surveys in the eastern part of the area at an average depth of 150 m (Gül & Demirel 2021). Stomach content analysis (88% of stomachs full) revealed that this species feeds mainly on Deep-water Rose Shrimp *Parapenaeus longirostris* (percentage index of relative importance [%IRI] = 88.4). This species has been reported to occur in higher abundances between 100–200 m mostly in the boreal autumn and winter (Daban et al. 2021).

Between 2017–2018, 28 Common Smoothhounds were caught in benthic trawl surveys, at an average depth of 89 m, mostly in the northern part of the area during autumn and winter. Stomach content analysis (95% of stomachs full) and stable isotope analysis revealed that the most important prey were the Harbour Crab *Liocarcinus depurator* (%IRI = 52.9) and the Deep-water Rose Shrimp (%IRI =



33.3) (Gül & Demirel 2021). Common Smoothhound has been reported to occur in higher abundances between 20–100 m in spring and summer (Daban et al. 2021). The Harbour Crab has been reported as an important discard of bivalve dredge fisheries (Colakoglu 2020) and the higher abundances in the Marmara Sea occur in autumn when abundances of Common Smoothhounds are also highest (Ayfer et al. 2017; Mulayim 2021). In addition, this crab is more abundant at similar depths (~100 m) as the Common Smoothhound (Koch & Duris 2016).

The Deep-water Rose Shrimp is the most abundant and most caught shrimp species in the Marmara Sea and has higher abundances in this location compared with other areas in Turkish waters (Bayhan & Akkaya 2005; Inceoğlu et al. 2021). Higher biomass and relative abundances were reported between 50–200 m and during summer and autumn (Bayhan & Akkaya 2005; Inceoğlu et al. 2021). This pattern matches with the occurrence of both smoothhound species, indicating that both species take seasonal advantage of the high biomass of this prey within the area to feed.



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QUALIFYING SPECIES

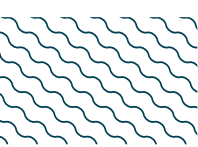
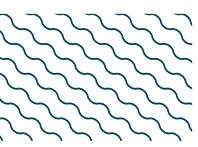
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met									
				A	B	C1	C2	C3	C4	C5	D1	D2	
SHARKS													
<i>Mustelus asterias</i>	Starry Smoothhound	VU*	0-199	X			X						
<i>Mustelus mustelus</i>	Common Smoothhound	EN	5-800	X			X						

*Assessed as VU in a Mediterranean regional assessment but considered NT globally.

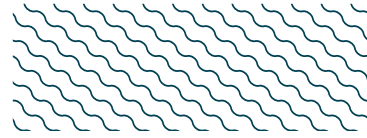
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Alopias superciliosus</i>	Bigeye Thresher	VU
<i>Alopias vulpinus</i>	Common Thresher	VU
<i>Echinorhinus brucus</i>	Bramble Shark	EN
<i>Hexanchus griseus</i>	Bluntnose Sixgill Shark	NT
<i>Oxynotus centrina</i>	Angular Roughshark	EN
<i>Scyliorhinus canicula</i>	Smallspotted Catshark	LC
<i>Squalus acanthias</i>	Spiny Dogfish	VU
<i>Squatina squatina</i>	Angelshark	CR
RAYS		
<i>Dasyatis pastinaca</i>	Common Stingray	VU
<i>Dipturus oxyrinchus</i>	Longnosed Skate	NT
<i>Myliobatis aquila</i>	Common Eagle Ray	CR
<i>Raja clavata</i>	Thornback Skate	NT
<i>Torpedo marmorata</i>	Marbled Torpedo Ray	VU

IUCN Red List of Threatened Species Categories are available by searching species names at www.iucnredlist.org. Abbreviations refer to: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.



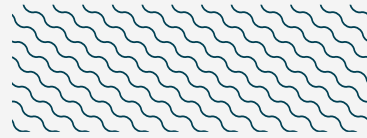
SUPPORTING INFORMATION



There are additional indications that this area is important for the feeding of one shark and two ray species. Stomach content analysis of Common Eagle Ray (n = 15) caught at mean depths of 78 m between 2017–2018 revealed that this species feeds mostly on tusk shells (scaphopods) and bony fishes (Gül & Demiral 2020). In addition, stable isotope analysis in muscle and liver from this species (n = 4) and from Common Stingray (n = 4) showed that these individuals were feeding within the Marmara Sea, due to depleted ^{13}C values compared to other areas in the eastern Mediterranean (Gül & Demiral 2020). However, more information is needed to confirm the feeding importance of this area compared to other areas.

Between 2017–2018, 50 Smallspotted Catsharks were caught in benthic trawl surveys, at an average depth of 77 m (Gül & Demirel 2021). Stomach content analysis (56% of stomachs full) revealed that the species feed mainly on bony fishes and cephalopods. However, mixing models of stable isotope analysis revealed that shrimps are also important in the short and long term (Gül & Demirel 2021). More evidence is needed to confirm the feeding importance of the area for this species.

Between 2017–2018, 45 Spiny Dogfish were caught in benthic trawl surveys, at an average depth of 101 m mainly in the southern part of the area during spring and summer (Gül & Demirel 2021). Stomach content analysis (89% of stomachs full) revealed that the species feeds mainly on bony fishes, especially jack mackerels *Trachurus* sp. (%IRI = 33.4) which was also supported by results from mixing models of stable isotope analysis (Gül & Demirel 2021). Anchovies and Mediterranean Horse Mackerel (*Trachurus mediterraneus*) are the most caught species in the Black Sea and the Sea of Marmara (Demirel & Yüksek 2013). Spiny Dogfish seems to take advantage of the spawning season of the Mediterranean Horse Mackerel, that has been reported to start in May, with peaks in July–August and ending in September (Demirel & Yüksek 2013) but more evidence is needed to confirm this and to confirm the feeding importance of this area compared to others.



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