

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

LIGURIAN SEA ISRA

Mediterranean and Black Seas Region

SUMMARY

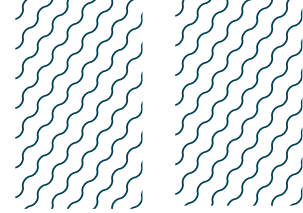
Ligurian Sea is located in the northwestern Mediterranean Sea, in the Italian region of Liguria. The area is characterised by the presence of a cyclonic circulation of water masses, mesoscale eddies, and areas of significant upwelling. It also includes seamounts, underwater canyons, and deepwater coral banks. Within this area there are: **threatened species** (e.g., Spinetail Devil Ray *Mobula mobular*); **reproductive areas** (Little Sleeper Shark *Somniosus rostratus*); and **feeding areas** (e.g., Basking Shark *Cetorhinus maximus*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas;
Sub-criterion C2 - Feeding Areas

— —
ITALY — —
 — —
0-2,620 metres
 — —
3,345.3 km²
 — —





DESCRIPTION OF HABITAT

Ligurian Sea is located in the northwestern Mediterranean Sea, along the Italian coastline of Liguria. The area sits on continental shelf, slope, and bathyal habitats. One of the most important geomorphological features is the presence of several deep underwater canyons, carving the sea floor perpendicularly to the coast. Offshore seamounts are also present in the area.

Cyclonic water circulations and vorticity in the area are caused by southerly wind stress that cause a coastal counter current in the Gulf of Genova leading to high productivity (Esposito & Manzella 1982). The oceanographic circulation is induced by the density gradients of three different water masses (Prieur et al. 2020). First, surface waters (0-200/300 m depth) are from the Modified Atlantic Water. The reunion of this water mass with waters raising along the eastern coast of Corsica, right in front of Genoa, creates the Ligurian-Provençal Current, which flows westward along the continental slope. It is present throughout the year and, more importantly, creates between coastal and offshore waters, a geostrophic permanent frontal zone, which is fundamental in terms of biological productivity. Second, intermediate waters (200/300-1,000 m), are from the Levantine Intermediate Water, and are denser, saltier, richer in nutrients and relatively warmer, than surface waters as they originate from the Eastern Mediterranean Basin. Third, the Mediterranean Deep Water (from 1,000 m to the bottom), is more homogenous, with an annual near-constant temperature around 12.5-13°C. Productivity of these waters is due to winter mixing, frontal zones, local 'upwelling' phenomena coupled with meso-scale vortices and the presence of complex structures of divergences/convergences. These phenomena, coupled with wind-induced water exchanges, makes the offshore area present a primary productivity higher than the coastal zone, especially within the frontal zone. This productivity is relatively high throughout the year, constituting a mesotrophic zone, opposite to the general oligotrophy of the Mediterranean Sea.

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 2,620 m based on the bathymetry of 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. These are the Endangered Basking Shark (Rigby et al. 2021) and Spinetail Devil Ray (Marshall et al. 2022).

SUB-CRITERION C1 - REPRODUCTIVE AREAS

Ligurian Sea is an important reproductive area for one shark species.

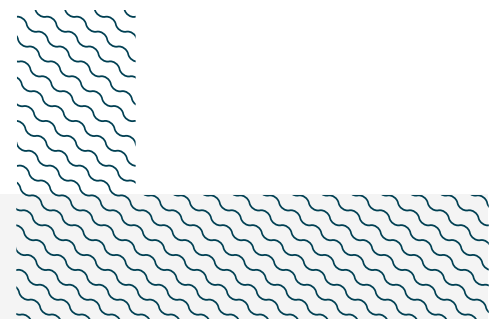
Pregnant female Little Sleeper Shark (n = 7; Garibaldi et al. 2012) and individuals at all stages of maturity are regularly recorded, with embryos ranging from a few cm to 15 cm total length (TL) (n = 55; Garibaldi et al. 2012; F Garibaldi unpubl. data 2008-2022). Size-at-birth for this species is 21-28 cm TL (Ebert et al. 2021). Limited reproductive information is available for the species with only one other side identified in the Mediterranean Sea which highlights that the area is important for the gestation of this species.



SUB-CRITERION C2 - FEEDING AREAS

Ligurian Sea is an important feeding area for one shark and one ray species.

Ligurian Sea shows a high abundance and density of zooplankton compared with other areas in the Mediterranean Sea, particularly in spring, but also well into summer, favoured by upwelling and frontal zones (Frangou et al. 2010; Bozzano et al. 2014). Basking Shark and Spinetail Devil Ray feed on meso- and macro-zooplankton including copepods and euphausiid shrimps, mostly Northern Krill *Meganyctiphanes norvegica* (Celona 2004; Couturier et al. 2012; Notarbartolo di Sciara et al. 2015). Peaks of zooplankton abundances coincide with the presence of large filter-feeding animals in the area, including Basking Shark (Serena et al. 1999) and Spinetail Devil Ray (Orsi Relini & Cappello 1992; Serena et al. 1999; Notarbartolo di Sciara et al. 2015).



Acknowledgments

Simone Niedermueller (WWF Mediterranean), Fulvio Garibaldi (University of Genoa), Alessandro Buzzi (WWF Mediterranean), Luca Lanteri (University of Genoa), Cecilia Pinto (University of Genoa), Fabrizio Serena (IRBIM-CNR), and Théophile L. Mouton (IUCN SSC Shark Specialist Group - ISRA Project) contributed and consolidated information included in this factsheet. We thank all participants of the 2023 ISRA Region 3 - Mediterranean and Black Seas workshop for their contributions to this process.

This factsheet has undergone review by the ISRA Independent Review Panel prior to its publication.

This project was funded by the Shark Conservation Fund, a philanthropic collaborative pooling expertise and resources to meet the threats facing the world's sharks and rays. The Shark Conservation Fund is a project of Rockefeller Philanthropy Advisors.

Suggested citation

IUCN SSC Shark Specialist Group. 2023. Ligurian Sea ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

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>Cetorhinus maximus</i>	Basking Shark	EN	180-2,734	X			X						
<i>Somniosus rostratus</i>	Little Sleeper Shark	LC	100-2,500			X							
RAYS													
<i>Mobula mobular</i>	Spinetail Devil Ray	EN	0-1,000	X			X						

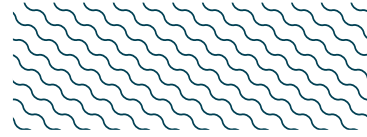
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Alopias vulpinus</i>	Common Thresher	VU
<i>Centrophorus uyato</i>	Little Gulper Shark	EN
<i>Centroscymnus coelolepis</i>	Portuguese Dogfish	NT
<i>Dalatias licha</i>	Kitefin Shark	VU
<i>Etmopterus spinax</i>	Velvet Belly Lanternshark	VU
<i>Galeorhinus galeus</i>	Tope	CR
<i>Galeus melastomus</i>	Blackmouth Catshark	LC
<i>Heptranchias perlo</i>	Sharpnose Sevengill shark	NT
<i>Hexanchus griseus</i>	Bluntnose Sixgill Shark	NT
<i>Isurus oxyrinchus</i>	Shortfin Mako	EN
<i>Lamna nasus</i>	Porbeagle	VU
<i>Mustelus mustelus</i>	Common Smoothhound	EN
<i>Oxynotus centrina</i>	Angular Roughshark	EN
<i>Prionace glauca</i>	Blue Shark	CR*
<i>Scyliorhinus canicula</i>	Smallspotted Catshark	LC
<i>Scyliorhinus stellaris</i>	Nursehound	VU
<i>Squatina squatina</i>	Angelshark	CR
RAYS		
<i>Dasyatis pastinaca</i>	Common Stingray	VU
<i>Myliobatis aquila</i>	Common Eagle Ray	DD
<i>Pteroplatytrygon violacea</i>	Pelagic Stingray	LC
<i>Raja asterias</i>	Starry Skate	NT
<i>Raja brachyura</i>	Blonde Ray	NT
<i>Raja clavata</i>	Thornback Skate	NT
<i>Raja miraletus</i>	Brown Ray	LC
<i>Torpedo marmorata</i>	Marbled Torpedo Ray	VU
CHIMAERAS		
<i>Chimaera monstrosa</i>	Rabbitfish	VU

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

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.

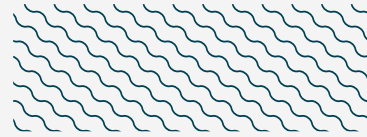
SUPPORTING INFORMATION



There are additional indications that Ligurian Sea is an important reproductive area for two shark species.

Pregnant female Blue Shark with near-term pups are caught each year in late boreal spring as bycatch of the swordfish surface longline fishery (F Garibaldi pers. obs. 2008-2022). Neonates with open umbilical scars (35-60 cm TL; Pratt 1979; Stevens 1984; Hazin et al. 1994; Nakano 1994) are regularly reported by recreational fishers (estimated number of more than 50 each year) between June and July (F Garibaldi pers. obs. 2008-2022). Young-of-the-year individuals (60-100 cm TL) constitute ~15-20% of Blue Shark catches in the area (Garibaldi & Orsi Relini 2000; F Garibaldi unpubl. data 2015-2017). However, more information is needed to understand the importance of the area for reproduction.

The presence of neonate and young-of-the-year Shortfin Mako (60-90 cm TL; size-at-birth is 60-70 cm TL; Garrick 1967; Compagno 2001) is regular, every year, and highest in the summer season (F Garibaldi pers. obs. 2008-2022). These individuals constitute a bycatch of the longline fishery targeting swordfish and the recreational fishery (Mancusi et al. 2020, ~30% of catches; F Garibaldi unpubl. data 1995-2020). However, more information is needed to understand the importance of the area for reproduction.



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