Mediterranean Angel Sharks: SubRegional Action Plan (SubRAP)

GSA 25* (Cyprus – Republic of Cyprus)

*SubRAP – GSA 25 consists of two parts

Ioannis Giovos[1,2], Rebecca Gillham[3], Louis Hadjioannou[4], Ali Hood[3], Periklis Kleitou[2], Roxani Naasan Aga – Spyridopoulou[1], Marios Papageorgiou[4]

[1] iSea [2] Marine and Environmental Research (MER) Lab Ltd. [3] Shark Trust [4] Enalia Physis

INTRODUCTION

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

- *Squatina aculeata* **Sawback Angelshark** (EN), **Ακανθορίνα** (GR), **Keler** (TR), **Γάτος** (CY)
- *Squatina oculata* **Smoothback Angelshark** (EN), **Ματορίνα** (GR), **Keler** (TR), **Γάτος** (CY)
- *Squatina squatina* **Angelshark** (EN), **Αγγελοκαρχαρίας / Ρίνα** (GR), **Keler** (TR), **Γάτος** (CY)

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.

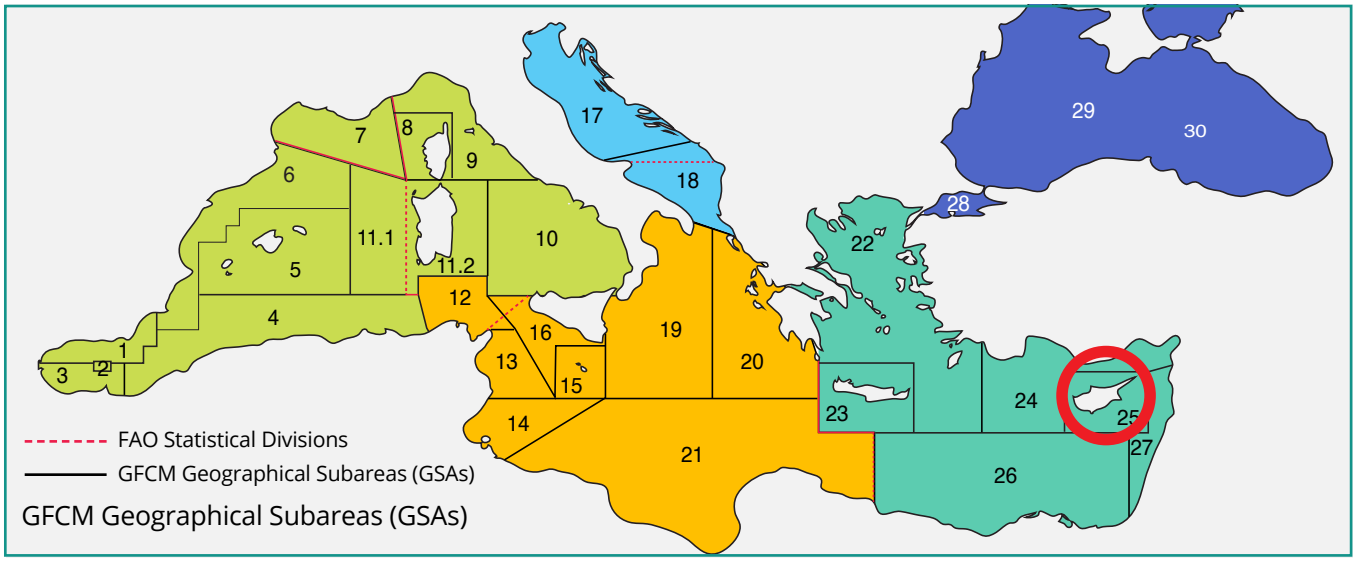
With over 20 coastal states and territories, the complex nature of the Mediterranean creates further need for highly collaborative action to build capacity for angel shark conservation. To allow a tailored approach in priority regions, SubRegional Action Plans (SubRAPs), such as this, are designed to 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) 25 has been identified as a priority region for angel sharks, given the recent occurrence of all three species of *Squatina* known in the Mediterranean. There have been recent captures (and subsequent trade) of all three species, despite regulations in place to prohibit this.

Lead partners involved in this SubRAP are the *Shark Trust, iSea, Marine and Environmental Research (MER) Lab Ltd.* and *Enalia Physis Environmental Research Center.*



FAO (20a18). 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 25 (Republic of Cyprus) which will be engaged during this process include:

Sharks and Rays in Greece and Cyprus (Mediterranean Elasmobranchs Citizen Observations, M.E.C.O) – as part of the wider Mediterranean initiative, sightings data are collected and shared between a network of organisations to better understand the occurrence, seasonality, and distribution of elasmobranchs in the region.

ELIFE (Coordinated by Dohrn Zoological Station of Naples) – aims to improve the conservation of elasmobranchs through the promotion of best conservation practices for professional fishing in the Mediterranean Sea. Through the implementation of pilot and demonstrative actions and collaboration with fishers to help establish past and present occurrence of *Squatina* spp. in Cyprus.

Cyprus Bycatch Project (Republic of Cyprus – Birdlife International/Birdlife Cyprus, Enalia Physis) – assesses and monitors the issue of fisheries bycatch in Cyprus. Through an onboard observation programme, species data is collected by observers and collaborating fishers. Through data collection and workshop outputs, mitigation measures are examined with a focus to advocate for and implement changes in practices, and update national legislation and conservation areas.

Cyprus Elasmobranch Research and Conservation Network (CERECON) (Republic of Cyprus – Enalia Physis) – aims to better understand the diversity and ecology of threatened and data deficient elasmobranchs in Cyprus to better manage populations. Angel sharks encountered through targeted and casual observations are measured, analysed, and sampled for genetic testing with the objective of feeding additional knowledge into bycatch management plans and proposing conservation measures.

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.

There is no national legislation in place for angel sharks in the Republic of Cyprus. However, the European Union (EU) transposed the GFCM Recommendation into EU Regulation (EU 2015/2102), thereby as an EU Member State, this regulation is applicable. In addition, *S. squatina* is a Prohibited species under the Technical Measure, Regulation (EU) 2019/1241, which applies to the EU fleet in the Mediterranean and third country vessels fishing in Union waters.

RECENT SIGHTINGS AND NON-COMPLIANCE

Contemporary sightings have been documented for all three Mediterranean species of angel shark in the Republic of Cyprus (Giovos *et al*., 2019; Giovos *et al*., 2021; Papageorgiou *et al*., in prep.). Sightings as recently as February 2020 for *Squatina aculeata* (Paphos); August 2019 for *Squatina squatina* (Ayia Napa), and May 2018 for *Squatina oculata* (Paralimni) have been documented.

Many of these sightings have been identified as bycatch incidents. There is evidence of non-compliance with exisiting regulations and illegal fishing and trade of angel sharks continues in the Republic of Cyprus.

◀ *Squatina aculeata* – Paphos, Cyprus
© Giovos *et al.*, 2021

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

THREATS

Priority threats in the Republic of Cyprus are 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 and impact of differing gear types in SSF and LSF, and the low genetic diversity of fragmented angel shark populations in the region. Little is known about the habitat preferences of angel sharks, as such habitat degradation is perceived to be an additional priority threat.

No additional priority threats specific to the Republic of Cyprus have been identified at this time.

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.

CONSTRAINTS

Despite EU legislation prohibiting the capture and trade of angel sharks in Cyprus, illegal fishing and trade continues. Constraints include a lack of knowledge of existing regulations and weak implementation of these regulations caused by a shortage of resources and low capacity of monitoring and enforcement agencies. Aggregated landings further impede collection of species-specific data.

The multijurisdictional nature of Cyprus proves to be a major obstacle in implementing or enforcing conservation measures.

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).

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 25 (Republic of Cyprus) 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.

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 Republic of Cyprus 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 currenta threat

FISHERIES

GOAL 1: FISHERIES BASED ANGEL SHARK MORTALITY IS MINIMISED IN THE REPUBLIC OF CYPRUS

In 2019, the commercial fishing fleet in the Republic of Cyprus was made up of 774 licensed fishing vessels (Department of Fisheries and Marine Research, 2020). The small-scale inshore fishery represents the majority of licensed vessels and primarily operates with bottom set nets and demersal longlines. Additional gear types used across the commercial fleet consist of static and towed gear including trammel nets, gill nets, traps, pelagic longlines, purse seines and bottom otter trawls.

Restrictions are in place concerning the use of fishing gears, minimum landing size and fishing effort. However, the presence of numerous small landing sites, lack of auction markets and low capacity of enforcement agencies make monitoring and implementation of existing regulations and restrictions a challenge.

Priority actions to help minimise fisheries-based angel shark mortality in the Republic of Cyprus have been identified. These include the development and dissemination of angel shark guidance and identification resources to the wider fishing industry to further support species-specific identification and compliance of existing reporting procedures.

GOAL 1 **Fisheries based angel shark mortality is minimised in the Mediterranean.**	
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
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, Government, Researchers
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, Government, Researchers
1.2.2	Ascertain the level of bycatch and incidental catch by gear type in order to inform further necessary action	Government, 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, Fishing Industry
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, NGOs
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, Researchers, ASCN
1.3.4	Ascertain other drivers to angel shark retention to inform actions	NGOs, ASCN, Government
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
1.4.3	Determine how often recreational fishers encounter angel sharks (contemporary and historic records)	NGOs
1.4.4	Create recreational fishing best practice guidelines specific to the three Squatina 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
1.4.6	Encourage participation of recreational fishers in data collection	NGOs, Government, Recreational Fishing Cooperatives

HABITATS & NON-FISHING HUMAN IMPACT

GOAL 2: ANGEL SHARK HABITAT IS IDENTIFIED AND PROTECTED

The sea floor habitat surrounding the Republic of Cyprus is largely unknown. In the absence of information, better understanding of the sea floor, especially >50 m depth is a priority. In addition, identification of Critical Angel Shark Areas (CASAs), especially related to inshore nursery areas is also deemed a priority action. A habitat mapping project is currently under implementation for the coastal zone <50 m that will provide information on areas with soft, and rocky substrates, and Posidonia seagrass beds. Further investigation of non-fishing activities (e.g., Coastal building and infrastructure development) that could impact angel shark populations is also essential.

Fisheries Restricted Areas (FRAs) have been designated in the Republic of Cyprus, the boundaries of which extend to 35 m bathymetric contour or to 1.5 km offshore.

Protection is provided to coastal species under EU and GFCM regulations prohibiting the use of towed gears within 3 nm of the coast or within the 50 m isobath where that depth is reached at a shorter distance from the coast (Gordon *et al*, 2020).

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.

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 RAP (e.g. through data provision, assessments etc.).	Government, ASCN, NGOs, Researchers
2.1.3	Use fisheries data and other reporting methods to improve spatial data on distribution.	ASCN, GFCM, Government, Fishing Industry, Researchers
2.2.1	Engage dive clubs across the Mediterranean to look out for signs of presence (e.g. angel shark 'beds')	Government, NGOs
2.2.2	Identify and map popular beaches and dive sites and compare with sightings data	Government, Researchers, NGOs, ASCN
2.2.3	Investigate the impact of tourism near CASAs	Government, Researchers, NGOs
2.2.4	Confirm if noise impacts angel sharks and if there are ways this can be mitigated.	Government, Researchers,
2.2.5	Identify if areas with high levels of pollution (plastics, agriculture etc.) overlap with important areas for angel sharks	Government, Researchers
2.3.1	Determine general features of potential CASAs based on those habitats in which angel sharks have been sighted on previously.	Government, Researchers
2.3.2	Based on Action 2.3.1, examine models to predict potential CASAs.	Government, Researchers
2.3.3	Increase engagement with SPA/RAC habitat mapping programmes to identify potential CASAs.	NGOs, RAC/SPA, Government
2.3.4	Evaluate spatial distribution of threats and existing conservation measures (e.g. MPAs, Natura 2000)	Government, Researchers, NGOs
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)	Government, Researchers, NGOs
2.3.6	Identify activities and develop management plans aiming to conserve and restore CASAs in CMS Range States, in line with CMS Appendix I obligations	Government, NGOs, CMS Parties
2.4.1	Engage with Environmental Impact Assessment process prior to coastal developments near CASAs	Government, Wider industry, Researchers, NGOs
2.4.2	Monitor coastal developments near CASAs and mitigate impacts where possible	Government, Researchers
2.4.3	Identify what spatial/temporal management measures would be most appropriate according to each subarea	GFCM, Government, Input from NGOs
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	ASCN, NGOs, Government

**New action for this SubRAP*

Critical Angel Shark Areas – 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.

LEGISLATION AND REGULATIONS

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

GFCM Recommendation 42/2018/2 has not yet been transposed into national legislation.

As an EU Member State, Regulation (EU) 2015/2102 (for all three species) and Regulation (EU) 2019/124 (for *S. squatina*) applies. Despite these regulations, evidence of non-compliance and the capture and trade of angel sharks continues.

Priority actions identified to support the enforcement of legislation concerning angel sharks include engaging with government agencies and industry to identify gaps in the implementation of legislation and aid compliance with existing policies.

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 and CMS.	Government, CMS, GFCM, ASCN, NGOs
3.1.2	Transpose GFCM/42/2018/2 into national legislation where lacking.	Government
3.1.3	Fulfil obligations under CMS App I & II listing and CMS Sharks MoU Annex I.	Government, CMS
3.1.4	Engage with governments/CMS Range States and industry to aid compliance with existing legislation/policies/regulations.	Government, NGOs, ASCN
3.1.5	Where absent, seek adoption of full protective measures to cover recreational activities and disturbance	NGOs, Government
3.2.1	Implement and enforce GFCM/42/2018/2 & national legislations.	Government, Fishing Industry
3.2.2	Implement CMS Appendix I listing in all Mediterranean and Black Sea Range States.	Government
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, CMS).	NGOs, ASCN
3.2.5	Engage with CMS Focal Points to seek comment on the RAP.	CMS
3.2.6	Promote RAP at relevant fora (e.g. CMS, GFCM, SPA/RAC).	ASCN
3.2.7	Ensure regulatory obligations are reflected in training for fishers, accommodating subregional constraints	NGOs, Government
3.3.1	Advocate for adoption of spatial/temporal management in appropriate fora (e.g. GFCM, SPA/RAC) and at country level	NGOs
3.3.2	Ensure CMS obligations are reflected in marine spatial planning (e.g. MPAs, FRAs, SPAs) and coastal development processes	Governments, NGOs, CMS

REFERENCES

Department of Fisheries and Marine Research, 2020. Cyprus annual report on efforts during 2019 to achieve a sustainable balance between fishing capacity and fishing opportunities. Nicosia: Republic of Cyprus.

Gordon, C.A., Hood, A.R., Al Mabruk, S. A. A., Barker, J., Bartolí, A., Ben Abdelhamid, S., Bradai, M.N., Dulvy, N.K., Fortibuoni, T., Giovos, I., Jimenez Alvarado, D., Meyers, E.K.M., Morey, G., Niedermuller, S., Pauly, A., Serena, F. and Vacchi, M. (2019) Mediterranean Angel Sharks: Regional Action Plan. The Shark Trust, United Kingdom. 36 pp

Giovos, I., Stoilas, V.S., Al Mabruk, S.A.A., Doumpas, N., Marakis, P., Maximiadi, M., Moutopoulos, M., Kleitou, P., Keramidas, I., Tiralongo, F., De Maddalena, A. (2019) Integrating local ecological knowledge, citizen science and long-term historical data for endangered species conservation: New records of Angel Sharks (Chondrichthyes: Squatinidae) in the Mediterranean Sea. Aquatic Conservation: Marine and Freshwater Ecosystems, 29(6): 881-890.

Giovos, I., Serena, F., Katsada, D., Anastasiadis, A., Barash, A., Charilaou, C., Hall-Spencer, J.M., Crocetta, F, Kaminas, A., Kletou, D., Maximiadi, M., Minasidis, V., Moutopoulos, D.K., Naasan Aga Spyridopoulou, R., Thasitis, I., Kleitou, P. (2021) Integrating literature, biodiversity databases, and citizen-science to reconstruct the checklist of chondrichthyans in Cyprus (eastern Mediterranean Sea). Fishes, 6(3): 24.

Papageorgiou, M. Exploring fishers' ecological knowledge on five rare and endangered species in the eastern Mediterranean: *Oxynotus centrina*, *Gymnura altavela*, *Squatina squatina*, *Squatina oculata* and *Squatina oculeata*. in prep.

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.

With support from:

Shark Conservation Fund

Disney Conservation Fund