

Mediterranean Angel Sharks: SubRegional Action Plan (SubRAP) GSA 24 (Northern Levant Sea)

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INTRODUCTION

Three species of Critically Endangered angel shark are present in the Mediterranean with overlapping ranges:

- *Squatina aculeata* **Sawback Angelshark (EN), Çivili Keler (TR)**
- *Squatina oculata* **Smoothback Angelshark (EN), Benekli Keler (TR)**
- *Squatina squatina* **Angelshark (EN), Keler (TR)**

The *Mediterranean Angel Sharks: Regional Action Plan* (Gordon *et al.*, 2019) sets out a roadmap to help restore these enigmatic species to robust populations in the region. It acts as a call to action for stakeholders to work together to address the challenges faced by these three imperilled species.

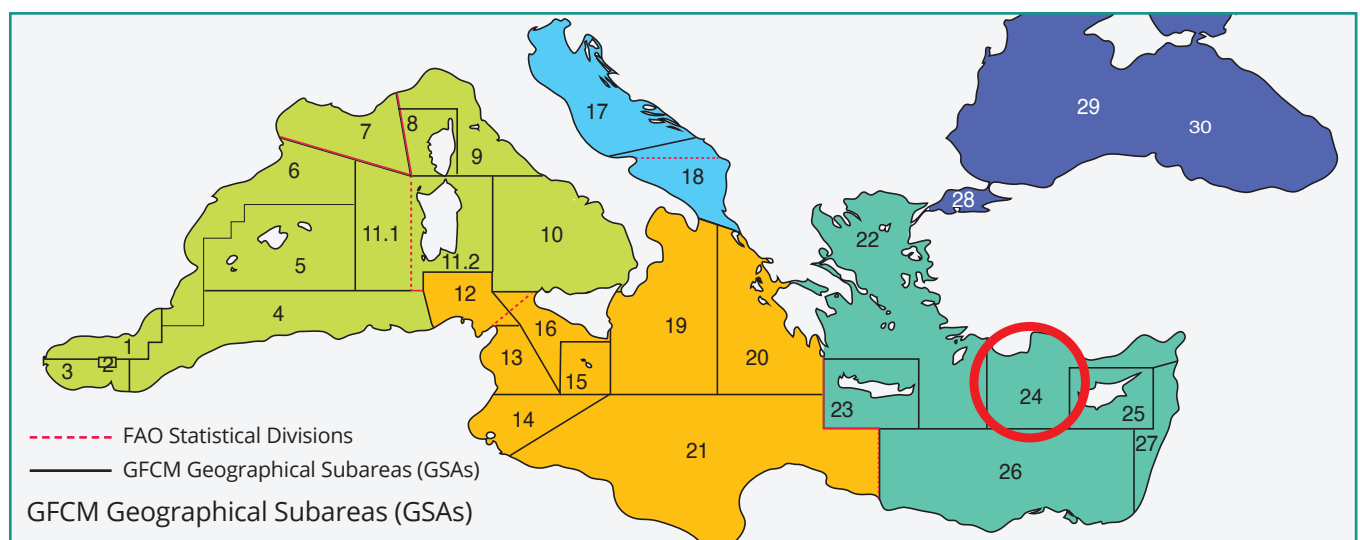
With over 20 coastal states and territories, the complex nature of the Mediterranean creates further need for highly collaborative action to build capacity for angel shark conservation. To allow a tailored approach in priority regions, SubRegional Action Plans (SubRAPs), such as this, are designed to facilitate further coordinated action by engaging regional stakeholders including governments and industry.

The *Mediterranean Angel Sharks: Regional Action Plan* should be referred to for more detail.

IMPORTANCE OF SUBAREA

General Fisheries Commission for the Mediterranean (GFCM) *Geographical Subarea* (GSA) 24 has been identified as a priority region for angel sharks, given the contemporary occurrence of all three species of *Squatina* known in the Mediterranean. There have been recent captures of all three species, despite regulations in place to prohibit this.

Lead partners involved in this SubRAP are *Mersea Marine Consulting*, *Shark Trust*, *Turkish Marine Research Foundation* (TUDAV) and *WWF Turkey*.



FAO (2018). The State of Mediterranean and Black Sea Fisheries. General Fisheries Commission for the Mediterranean.

EXISTING REGIONAL PROJECTS AND INITIATIVES

Key projects already established in GSA 24 which will be engaged during this process include:

Understanding Mediterranean multi-taxa 'bycatch' of vulnerable species and testing mitigation - a collaborative approach (Coordinated by BirdLife International. Direct partners: SPA/RAC, GFCM, ACCOBAMS, MEDASSET, IUCN-Med, WWF MMI. Indirect partners: GREPOM, AAO/BirdLife Tunisia, DEKAMER, DD/BirdLife Turkey, WWF-Turkey, TUDAV, WWF North Africa, LIPU and WWF Italy) – this bycatch project aims to identify and test measures to reduce bycatch and the impact of fisheries on marine mammals, birds, turtles and elasmobranchs.

Support mechanism for filling key knowledge gaps for vulnerable species (marine mammals, sea birds, sea turtles and elasmobranchs) impacted by fisheries in priority areas of the Mediterranean (Implemented by WWF Turkey, supported by SPA/RAC as a part of MAVA Species Knowledge Program) - This project aims to reveal the interaction between elasmobranchs and Small-Scale Fishing (SSF) vessels in the most exploited fishing areas of north-eastern Mediterranean. Data collection focuses on three main objectives: i) to estimate incidental catch rate of vulnerable species in SSF by conducting onboard observations; ii) to understand and identify elasmobranchs' behaviour associated with their movement by using PSAT tags; iii) to map areas where fishing and tagged species overlap by using handheld GPS and printed maps.

Updating Species of Sharks in Turkish Waters (Ichthyological Research Society [IRS]) – this project aims to provide the latest information on the status of elasmobranchs occurring in Turkish waters. Historical and contemporary data is obtained through field surveys, historical specimens present in museums, and research of literature and media.

SPECIES MANAGEMENT

All three Mediterranean *Squatina* species are listed under binding Recommendation GFCM/42/2018/2 (amending GFCM/36/2012/3) which was adopted by the 24 Parties to the GFCM. This Recommendation prohibits the retention and sale of 24 elasmobranchs listed on Annex II of the Barcelona Convention.

Fisheries Law No: 1380 of 1971 is the main legislative instrument governing fisheries in Turkey. In 2018, Communique 2018/19 updated Article 5 of the Turkish Prohibited Species lists (Communique 2016/35), prohibiting targeting and retention of all three *Squatina* species found in the Mediterranean. This legislation also applies to recreational fisheries in Turkey.

An additional national fisheries legislation that is likely to be of significance to angel sharks is:

- Communique on Regulation of Commercial Fisheries No: 5/1 (Communique No: 2020/20)
 - prohibiting shark fishing in Turkish territorial waters between Anamur Cape and Eşen Creek between 1 April and 31 October.
 - regulating the obligations, limitations and prohibitions related to commercial fishing.

RECENT SIGHTINGS AND NON-COMPLIANCE

Contemporary occurrence of all three Mediterranean species of angel shark have been documented in Turkish waters (Kabasakal, 2020; Kabaskal, 2019; Ulman, pers. comms.; Yağlıoğlu *et al.* 2015), with sightings as recently as April 2021 for *S. aculeata* (Fethiye), October 2020 for *S. oculata* (Fethiye), and 2009 for *S. squatina* (Iskenderun).

Many of these sightings have been a result of bycatch incidents. Whilst many fishers state they release angel sharks captured incidentally, the presence of angel sharks in fish markets demonstrates non-compliance with existing regulations.



< *Squatina aculeata*, Fethiye, Turkey © Aylin Ulman



< *Squatina oculata*, Fethiye, Turkey © Aylin Ulman

Sightings can be reported through the Angel Shark Conservation Network (ASCN) Angel Shark Sightings Map at www.angelsharknetwork.com/#map



< *Squatina aculeata*, Samandag, Turkey © Emre Fakioglu

THREATS

Priority threats in the Northern Levant Sea remain largely the same as across the Mediterranean. These include lack of species-specific landings and identification issues in Small-Scale Fisheries (SSF) and Large-Scale Fisheries (LSF); Illegal, Unreported and Unregulated (IUU) fishing; impact of differing gear types in SSF, LSF and recreational fishing.

Whilst little is known about the habitat preference of angel sharks and the effect of other anthropogenic pressures (beyond fishing), additional priority threats are perceived to be degradation of habitat; altered seafloor morphology; and low genetic diversity and fragmentation of angel shark populations.

Ghost fishing; invasive species; oil pollution; plastic pollution are considered secondary threats to angel sharks in this region. More research needs to be carried out to determine the extent of these threats.

CONSTRAINTS

Limited resources and capacity of the authorities responsible for implementing, monitoring, and enforcing fisheries legislation at sea, in ports and fish markets has resulted in ineffective implementation of the management measures.

The Fisheries Division of Ministry of Agriculture is responsible for monitoring ports and fish markets in Turkey however resources and staffing are insufficient. The Coast Guard is responsible for conducting inspections of fishing vessels at sea under the Coast Guard Act and Fisheries Act following reported incidents, however this is rare.

The ongoing dispute over territorial waters surrounding the Island of Kastellorizo/Megisti (located in GSA 24) creates further complexity with regard to monitoring and managing species populations, marine habitats and fisheries in this area.

ACTIONS

A working version of this SubRAP is retained by the lead partners outlined in this document. In the working version, actions have been adapted and attributed to relevant bodies working in GSA 24 and they have been assigned approximate timescales (short, medium, long term) and costs (€, €, €€). Where existing projects and initiatives are in place, it is the intention of the authors that necessary actions will be approached in a collaborative manner.

Threat – A factor which causes either a substantial decline in numbers of individuals of that species, or a substantial contraction of the species' geographic range.

Priority threat – The most pertinent threats identified for angel sharks in Turkey at this time.

Secondary threat – Considered a possible threat for angel sharks in Turkey at this time. Further data is required to assess and prioritise these.

Constraints – Factors which contribute to or compound the threats. (For example, lack of political will and resources might contribute to a lack of law enforcement, leading in turn to over-exploitation).

Goal – A description in operational terms to capture what needs to be done and where, to save the species.

Objective – Summary of the approach to be taken to achieve the Vision and Goals, normally relating to a set of threats and constraints.

Headline threat categories are identified with second-level threats outlined below each category. Priority and secondary threats for the Northern Levant Sea are highlighted.

Table adjusted from Figure 6 in the *Mediterranean Angel Sharks: Regional Action Plan*.

THREAT CATEGORIES							
1 Agriculture & Aquaculture	2 Biological Resource Use	3 Climate Change & Severe Weather	4 Human Intrusion & Disturbance	5 Invasive & Other Problematic Species, Genes & Diseases	6 Pollution	7 Residential & Commercial Development	8 Transportation & Service Corridors
1.1 Aquaculture cages (hormones, food etc.)	2.1 Illegal, Unreported & Unregulated (IUU) fishing	3.1 Changing water temperature	4.1 Degradation of habitat	5.1 Pathogens	6.1 Water pollution/runoff	7.1 Coastal building and infrastructure development	8.1 Pipelines and electrical cables
	2.2 Small-scale & Large-scale fisheries: lack of species-specific landings and identification issues		4.2 Altered seafloor morphology	5.2 Low genetic diversity (genetic bottlenecks/ population fragmentation)	6.2 Micro/macro plastics	7.2 Renewable energy (e.g. wind farms, underwater turbines, lagoons)	8.2 Shipping disturbance (e.g. physical disturbance, noise pollution)
	2.3 Small-scale & Large-scale fisheries: impact of different gear types		4.3 Anchor damage of habitats	5.3 Invasive species	6.3 Sewage	7.3 Extractive Industries (e.g. aggregate, mining, dredging)	
	2.4 Subsistence/ food security		4.4 Recreational watersports		6.4 Oil spills		
	2.5 Recreational and sports fishing (e.g. rod & line, surfcasting, spearfishing)		4.5 Increasing number of tourists		6.5 Eutrophication		
	2.6 Ghost fishing		4.6 Physical disturbance				
	2.7 Alteration of the food web (overfishing of prey species)		4.7 Diver disturbance				
			4.8 Impact of beach users/ activities on coastal nursery areas				

Priority Threat
 Secondary Threat
 Not a current threat

FISHERIES

GOAL 1: FISHERIES BASED ANGEL SHARK MORTALITY IS MINIMISED IN THE NORTH LEVANT SEA

As of 2018, a total of 18,008 vessels (both marine and inland waters) were registered to the Turkish fleet, including bottom trawl, longline, and polyvalent vessels (Gordon *et al*, 2020). In 2019, the Turkish fishing fleet operating within GFCM GSA 24 consisted of 1,705 vessels, using both static and towed gear (gill nets, trammel nets, purse seines, bottom trawls, longlines, encircling nets).

Under existing Turkish regulations, it is forbidden to catch, retain, land or trade all three species of angel shark found in the Mediterranean and evidence of illegal behaviour can result in a fine. Despite existing legislation and conservation efforts to manage fisheries in the Mediterranean, effective fisheries management and implementation of regulations is often lacking. Overfishing and IUU fishing continues in Turkish waters, resulting in declining fish stocks in recent years.

Shark meat consumption is low in Turkey and it is now primarily processed for export (Gordon *et al*, 2020). Prior to the addition of all three Mediterranean species of angel shark to the Turkish Prohibited Species lists in 2018, catches of angel shark had rapidly declined between 2005-2017. In Turkey, landings of elasmobranchs are recorded under generic names e.g. "sharks" and "rays", and angel shark landings data is combined to include all three species. Thereby not providing an accurate picture of the diversity and abundance of elasmobranchs in Turkish waters.

GOAL 1 Fisheries based angel shark mortality is minimised in the North Levant Sea.	
Objective 1.1	Reporting and monitoring in all segments of coastline in the areas of interest, including recreational, is improved for the three species of angel shark.
Objective 1.2	Incidental catch of angel sharks by all fisheries is minimised.
Objective 1.3	Retention is reduced, and post release survival enhanced, through information, training, and education for fishers.
Objective 1.4	The extent of interaction between marine recreational fishing activities and angel sharks is ascertained and minimised.

Action No.	Actions (adapted from MedRAP)	By who
1.1.1	Translate identification materials featuring the three species of angel sharks and lookalike/similar species (e.g. guitarfishes) so species-specific reporting is improved.	NGOs
1.1.2	Translate guidance documents for reporting procedure in line with GFCM Recommendations for data recording and ensure the document is accessible to industry.	NGOs, GFCM, Government, Fishing Industry
1.1.3	ASCN Angel Shark Sightings Map widely advertised through social media to encourage submissions from recreational anglers.	ASCN, NGOs
1.1.4	Engage with regional observer programmes to ensure collation of angel shark records.	RAC/SPA, NGOs, ASCN
1.1.5	Comply with existing GFCM and national reporting procedures.	Fishing Industry, Government
1.2.1	Collate data on incidental catch to inform management measures (liaise with programmes such as the Med Bycatch Project).	GFCM, NGOs
1.2.2	Ascertain the level of bycatch and incidental catch by gear type in order to inform further necessary action.	Government, Fishing Industry, NGOs
1.2.3	Map hotspots for bycatch of angel sharks (spatially and temporally).	NGOs, ASCN, Researchers
1.2.4	Secure spatial/temporal management and gear restrictions based on collated data.	Government, ASCN, NGOs, GFCM
1.3.1	Develop angel shark handling guides for fishers to improve post-release survival in the Mediterranean (using existing guidance materials as a basis).	ASCN
1.3.2	Identification (see Action 1.1.1) and handling guides (see Action 1.3.1) to be disseminated amongst fishing industry, recreational anglers, enforcement bodies, fish markets, governments etc..	NGOs, GFCM, Government
1.3.3	Develop training programmes to educate fishers about conservation status and prohibited status of angel sharks, as well as best practice handling techniques.	Government, NGOs
1.3.4	Ascertain other drivers to angel shark retention to inform actions.	NGOs, ASCN
1.4.1	Quantify the level of recreational fishing activity in the Mediterranean, guided by GFCM recreational fisheries handbook.	GFCM, Government
1.4.2	Collate information on whether licence systems are in force in each subregion and what requirements are stipulated.	NGOs, ASCN
1.4.3	Determine how often recreational fishers encounter angel sharks (contemporary and historic records).	GFCM, NGOs, ASCN
1.4.4	Create recreational fishing best practice guidelines specific to the three <i>Squatina</i> species in the Mediterranean drawing on existing recreational guidelines where available.	NGOs, ASCN
1.4.5	Identify angling clubs/shops in each region where guidelines can be distributed.	NGOs, ASCN
1.4.6	Encourage participation of recreational fishers in data collection.	NGOs, ASCN

HABITATS & NON-FISHING HUMAN IMPACT

GOAL 2: ANGEL SHARK HABITAT IS IDENTIFIED AND PROTECTED

The seafloor habitat in the Northern Levant Sea is largely unknown. Baseline data of the spatial distribution patterns, habitat use and population structure of angel sharks within GSA 24 is required. *Posidonia* seagrass meadows are present along the Turkish coastline however further mapping is necessary to obtain accurate data required for marine spatial planning (Akcali *et al*, 2019). *Posidonia* meadows located within GSA 24 are protected.

In Turkish territorial waters (except for Black Sea), the use of purse seines is prohibited in waters shallower than 13 fathom (24 m) deep. It is also prohibited to use purse seines to harvest fish from 15th April to 15th September in Levant Sea/Turkish territorial waters of the Mediterranean. Seining with ıgırıp, trata, tarlakoz, manyat and other beach seines is prohibited. Area-based restrictions relating to commercial fishing in GSA 24 may be of importance to angel shark populations and habitats.

The ongoing dispute over the territorial waters surrounding the Island of Kastellorizo/Megisti (located in GSA 24) further hinders efforts to monitor species populations and marine habitats, and implement protection measures.

GOAL 2 Angel shark habitat is identified and protected.

Objective 2.1	Angel shark distribution is better understood.
Objective 2.2	The impact of non-fishing activities on angel sharks in the area is better understood.
Objective 2.3	Angel shark habitat is identified, specifically Critical Angel Shark Areas (CASAs).
Objective 2.4	Angel shark habitat is reflected in marine spatial planning and coastal development.

Critical Angel Shark Areas (CASAs) – A specific geographic area that contains essential features necessary for the conservation of angel sharks. This may include an area that is not currently occupied by the species that will be needed for its recovery or conservation e.g. nursery, mating, aggregation and foraging areas.

Action No.	Actions (adapted from MedRAP)	By who
2.1.1	Increase the profile of three species to encourage public reporting to ASCN Angel Shark Sightings Map, complementing fisheries data.	ASCN, NGOs
2.1.2	Liaise with scientific surveys operating throughout the Mediterranean and encourage engagement with this SubRAP (e.g. through data provision, assessments etc.).	ASCN, NGOs, Researchers
2.1.3	Use fisheries data and other reporting methods to improve spatial data on distribution.	ASCN, GFCM, Government, Fishing Industry
2.2.1	Engage dive clubs across Turkey to look out for signs of presence (e.g. angel shark 'beds').	NGOs, ASCN
2.2.2	Identify and map popular beaches and dive sites and compare with sightings data.	Researchers, NGOs, ASCN, Industry
2.2.3	Investigate the impact of tourism near CASAs.	Researchers, NGOs, ASCN
2.2.4	Confirm if noise impacts angel sharks and if there are ways this can be mitigated.	Researchers, ASCN
2.2.5	Identify if areas with high levels of pollution (plastics, agriculture etc.) overlap with important areas for angel sharks.	Researchers
2.3.1	Determine general features of potential CASAs based on those habitats in which angel sharks have been sighted on previously.	Researchers
2.3.2	Based on Action 2.3.1, examine models to predict potential CASAs.	Researchers
2.3.3	Increase engagement with SPA/RAC habitat mapping programmes to identify potential CASAs.	NGOs, RAC/SPA, Government, ASCN
2.3.4	Evaluate spatial distribution of threats and existing conservation measures (e.g. MPAs, Natura 2000).	Researchers
2.3.5	Identify key habitats that are not protected/not sufficiently protected and make suggestions for improved management of areas (with involvement from stakeholders).	Researchers
2.3.6	Identify activities and develop management plans aiming to conserve and restore CASAs.	Government
2.4.1	Engage with Environmental Impact Assessment process prior to coastal developments near CASAs.	Government, Wider industry, NGOs
2.4.2	Monitor coastal developments near CASAs and mitigate impacts where possible.	Government, Wider industry, NGOs
2.4.3	Identify what spatial/temporal management measures would be most appropriate according to each subarea.	GFCM, Government
2.4.4	Include CASAs in MPA processes and EIA to ensure these areas are managed sustainably, that important habitat features are conserved and maintained or re-established and that impacts on angel sharks are kept at acceptable levels.	Government
2.4.5*	Promote a citizen science observatory for angel sharks.	NGOs

*New action for this SubRAP

LEGISLATION AND REGULATIONS

GOAL 3: NATIONAL LEGISLATION FOR ANGEL SHARKS IS ESTABLISHED, IMPLEMENTED AND ENFORCED

The GFCM regulation has not been fully transposed into Turkish law. However, in 2018 all three *Squatina* species found in the Mediterranean were listed as protected species in the updated Article 5 of the Turkish Prohibited Species lists (Communique 2016/35) prohibiting targeting and retention of all three species. Despite national protection, angel sharks are still caught incidentally.

Management of fisheries and enforcement of regulations is lacking due to limited capacity and resources of the responsible agencies. The extensive coastline further adds to the challenge of monitoring fisheries. In addition, many fishermen are unaware of the legislation and conservation measures regarding protected species.

UNDERLYING GOAL

National legislation for angel sharks is established, implemented and enforced.

Objective 3.1	Angel sharks are protected by regional and national management measures.
Objective 3.2	Management measures are implemented and enforced.
Objective 3.3	CASAs are protected through appropriate spatial and/or temporal management of non-fishing as well as fishing activities (in line with Goal 2).

Action No.	Actions (adapted from MedRAP)	By who
3.1.1	Review national legislation and identify gaps in the implementation of relevant international and regional obligations, including those under GFCM.	Government, GFCM, ASCN
3.1.2	Complete transposition of GFCM/42/2018/2 into national legislation where lacking.	Government
3.1.3**	<i>Fulfil obligations under CMS App I & II listing and CMS Sharks MoU Annex I.</i>	<i>Action not relevant at this time</i>
3.1.4	Engage with governments and industry to aid compliance with existing legislation/policies/regulations.	NGOs, ASCN
3.1.5	Where absent, seek adoption of full protective measures to cover recreational activities and disturbance.	NGOs, Government
3.1.6*	Become a Party to CMS.	Government
3.2.1	Implement and enforce GFCM/42/2018/2 & national legislations.	Government, Fishing Industry, NGOs
3.2.2**	<i>Implement CMS Appendix I listing in all Mediterranean and Black Sea Range States.</i>	<i>Action not relevant at this time</i>
3.2.3	Reinforce compliance reporting processes at regional fora, requiring more detailed documentation.	Government, GFCM, NGOs
3.2.4	Highlight cases of non-compliance with existing legislation/policies/regulations to key regional and international fora (e.g. GFCM, SPA/RAC).	NGOs, ASCN
3.2.5**	<i>Engage with CMS Focal Points to seek comment on the RAP.</i>	<i>Action not relevant at this time</i>
3.2.6	Promote RAP at relevant fora (e.g. GFCM, SPA/RAC).	ASCN
3.2.7	Ensure regulatory obligations are reflected in training for fishers, accommodating subregional constraints.	NGOs, Government

* New action for this SubRAP

** As Turkey is not a Party to CMS, Actions relating to CMS have been amended or removed from this SubRAP. At such a time that Turkey becomes a Party, these actions will be reinstated. (See: www.cms.int)

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GLOSSARY/ACRONYMS

ASCN – Angel Shark Conservation Network

CASA – Critical Angel Shark Area

CMS – Convention on the Conservation of Migratory Species of Wild Animals

FRA – Fisheries Restricted Area

GFCM – General Fisheries Commission for the Mediterranean

GSA – Geographical Subarea

LSF – Large-Scale Fisheries

MPA – Marine Protected Area

NGO – Non-governmental Organisation

RAC/SPA – Specially Protected Areas

Regional Activity Centre

SPA – Special Protection Area

SSF – Small-Scale Fisheries

If you would like to be further involved in this work, please email angels@sharktrust.org with details about the work you are undertaking and we would be pleased to discuss engagement.



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