

**Memorandum of Understanding**

**on the Conservation of Migratory Sharks**

CMS/Angelshark-SSAP/SSAP/Draft 1

**Draft Single Species Action Plan for the Angelshark (*Squatina squatina*) in the Mediterranean Sea**

A sea animal swimming in the water

Description automatically generated with low confidence

Photo credit: Michael Sealey

***Draft 1 for comments***

***April 2022***

**INTRODUCTION**

Alongside the inclusion of the Angelshark (*Squatina squatina*) at the 12th Conference of the Parties to the Convention (CMS COP12) in Appendices I and II, Parties approved Concerted Action for the species, which was updated and extended until 2023 at CMS COP13 [(Concerted Action 12.5 (Rev.COP13))](https://www.cms.int/en/document/concerted-action-angelshark-squatina-squatina-1)[[1]](#footnote-2). Among other activities, it was agreed to develop regional Conservation Plans, including for the Mediterranean region.

In March 2019, a workshop was held by the Angel Shark Conservation Network (ASCN), bringing together local and global experts to create the [Mediterranean Angel Sharks: Regional Action Plan](https://www.cms.int/sites/default/files/document/Med-Angel-Sharks-Regional-Action-Plan_2019_EN.pdf) (MedRAP)[[2]](#footnote-3). This action plan collated information on three species of Angel Shark within the Mediterranean Sea and developed a strategy for Angel Shark conservation within the region. The MedRAP was designed for a range of stakeholders including governments, researchers, NGOs, as well as commercial and recreational fishing industries.

Aiming to implement parts of the CMS Concerted Action and building upon the work developed by the MedRAP, CMS has developed this Single Species Action Plan (SSAP) for the Angelshark (*Squatina squatina*) in the Mediterranean region to work alongside the MedRAP. The SSAP provides a clearly defined plan for CMS Parties, Signatories of the Sharks-MOU, and other Range States, to officially adopt and implement with specific guidance as to how this could be achieved.

**ACKNOWLEDGEMENTS**

The development of the SSAP was led by James Ellis, vice-chair of the Advisory Committee of the Sharks MOU, and Marino Vacchi, Committee member for Europe. Significant advice was provided by other Committee members and experts from the Angel Shark Conservation Network (ASCN) and Angel Shark Project, supported by the Secretariat and CMS interns Jennifer Pytka, Manon Seyssaut, and Fenella Wood.

The Principality of Monaco spear-headed this action by submitting the proposal to list Angelsharks on CMS Appendices I and II and proposing the [Concerted Action1](https://www.cms.int/sites/default/files/document/cms_cop13_ca.12.5_rev.cop13_e.pdf). It also provided financial support for the development of this Single-Species Action Plan.

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# ACRONYMS

|  |  |
| --- | --- |
| ASCN | Angel Shark Conservation Network |
| CASA | Critical Angel Shark Area |
| CBD | Convention on Biological Diversity |
| CECAF | Fishery Committee for the Eastern Central Atlantic |
| CMS | Convention on the Conservation of Migratory Species of Wild Animals |
| CPUE | Catch Per Unit Effort |
| EIA | Environmental Impact Assessment |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FRA | Fisheries Restricted Area |
| GFCM | General Fisheries Commission for the Mediterranean |
| GFCM GSA | General Fisheries Commission for the Mediterranean Geographical Subareas |
| ICES | International Council for the Exploration of the Sea |
| IUU | Illegal, Unreported and Unregulated Fishing |
| LEK | Local Ecological Knowledge |
| MPA | Marine Protected Area |
| MedRAP | Mediterranean Angel Sharks: Regional Action Plan |
| NGO | Non-Governmental Organisation |
| OSPAR | Convention for the Protection of the Marine Environment of the North-East Atlantic |
| Sharks MOU | Memorandum of Understanding on the Conservation of Migratory Sharks |
| SPA | Specially Protected Area |
| SPA/RAC | Specially Protection Areas Regional Activity Centre |
| SSAP | Single-Species Action Plan |
| UNEP-MAP | United Nations Environment Programme Mediterranean Action Plan (Barcelona Convention) |

# GLOSSARY

|  |  |
| --- | --- |
| Aggregate extraction | The extraction of sands and gravels for supplying construction industries. |
| Angelshark | Used for species common names, for example Angelshark (*Squatina squatina*). |
| Angel Shark | Refers to multiple species of the family *Squatinidae*. |
| Anterior | Located on or near the front of the body. |
| Artisanal fisheries | Traditional fisheries involving fishing households, using relatively small amount of capital and energy, relatively small fishing vessels (if any), short fishing trips, close to shore, mainly for local consumption. |
| At-vessel mortality | The proportion of the individuals caught by a fishing gear that are dead when the gear is retrieved (see also post-release mortality). |
| Bifurcated | Forked or divided into two parts or branches. |
| Bottom longline fisheries | Commercial fishing technique that deploys a long main line, with small anchors or weights to keep it on the seafloor, with side traces and baited hooks targeting demersal fish species. |
| Bottom trawl | A cone-shaped net that is towed by boat(s) along the seafloor. |
| Bycatch | The capture of a non-target species in fisheries. |
| Caudal/caudal fin | Relating to, resembling, or in the position of the tail. |
| Cephalopods | Group of molluscs comprising octopus, cuttlefish and squid. |
| Critical Angel Shark Area (CASA) | 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. |
| Decapod crustaceans | Group of crustaceans that comprised shrimps, prawns, crabs and lobsters. |
| Dorsal/dorsal fins | Situated on or toward the upper side of the body, equivalent to the back. |
| eDNA | Environmental DNA – DNA that can be extracted from environmental samples such as seawater or sediment, which can identify the presence of an organism in the area. |
| Eutrophication | Excessive richness of nutrients in a body of water, frequently due to run-off from land, which causes a dense growth of plant life. |
| Extant | Still in existence. |
| Genetic bottleneck | A sharp reduction in population size reducing gene pool of the population. The remaining smaller population has a low genetic diversity, which remains low even after repopulating. Genetic diversity only increases with influx from another population via gene flow. |
| Genetic diversity | Genetic variability present within a species or population. |
| Ghost fishing | When discarded, lost, or abandoned fishing gear continues to trap, entangle, or kill marine life. |
| Gillnet | An entangling net which sits vertical in the water, either at the surface, midwater, or bottom. Mesh size can be altered to target specific fish, designed to catch fish by their gills. |
| Hypoxia | Low or depleted oxygen levels in a water body. It is often associated with overgrowth of certain species of algae, which can lead to oxygen depletion when they die, sink, and decompose. Hypoxia causes ‘dead zones’. |
| Invasive Species | An organism that causes ecological or economic harm in a new environment where it is not native. |
| Nasal barbel | Slender, whisker-like tactile organ extending from the head of certain fishes. |
| Ocelli | A marking that resembles an eye. |
| Pathogens | A bacterium, virus, or other microorganism that can cause disease. |
| Population fragmentation | When groups of animals become separated from other groups of the same species and are no longer connected in a way that allows for gene flow between groups. Increases the risk of inbreeding and lowers genetic diversity. |
| Posterior | Located on or near the rear of the body. |
| Post-release mortality | The proportion of specimens that are released alive after being captured by a fishing gear, but subsequently die due to the direct or indirect effects of the capture process (see also at-vessel mortality). |
| Pseudobranchial lamellae | Various thin layers of membranes, which make a structure resembling a gill. Has respiratory role during embryonic stage, but not as an adult. |
| Recreational fisheries | Activity of catching or attempting to catch fish, principally by rod and line, pole or hand-held line for non-commercial purposes. |
| Rod and Line | Rod with fishing line attached with hooks. |
| Spatulate | Broad at the apex and tapered to the base. |
| Spearfishing | Activity of fishing using a spear, either underwater or from the surface (either from a boat or standing in shallow water). |
| Spiracles | Small respiratory opening behind the eye of sharks and rays. |
| Surfcasting | Fishing by casting a line into the sea from the shore. |
| Tangle net | An entangling net with a headline much shorter than the length of the netting panel. So that the net hangs in folds. Mesh size is smaller than a gillnet, designed to catch fish by their nose or jaw. |
| Trammel net | An entangling net which sits vertical in the water, usually comprised of an inner small mesh between two panels of large mesh netting within which fish will entangle. |

# BIOLOGICAL ASSESSMENT

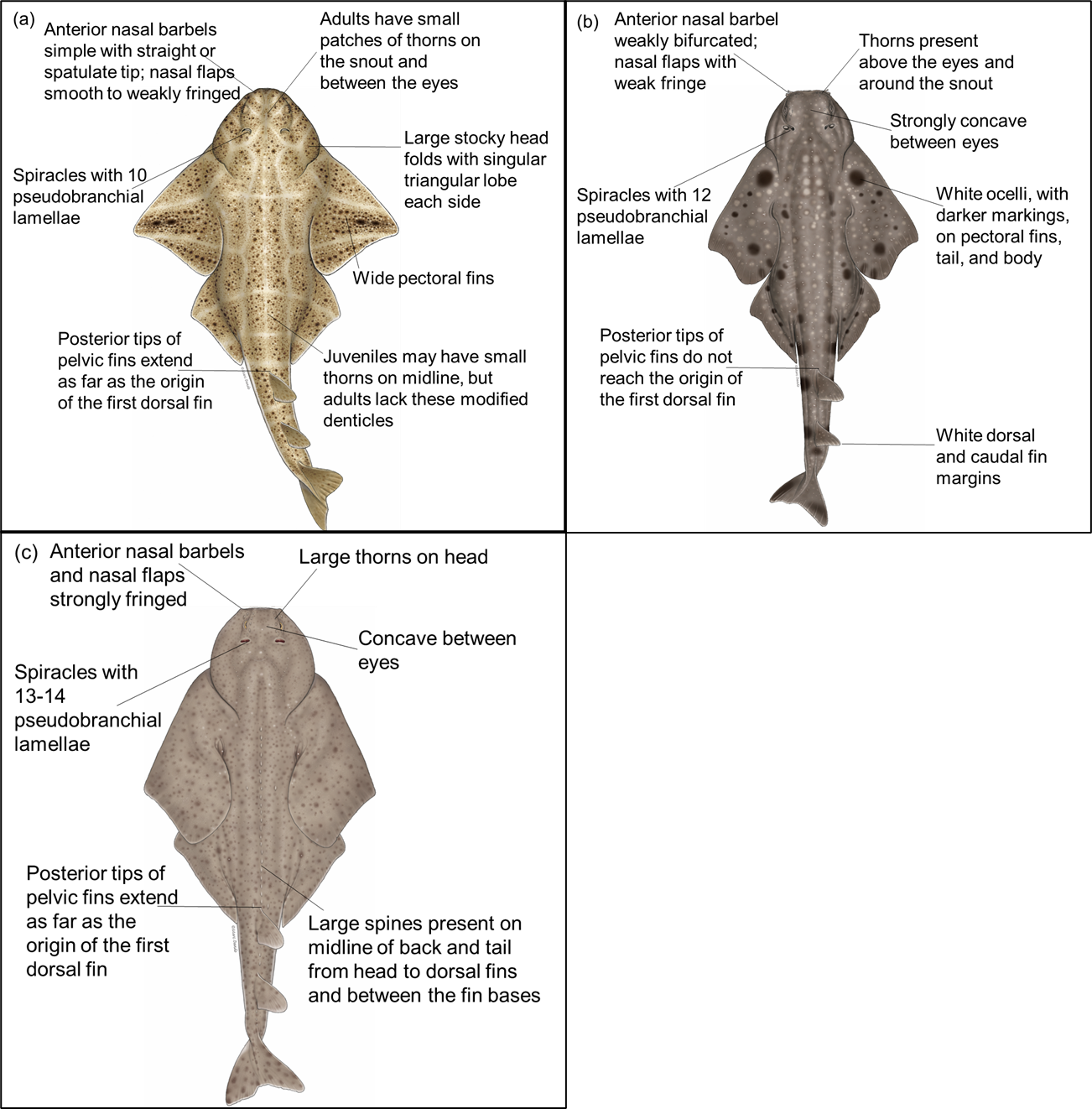
## 1.1. Taxon

Three species of Angel Shark occur in the Mediterranean Sea: Angelshark (*Squatina squatina;* Table 1), Smoothback Angelshark (*Squatina oculata*)and Sawback Angelshark (*Squatina aculeata*). All species have a broadly similar morphology, and misidentifications can be made between the three species. Only one species, Angelshark *Squatina squatina*, is listed on the Appendices of the Convention on the Conservation of Migratory Species (CMS) and the subject of this Single Species Action Plan.

**Table 1:** Taxonomic classification of the Angelshark (*Squatina squatina*) and common names in multiple languages.

|  |  |
| --- | --- |
| * 1. Class: | Elasmobranchii[[3]](#footnote-4) |
| * 1. Order: | Squatiniformes |
| * 1. Family: | Squatinidae |
| * 1. Genus: | *Squatina* (Duméril, 1805) |
| * 1. Species: | *Squatina squatina* (Linnaeus, 1758) |
| * 1. Common names: | English: Angelshark; European angelshark; Fiddlefish, Monkfish  French: Ange de mer; Ange de mer commun; Angelot  Spanish: Angel; Angelote; Pez ángel  Arabic: القرش الملاك  North Africa: Esfen, Shkatleo |

The three Mediterranean Angel Shark species can be described as (i) Angelshark (*Squatina squatina;* Figure 1a); reddish or greenish brown with scattered small white spots with dorsal dark dots. Lacks ocelli and midline spines (in adults). Max size: (M) 183 cm and (F) 244 cm. (ii) Smoothback Angelshark (*Squatina oculata;* Figure 1b); smallest of three Mediterranean species. Grey-brown, with small white and dark spots, with dark ocelli. Lacks midline spines. Max size: (M) 145 cm and (F) 160 cm. (iii) Sawback Angelshark (*Squatina aculeata;*Figure 1c); colouration is light grey/brown mottled with darker brown. Large dorsal spines present on midline and head. Lacks ocelli. Max size: 188 cm. See Figure 1 for further detail.



**Figure 1**: Diagram highlighting distinguishing features of the three species of Angel Shark occurring in the Mediterranean Sea. Adapted from Compagno (1984), Roux (1984) and Gordon *et al.* (2019). Illustrations by Marc Dando. (a) *Squatina squatina*, (b) *Squatina oculata*, (c) *Squatina aculeata*.

## 1.2. Distribution

Angelshark (*S. squatina)* is distributed along the coasts and continental shelf of the North-east Atlantic, from Scotland in the North to as far south as North-west Africa, including the Canary Islands, and extending throughout the Mediterranean Sea (Lawson *et al.*, 2020; Figure 2). Whilst not distributed over the wider Black Sea, occasional specimens are reported from those areas in close proximity to the Turkish Strait system (Sea of Marmara). The southern limits of this species along the coast of North-west Africa are somewhat uncertain. The maximum depth is unknown, though they are generally reported from waters less than 200 m deep. As such, it occurs in FAO Areas 27 (North-east Atlantic), 34 (Central Eastern Atlantic) and 37 (Mediterranean Sea).



**Figure 2:** Range of Angelshark, *Squatina squatina*. Source: Morey *et al.* (2019).[[4]](#footnote-5)

## 1.3. Population productivity and trend

Angelshark is considered to have declined over much of its geographical range, with the majority of the evidence originating from northern Europe and the Mediterranean region. The perception of decline is based largely on documented losses from former parts of the species range over the last century. Life-history studies for Angelshark in the Mediterranean Sea are limited (e.g. Capapé *et al.*, 1990) and quantitative data on populations or indices of abundance are lacking, due to there being limited contemporary data. Population trends off the Atlantic coast of north-western Africa are uncertain.

The decline of *S. squatina* was first reported by Quéro and Cendrero (1996), who noted that the species had declined along the Atlantic coast of France, which included areas such as the Baie d'Arcachon where it had historically been subject to targeted fisheries. Subsequent studies have highlighted the decline in *S. squatina* records from the North Sea (Sguotti *et al.*, 2016; Bom *et al.*, 2020), English Channel (Rogers & Ellis, 2000; McHugh *et al.*, 2011), Irish Sea, Bristol Channel (Ellis *et al.*, 2002; Hiddink *et al.*, 2019), and west coast of Ireland (Shephard *et al.*, 2019), with extant populations in some of these areas, including Welsh waters (Barker *et al.* 2020, Hiddink *et al*. 2019).

Within the Mediterranean Sea, the absence of *S. squatina* in contemporary trawl surveys (in comparison with historical trawl surveys), has been shown for the Adriatic Sea (Jukic-Peladic *et al.*, 2001, Fortibuoni *et al.*, 2016) and elsewhere in this body of water (Ragonese *et al.*, 2013). Both Giovos *et al.* (2019) and Lawson *et al.* (2020) have provided overviews of the Mediterranean distribution of *S. squatina*, with available information also summarised by Ellis *et al.* (2021).

Historical data on the quantity of Angelshark catches in the Mediterranean are limited. However, one example is a report by Vinciguerra (1884), who indicated Angelshark to be the most abundant species of cartilaginous fish caught in the Gulf of Tunis (Tunisia), with an annual catch of 2700 kg in 1879. Quantitative data relating to a declining population were provided by Vacchi *et al.* (2000), who analysed historical catch information for *Squatina* spp. in “tonnarella” tuna traps. These traps were set at depths of 2–15 m in the Gulf of Baratti (Tyrrhenian Sea). The number of *Squatina* spp. recorded (and the annual frequency of occurrence) declined from 134 (100%) in the period 1898–1905, to 95 (87.5%) over the years 1906–1913, and then to 15 (33.3%) for the final period of the study (1914–1922). These data also indicated that the decline of *S. squatina* has been a longer-term trend, occurring over much of the 20th century (Vacchi *et al.*, 2000).

# THREATS

The primary threat to the distribution and abundance of Angelsharks is thought to be fishing pressure, however, habitat degradation may also have contributed to their decline (Gordon *et al.*, 2019).

## 2.1. Unsustainable exploitation

Historically, Angelsharks were utilised for both food and for its skin. In the first half of the 20th century, Angelsharks were subject to some localised targeted fisheries performed by specialized types of nets, often named after the local name of the species: *Escatera* (Spain), *Squaenera* (Italy), *Sklatara* (Croatia), *Martramou* (France). Over the latter half of the 20th century, Angelsharks continued to be a bycatch in a range of fisheries, including bottom trawl and bottom net fisheries (e.g. gillnet, trammel net, and tangle net) and, to a lesser extent, bottom longline fisheries. In some parts of its range, there has been additional fishing mortality through recreational fisheries.

Excessive fishing pressure has been identified as the most probable impact at the population level, given the broadscale decline in geographical extent. Given the largely inshore distribution of Angelshark, though noting that there can be seasonality in their distributions, there is potentially a high overlap between their populations with commercial, artisanal, and recreational fisheries. In addition to a reduction in population size and range, overfishing can result in population fragmentation and subsequent impacts on genetic population structure.

## Habitat degradation (including pollution)

Given that contemporary data on the habitat and distribution of Angelsharks are limited, the potential impacts of habitat degradation and other anthropogenic pressures on this species are uncertain. Angelsharks often occur on sandy habitats in close proximity to more complex features (e.g. seagrass meadows and reefs) and have an inshore distribution, especially gravid females and neonates that may occupy very shallow waters. Therefore it is likely that other anthropogenic activities (e.g. aggregate extraction, habitat loss, and coastal pollution) may have had an unquantified impact. There have also been hypoxic events in some parts of the Mediterranean Sea (Riedel *et al.*, 2008; Giani *et al.*, 2012), including inshore areas, which can be important pupping and nursery grounds for Angelsharks. Whilst the effect of hypoxia on Angelsharks has not been studied, it is possible that reduced levels of dissolved oxygen may influence their localised distributions, given that Angelshark partially bury in soft sediments and have restricted breathing movements of the gills, as part of their cryptic nature (Tomita *et al.*, 2018).

The potential disturbance on *Squatina* spp. due to the magnetic fields generated by underwater cables, including offshore wind farms (currently under development in some Mediterranean coastal areas), also needs to be investigated (Gill & Taylor, 2001).

## Other factors

Whilst there has been some consideration of other factors that may affect Angelsharks, including prey availability, multispecies interactions, and climate change, these are not considered here to be of significant impact at the population level.

Angelsharks are ambush predators that are known to predate on a range of demersal fish species, both commercial and non-commercial, and larger invertebrates (e.g. cephalopods and decapod crustaceans). Given the diverse range of potential prey, it is unlikely that prey availability has impacted the global population.

In relation to climate change, it may be noted that some warmer-water fish species have displayed a northward extension in geographic range. However, this has not been observed for the Angelshark, perhaps due to sparsity of records, so we cannot currently assess whether increased water temperatures have, or would, impact the population.

## Threat prioritisation

Each threat outlined above has been assessed using a pre-defined matrix (Table 3) to determine its relative impact on Angelsharks across their range.

The matrix considers the consequences of a threat or impact on Angelsharks and the likelihood of occurrence of that threat. Where mitigation/management measures do exist and have been implemented, the likelihood of the threat has been assessed assuming that these measures continue to be applied appropriately.

Likelihood of occurrence has been categorised as ‘Almost Certain’, ‘Likely’, ‘Possible’, ‘Unlikely’, and ‘Rare/Unknown’. Consequence classifications are defined as follows:

1. Not significant – No known impact to species decline if not addressed.
2. Minor – Possible, but not known, contribution to species decline. Should not be prioritised over other threats.
3. Moderate – Could contribute to species decline, but not an immediate threat.
4. Major – Could result in significant declines of species in an area if not addressed.
5. Catastrophic – Could lead to the loss of the species in an area if not addressed and contribute to extinction risk.

The threat matrix has been considered for this action plan for the Mediterranean region only. The matrix uses a qualitative assessment drawing on peer-reviewed literature and expert opinion from CMS and captured during the Angel Shark Conservation Network’s (ASCN) Mediterranean Workshop (Gordon *et al.,* 2019). Levels of risk and the associated priority for action are defined as follows:

|  |  |
| --- | --- |
| Very High | immediate additional action required |
| High | additional action and the precautionary approach should be applied |
| Moderate | obtain additional information and develop additional action, if required |
| Low | monitor the occurrence of threats and reassess level of threat if likelihood or consequences change |

It is very important to recognise that addressing individual threats in isolation – both geographically, and in the context of other impacts - is likely to have limited effects and that interventions should be coordinated where possible.

## Threat matrix

**Table 3:** Threat matrix showing the combination of likelihood of occurrence (considering existing mitigation measures) and consequence of each threat, to determine the level of risk to the Angelshark in the Mediterranean Sea. Risk is categorised into four ratings: green – low, blue – moderate, yellow – high, red – very high. Threat matrix adapted from Gordon *et al.* (2019).

|  | | **Consequences** | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Not Significant** | **Minor** | **Moderate** | **Major** | **Catastrophic** |
| **Likelihood** | **Almost Certain** |  |  |  | Bycatch in small-scale & large-scale fisheries (including bycatch mortality[[5]](#footnote-6)). |  |
| **Likely** | Pollution from micro/macroplastics[[6]](#footnote-7). | Water pollution/runoff leading to accumulation of contaminants. | Low genetic diversity (genetic bottlenecks/population fragmentation). | Mortality from targeted and accidental catch due to recreational and sports fishing (e.g. rod & line, surfcasting, spearfishing). |  |
| Renewable energy (e.g. wind farms, underwater turbines, lagoons). | Water pollution/runoff and sewage leading to eutrophication. | Coastal building and infrastructure development that alter seafloor morphology. | Bycatch in small-scale and large-scale fisheries and illegal retention. |
| Extractive industries (e.g. aggregate, mining, dredging). | Changing water temperature. | Degradation of habitat. |
| Anchor damage of habitats. | Increasing number of tourists and recreational activity in coastal waters. |
| Pipelines and electrical cables. |
| **Likelihood** | **Likely** | Shipping disturbance. | Recreational watersports (including diver disturbance and boating). |
| **Possible** | Pathogens. | Alteration of the food web (overfishing of preferential prey species)[[7]](#footnote-8). | Ghost fishing. |  | Targeted fisheries or retained bycatch in small-scale inshore fisheries. |
| Invasive Species. | Hypoxia. |
| **Unlikely** |  |  |  |  |  |
| **Rare / Unknown** |  |  | Oil spills. |  |  |

# POLICIES AND LEGISLATION RELEVANT FOR MANAGEMENT

## 3.1. Conservation and legal status

**Table 4:** Details of international conservation instruments that list Angelshark, *Squatina squatina*. Numbers in parentheses indicate the year a species was assessed or listed on an agreement.

|  |  |
| --- | --- |
| **International legal and non-legal instruments** | **Angelshark listed under protection measure or assessment** |
| International Union for Conservation of Nature (IUCN) Red List of Threatened Species | Critically Endangered A2bcd (2019):  Population reduced an observed, estimated, inferred, or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on the following:  a) an index of abundance appropriate for the taxon,  b) a decline in area of occupancy, extent of occurrence and/or quality of habitat,  c) actual or potential levels of exploitation. |
| Convention on the Conservation of Migratory Species of Wild Animals (CMS) | Angelshark listed in Appendix I (2017)  Angelshark listed in Appendix II (2017) |
| Memorandum of Understanding on the Conservation of Migratory Sharks (CMS Sharks-MOU) | Angelshark listed in Annex 1 (2018) |
| Barcelona Convention and the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol) | Angelshark listed in Annex II |
| General Fisheries Commission for the Mediterranean (GFCM) | Article 6 of GFCM/42/2018/2 states that “*CPCs shall ensure a high protection from fishing activities for elasmobranch species listed in Annex II of the SPA/BD Protocol of the Barcelona Convention, which must be released unharmed and alive, to the extent possible*”. This listing applies to Angelshark (*S. squatina).*  Article 7 of GFCM/42/2018/2 states that “*Specimens of shark species listed in Annex II of the SPA/BD Protocol shall not be retained on board, transhipped, landed, transferred, stored, sold or displayed or offered for sale*”. This listing applies to Angelshark (*S. squatina).* |

## Range State Status under CMS Instruments

The table below (Table 5) provides the presence status of Angelshark in each Range State, considering a subset of four of the six IUCN presence codes. The presence statuses were determined and defined by Lawson *et al.* (2019), adapted from IUCN (2018).

1. Extant - the species is known or thought very likely to occur presently in the area, usually encompassing current or recent localities where suitable habitat at appropriate altitudes remains (or depths in the case of aquatic species).
2. Possibly Extant - There is no record of the species in the area, but the species may possibly occur, based on the distribution of potentially suitable habitat at appropriate altitudes, although the area is beyond where the species is Extant, and the degree of probability of the species occurring is lower.
3. Possibly Extinct - there is no record of the species in the area, but the species was formerly known or thought very likely to have occurred, but it is most likely now locally extinct from the area because habitat loss/other threats are thought likely to have eliminated the species and/or owing to a lack of records in the last 30 years.
4. Presence Uncertain - the species was formerly known or thought very likely to occur in the area, but it is no longer known if it still occurs.

**Table 5:** List of the Range States of the Mediterranean Sea with the presence status of Angelshark (*Squatina squatina*) and whether they are a member party or signatory of either CMS or Sharks-MOU. Presence statuses provided are according to Lawson *et al.* (2019) or if available, most recent information. It has been described in the following footnotes where Morey *et al.* (2019) or another source provided a differing presence status to Lawson *et al.* (2019). Unless specified, both sources (Lawson *et al.* 2019 & Morey *et al.* 2019) determined the same presence status per Range State. ‘Not Evaluated’ means that Angelsharks have not been assessed in the area by either Morey *et al.* (2019) or Lawson *et al.* (2019). ✓ indicates CMS Party and Sharks MOU Signatory. - indicates non-CMS Party and non-Sharks MOU Signatory.

| **Range State** | **Presence Status** | **CMS** | **Sharks - MOU** |
| --- | --- | --- | --- |
| European Union | Extant | **✓** | **✓** |
| Albania | Presence Uncertain | **✓** | **-** |
| Algeria | Extant | **✓** | **-** |
| Bosnia and Herzegovina | Presence Uncertain | **✓** | **-** |
| Croatia | Extant | **✓** | **-** |
| Cyprus[[8]](#footnote-9) | Extant | **✓** | **-** |
| Egypt | Presence Uncertain | **✓** | **✓** |
| France: |  | **✓** | **✓** |
| Mediterranean Coast | Presence Uncertain |
| Corsica | Extant |
|  |  |  |  |
|  |  |  |  |
| Greece: |  | **✓** | **-** |
| Mainland | Extant |
| Crete | Presence Uncertain |
| Other islands | Not evaluated |
| Israel | Extant | **✓** | **-** |
| Italy: |  | **✓** | **✓** |
| Mainland and Sicily | Extant9 |
| Sardinia | Extant[[9]](#footnote-10) |
| Lebanon | Presence Uncertain | **✓** | **-** |
| Libya | Extant | **✓** | **✓** |
| Malta | Extant | **✓** | **-** |
| Monaco | Presence Uncertain | **✓** | **✓** |
| Montenegro | Presence Uncertain | **✓** | **-** |
| Morocco | Presence Uncertain | **✓** | **-** |
| Slovenia | Extant | **✓** | **-** |
| Spain: |  | **✓** | **-** |
| Mediterranean Coast | Presence Uncertain |
| Balearic Islands | Presence Uncertain |
| Syrian Arab Republic | Presence Uncertain | **✓** | **✓** |
| Tunisia | Extant[[10]](#footnote-11) | **✓** | **-** |
| Turkey | Extant | **-** | **-** |
| United Kingdom: |  | **✓** | **✓** |
| Gibraltar | Presence Uncertain[[11]](#footnote-12) |
| Sovereign Base Areas of Akrotiri and Dhekelia (on Cyprus) | Not Evaluated |



**Figure 3:** Map of the Mediterranean region, FAO Major Fishing Area 37, showing the geographical position of the various GFCM Geographical Subareas (GSAs) and their respective borders. Source: FAO, 2020.[[12]](#footnote-13)

**Table 6:** List of GFCM Geographical Subareas (GSAs) with presence status of Angelsharks (*Squatina squatina*). Angelsharks were deemed ‘extant’ in a GSA, when one or more Range State in the area was classified as extant by Lawson *et al.* (2019) or if available, most recent information. Angelsharks were deemed ‘presence uncertain’ in a GSA, when all Range States were classified as ‘presence uncertain’ by Lawson *et al.* (2019). It is described in the following footnotes where Morey *et al.* (2019) or another source provided a differing presence status to Lawson *et al.* (2019). Unless specified, both sources (Lawson *et al.* 2019 & Morey *et al.* 2019) determined the same presence status per Range State.

|  |  |  |
| --- | --- | --- |
| **GFCM Geographical Subareas (GSAs)** | | **Presence Status** |
| **1** | Northern Alboran Sea | Presence Uncertain |
| **2** | Alboran Island | Presence Uncertain |
| **3** | Southern Alboran Sea | Presence Uncertain |
| **4** | Algeria | Extant |
| **5** | Balearic Islands | Presence Uncertain |
| **6** | Northern Spain | Presence Uncertain |
| **7** | Gulf of Lion | Presence Uncertain |
| **8** | Corsica | Extant |
| **9** | Ligurian Sea and Northern Tyrrhenian Sea | Extant |
| **10** | Southern and Central Tyrrhenian Sea | Extant |
| **11.1** | Western Sardinia | Presence Uncertain |
| **11.2** | Eastern Sardinia | Extant[[13]](#footnote-14) |
| **12** | Northern Tunisia | Extant[[14]](#footnote-15) |
| **13** | Gulf of Hammamet | Extant14 |
| **14** | Gulf of Gabès | Extant14 |
| **15** | Malta | Extant |
| **16** | Southern Sicily | Extant[[15]](#footnote-16) |
| **17** | Northern Adriatic Sea | Extant |
| **18** | Southern Adriatic Sea (part) | Extant |
| **19** | Western Ionian Sea | Extant |
| **20** | Eastern Ionian Sea | Extant |
| **21** | Southern Ionian Sea | Extant |
| **22** | Aegean Sea | Extant |
| **23** | Crete | Presence Uncertain |
| **24** | Northern Levant Sea | Extant |
| **25** | Cyprus | Extant[[16]](#footnote-17) |
| **26** | Southern Levant Sea | Presence Uncertain |
| **27** | Eastern Levant Sea | Extant |
| **28** | Marmara Sea | Extant |
| **29** | Black Sea | Extant[[17]](#footnote-18) |
| **30** | Azov Sea | Species does not occur |

## Relevant organisations operating in the Angelshark range

CECAF: Fishery Committee for the Eastern Central Atlantic

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

CBD: Convention on Biological Diversity

EU: European Union

GFCM: General Fisheries Commission for the Mediterranean

ICES: International Council for the Exploration of the Sea

OSPAR: Convention for the Protection of the Marine Environment of the North-East Atlantic

UNEPMAP: United Nations Environment Programme Mediterranean Action Plan (Barcelona Convention)

## National/EU legislation and management measures specific to the Angelshark

This table contains national and EU legislation, including management measures of Range States in the Mediterranean that protects Angelshark specifically. An overview of general legislation on fishery or biodiversity that is relevant to the conservation of Angelshark, is provided in Annex III for countries where species-specific legislation and measures are not present.

**Table 7:** Details of national and EU legislation of Mediterranean Range States that specifically protects Angelshark, *Squatina squatina*, or in general due to umbrella categories such as ‘all sharks’.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Range State** | **Specific legislation exists for:** | **Reference to legislation and disposition.**  **If not explicit to Angelsharks, see Annex III** | | **Penalties** |
| EUROPEAN UNION | ANGELSHARK | REGULATION (EU) 2015/2102 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 28 October 2015 amending Regulation (EU) No 1343/2011 on certain provisions for fishing in the GFCM (General Fisheries Commission for the Mediterranean) Agreement area.  EU Regulation (EU) 2019/1241 of the European Parliament and of the Council of 20 June 2019. | **Article 16j**  1. Shark and ray species which are included in Annex II to the Protocol concerning specially protected areas and biological diversity in the Mediterranean (“Protocol to the Barcelona Convention”) shall not be retained on board, transhipped, landed, transferred, stored, sold or displayed or offered for sale.  2. To the extent possible, fishing vessels that have incidentally caught sharks and rays of the species included in Annex II to the Protocol to the Barcelona Convention shall promptly release them unharmed and alive.  **Article 16k**  Beheading and skinning of sharks on board and before landing shall be prohibited. Beheaded and skinned sharks  may not be marketed at the first sale markets after landing.  **Annex I** lists *Squatina squatina* as a prohibited species, for which there is a prohibition “to fish for, retain on board, tranship, land, store, sell, display or offer for sale” Angelshark for all EU waters. |  |
| ALBANIA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| ALGERIA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| BOSNIA-HERZEGOVINA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| CROATIA | ANGELSHARK | Strictly protected species under [the Law on nature protection, 2013](http://extwprlegs1.fao.org/docs/pdf/cro143039.pdf) and [Act on strictly protected species, 2013](https://narodne-novine.nn.hr/clanci/sluzbeni/2013_12_144_3086.html) - NN 144/13, 3086. | B) STRICTLY PROTECTED SPECIES  1. Declaration of strictly protected species  Article 151  (1) Strictly protected species are native wild species that are endangered or are widespread endemics or wild species for which such protection is prescribed by European Union regulations governing the conservation of wild plant and animal species or international treaties to which the Republic of Croatia is a party.  (2) Strictly protected species, based on the Red List, taking into account the precautionary principle and other criteria prescribed by this Act, shall be declared by the Minister in an ordinance.  (3) The Ordinance referred to in paragraph 2 of this Article shall also prescribe general measures for the protection of strictly protected species and their habitats, detailed content of applications for permits for deviations from strict protection measures, handling of dead or injured specimens of strictly protected species, content, method of preparation and the procedure for adopting a management plan with an action plan and other rules for dealing with strictly protected species.  (4) The Red List shall be determined by the Ministry and shall be in charge of its updating. The Red list is published on the Ministry's website.  2. Prohibited actions with strictly protected species  Article 153  (1) It is prohibited to pick, cut, dig, collect or destroy individuals of strictly protected plants, fungi, lichens and algae from nature in their natural area of distribution.  (2) The following actions with strictly protected animals from nature in their natural area of distribution are prohibited:  - all forms of deliberate capture or killing,  -deliberate harassment, especially during breeding, rearing, hibernation, and migration,  - deliberate destruction or taking of eggs,  -intentional destruction, damage, or removal of their developmental forms, nests or litters,  -damage or destruction of their breeding or resting areas.  (3) The keeping, transport, sale, exchange, and offering for sale or exchange of live or dead individuals from the nature of strictly protected species referred to in paragraphs 1 and 2 of this Article shall be prohibited.  (4) The prohibitions referred to in paragraphs 1, 2 and 3 of this Article shall apply to all developmental forms of strictly protected species.  (5) The prohibitions referred to in paragraphs 2 and 3 of this Article shall apply to all birds of the wild that occur naturally in the territory of the Republic of Croatia. | Any harm toward strictly protected species is regulated by the Criminal Code of Croatia. Article 200 of the Criminal code (1) Whoever, contrary to regulations, kills, destroys, possesses, captures or takes a specimen of a protected species of an animal, plant or fungus or other protected natural value, shall be punished by imprisonment not exceeding three years. (2) Whoever commits the offence referred to in paragraph 1 of this Article against a highly protected wild species of an animal, plant or fungus, shall be punished by imprisonment from six months to five years. (3) Whoever commits the offense referred to in paragraph 1 or 2 of this Article by negligence, shall be punished by imprisonment not exceeding two years. (4) There shall be no criminal offense referred to in paragraph 1 of this Article where it is committed against a negligible quantity of members of a species or other protected natural value and has had a negligible impact on the preservation of this species or other protected natural value. |
| CYPRUS | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| EGYPT | ALL SHARKS | Decree 444/20112 | Prohibited to fish sharks of all species in the Mediterranean Sea and to place sharks (whole or parts) on the market. |  |
| FRANCE | ANGELSHARK | Décret n° 2014-1195 du 16 octobre 2014 portant publication de l'amendement de la liste des annexes II et III du protocole relatif aux aires spécialement protégées et à la diversité biologique en Méditerranée, signé à Barcelone le 10 juin 1995, adopté à Marrakech le 5 novembre 2009 (1) | Listed in annex as a species in danger or threatened. | L. 415-3 code de l’environnement:  “est puni de trois ans d'emprisonnement et de 150 000 € d'amende”. |
| GREECE | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| ISRAEL | ALL SHARKS | National Parks, Nature Reserves, National Sites and Memorial Sites Law,  5758-1998  2005 regulation | listed in the 2005 regulation:  Order Batoidea,  Order Chimaeriformes,  Order Selachii All species | section 57 states “(a) Whosoever contravenes one of the provisions of Sections  25, 33(c) or (d), 40 or 52(b), or whosoever contravenes the provisions of Section 30(d) and causes severe or irreversible damage, shall be liable to three years imprisonment.  (b) Whosoever contravenes the provisions of Section 30(d), or of regulations or rules made pursuant to Sections 18, 33(b), 49(d)  and 66 or one of the conditions of a license or permit granted pursuant thereto, shall be liable to six months imprisonment.” |
| ITALY | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| LEBANON | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| LIBYA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| MALTA | ANGELSHARK | ACT No. XX of 2001 AN ACT to protect the Environment.  7th December 2006  LEGAL NOTICE 311 of 2006, as amended by Legal Notices 426 of 2007,  162 of 2009, 94 of 2010, 322 of 2013 379 of 2016, and 164 of 2019 | Listed in the Schedule VI of the regulations: ANIMAL AND PLANT SPECIES OF NATIONAL INTEREST IN NEED OF STRICT PROTECTION  2) The competent authority shall set up a system to monitor the incidental capture and killing of the animal species listed in Schedules V (a) and VI (a).  In the light of the information gathered, the competent authority shall carry out further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned. |  |
| MONACO | ANGELSHARK | Code de la mer | Article O. 244-11 code de la mer  “Sont interdites de pêche les espèces suivantes : [...| 15° ange des mers (*Squatina squatina*) ;” “Sont interdits la vente, l'achat, le transport et l'emploi à un usage quelconque des produits des pêches interdites.” | article 390 code pénal - 6 months to 3 years imprisonment  article 26 fine 9 000 to 18 000 euros |
| MONTENEGRO | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| MOROCCO | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| SLOVENIA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| SPAIN | ANGELSHARK | Orden AAA/75/2012, de 12 de enero, por la que se incluyen distintas especies en el Listado de Especies Silvestres en Régimen de Protección Especial para su adaptación al Anexo II del Protocolo sobre zonas especialmente protegidas y la diversidad biológica en el Mediterráneo. | This national “List of Wild Species under Special Protection Regime and the Spanish Catalogue of Threatened Species) now lists Angelshark *S. squatina* (and related species) S. aculeata and S. oculata) as species being in danger of extinction, which is the highest category within this legislation (Boletín Oficial del Estado, 2019). |  |
| SYRIA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| TUNISIA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |
| TURKEY | ANGELSHARK | Communique 2018/19 updates Article 5 of the Turkish Prohibited Species Lists ([Communique 2016/35](https://www.resmigazete.gov.tr/eskiler/2018/04/20180419-7.htm)). | Article 5 states that *Squatina aculeata*, *S. oculata* and *S. squatina*, are under protection, and fishing, killing and landing of these species are prohibited. |  |
| UNITED KINGDOM OVERSEAS TERRITORIES   * GIBRALTAR * SOVEREIGN BASE AREAS OF AKROTIRI AND DHEKELIA | No specific legislation exists for Angelsharks, see Annex III for general legislation. | | | |

# FRAMEWORK FOR ACTION

Threats to Angelshark abundance and distribution were identified and attributed a level of risk using the threat matrix (see Table 3). Threats classified as very high risk were the focus of the following framework for action.

## 4.1. Goal

To strengthen coordination, harmonisation, delivery of data collection, conservation, and management efforts for the Angelshark across its range within the Mediterranean Sea.

## Objectives, Actions, and Results

A collaborative Regional Action Plan for three Angel Shark species in the Mediterranean was developed in 2019 (Gordon *et al*., 2019) and, under this, the suggested actions were broadly spread across three higher-level goals, namely:

1. National legislation for Angelsharks is established, implemented and enforced;
2. Fisheries-based Angelshark mortality is minimised in the Mediterranean; and
3. Angelshark habitat is identified and protected.

The various objectives and actions identified in the earlier Regional Action Plan (Gordon *et al.,* 2019), under which governments and CMS Parties had been identified as best placed to act on some selected actions, are summarised in Annex I.

Consequently, CMS Parties could usefully consider more focused work on Angelshark, *Squatina squatina*, including furthering progress of the Concerted Action for Angelshark in the Mediterranean Sea, specifically in relation to:

* Species protection
* Identification of Critical Angel Shark Areas (CASAs) and spatial management if required
* Scientific studies and data collection
* Secure further resources

These four broad topics, which would also address the various potential actions (as indicated by the Regional Action Plan), would all be in alignment with the CMS Convention Text, and demonstrate the commitment of the Parties to the Concerted Action Plan.

The objectives and corresponding actions and results are set out in the tables below (Tables 8, 9, 10, and 11) for the threats identified for Angelshark.

## Species protection

The main anthropogenic sources of mortality of Angelshark are expected to be the result of (i) commercial fisheries (including artisanal and subsistence fisheries), and (ii) recreational fisheries.

Recommendation GFCM/42/2018/2 states that "Specimens of shark species listed in Annex II of the SPA/BD Protocol shall not be retained on board, transhipped, landed, transferred, stored, sold or displayed or offered for sale”[[18]](#footnote-19). Given the listing of *S. squatina* on the Barcelona Convention, this indicates that it should be a ‘prohibited species’ in relation to commercial fisheries.

Whilst GFCM/42/2018/2 confers a degree of species protection, depending on levels of education, monitoring, compliance, enforcement, and implementation, it may not confer full protection. For example, Angelshark may also be taken in a range of recreational fisheries, including rod-and-line and spearfishing.

Hence, there is a rationale for Parties to determine whether there are other national legislative instruments that can provide more wide-ranging species protection. Furthermore, improved education, monitoring and enforcement to facilitate compliance by fishers may also be required.

Such efforts would be in alignment with the Convention (Article II, Section 3(b); Article III, Section 5).

## Identification of Critical Angel Shark Areas (CASAs)

A range of scientific studies have provided overviews of some of the recent occurrences of Angelshark. However, such studies may not have had full access to all available national data, both historical and contemporary.

Hence, national programmes to collate information on the sites of Angelshark occurrence (both historical and contemporary) would be useful, with potential data sources including: fisheries reports, commercial landings and observer data, historical accounts, fisher knowledge, citizen science programmes, social media and local ecological knowledge (LEK). Habitat modelling and environmental DNA (eDNA) could also be useful tools to identify potential sites of occurrence. The collation of national data (in a standardised format) would allow Parties to determine the current occurrence of Angelsharks and suitable Angelshark habitat in both national waters, and regional seas, and would allow subsequent aggregation of available data for the wider Mediterranean region.

Such data could then be used to inform on (1) habitat modelling and identification of other potential sites, (2) potential role of spatial management, and (3) options for non-destructive surveys to monitor trends in stock size.

Such efforts would be in alignment with the Convention (Article III, Section 4(a)).

## Scientific studies, data collection and liaison with the fishing industry

In support of the Concerted Plan of Action, there is a rationale for national programmes to improve scientific data collection as well as improved liaison between fisheries scientists with fishing industries and fishing communities (including artisanal and subsistence fisheries, and recreational fisheries).

Such initiatives could facilitate improved knowledge of historic and contemporary distribution of Angelshark, a better understanding of the current levels of bycatch, and estimates of discards (including dead and live discards).

Projects involving science-fisher collaboration can enhance scientific data collation and provide assistance to educational initiatives (e.g. in relation to GFCM recommendations and any national management measures).

There is also a strong rationale for the results of scientific studies to be used in collaborative scientific studies with other Parties. In particular, population genetics could reveal insight into connectivity between fragmented populations.

Such efforts would be in alignment with the Convention (Article II, Section 3(a)).

## Secure sufficient resources for ongoing Angelshark conservation

To successfully achieve the results of this Action Plan, sufficient resources need to be secured to implement actions at a national and regional scale. Parties might consider establishing national working groups that consist of local experts and stakeholders to support implementation on a national level.

## Objectives Framework

To address the objectives, actions and results, as introduced in section 4.2, the following framework (Tables 8, 9, 10, and 11) has been created. For each objective, there is an intended result that will be achieved through several actions, each of which has a priority, time scale, and Range States responsible for the action specified. ‘Range States Responsible’ contains two categories, ‘All Range States’ and ‘Range States where Angelsharks are extant’, the categorisation of Range States corresponds to Table 5.

**Actions** below have been prioritized as:

- Essential

- High

- Medium

- Low

**Timescales** have also been attached to each Action using the following scale:

- Immediate: completed within the next year

- Short: completed within the next 3 years

- Medium: completed within the next 5 years

- Long: completed within the next 10 years

- Ongoing: currently being implemented and should continue

- Completed: completed during review of Action Plan

All Range States should aim to undertake Actions 1.1-1.4, Actions 2.1-2.3, Action 3.1, and Actions 4.1 and 4.2. The outcomes of these Actions will inform on the practicalities and merits of undertaking subsequent Actions in national waters, and as to how more collaborative, regional studies could be conducted.

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| --- | --- | --- | --- | --- |
| **Table 8: *Objective 1 -* Ensure appropriate species-level protection for Angelshark *Squatina squatina*** | | | | |
| ***Result*** | ***Action*** | ***Priority*** | ***Time Scale*** | ***Range States Responsible*** |
| Appropriate species protection in line with CMS Appendix I listing, and relevant GFCM recommendations (GFCM/42/2018/2) are enforced or introduced for Angelshark *Squatina squatina\**.  Such protection may need to apply to both commercial and recreational fisheries (and should also consider other potential sources of anthropogenic mortality), in order to comply fully with obligations to protect CMS Appendix I listed species.  Awareness programme to ensure relevant stakeholders are aware of regulations protecting Angelsharks and subsequent monitoring of compliance and enforcement, where necessary.  [\* and other relevant species] | 1.1 Prohibition in fisheries regulations: Secure national fisheries regulations to ensure that it is prohibited to fish for, retain, tranship and land Angel Sharks (*Squatina* spp.) in support of GFCM Recommendation GFCM/42/2018/2. Note it is important to also prohibit catches of Smoothback Angelshark (*Squatina oculata)* and Sawback Angelshark (*Squatina aculeata)* due to the difficulty to identify and distinguish between the three Angel Shark species found within the Mediterranean. | Essential | Immediate | All Range States. |
| 1.2 Species-protection: Establish national species-level protection against the deliberate killing, injuring or taking of Angelshark. This is of particular importance for those nations where prohibited species regulations (see 1.1) only apply to commercial fishing vessels, as additional protection against other sources of potential mortality (e.g. artisanal and recreational fisheries) may be required. | Essential | Immediate | All Range States. |
| 1.3 Awareness programmes: Initiate educational and awareness programmes with relevant stakeholder groups in both the fisheries sector (e.g. enforcement officials, fishing industry, fish markets) and recreational sector (e.g. recreational fishers, spearfishers, and amateur divers) as to the prohibited and/or protected status of Angelsharks. With particular focus on species identification to distinguish between the three *Squatina* spp.*,* but also for classification purposes as Angelsharks are often reported as rays and not sharks. Share resources already developed (by Angel Shark Project) for [best practice to safely release Angelsharks](https://angelsharknetwork.com/wp-content/uploads/sites/16/2019/11/2019_Recreational-Best-Practice-Guide_EN_WEB.pdf%20) if accidentally caught. | Essential | Short | Range States where Angelsharks are extant. |
| 1.4 Monitoring and enforcement: Ensure that enforcement staff undertake appropriate monitoring of commercial fisheries and landings, with particular regard to those fleets that are more likely to encounter Angelsharks. Develop, or extend, national reporting framework for collating the number of inspections undertaken (by port, fleet, and month) and instances of infringement with regards Angelsharks. | High | Ongoing | Range States where Angelsharks are extant. |

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| --- | --- | --- | --- | --- |
| **Table 9: *Objective 2 -* Identification of sites and habitats of Angelshark *Squatina squatina*** | | | | |
| ***Result*** | ***Action*** | ***Priority*** | ***Time Scale*** | ***Range States Responsible*** |
| To identify former, current and potential Critical Angel Shark Areas (CASAs) and ascertain the status of Angelshark in these areas. | 2.1 Data collation: Collate national data (including both contemporary and historic sources) regarding the presence of Angelsharks *Squatina squatina* (and sister taxa) from relevant sources (including published studies, commercial and recreational fisheries data, fish market data, fisher and diver interviews, citizen science programmes, trawl survey data, discard observer data and museum specimens) to better document the contemporary and historical occurrence of Angelsharks in national waters. Such data may also be enhanced through the collection of data on the current presence of Angelshark through the use of social media.  Such data could be usefully collated in a common format (see Annex II), with institutes collating national data collaborating with other national institutes in order that more robust regional data are available. The collation of comparable data for other species of Angel Shark should also be undertaken, in order to aid in the interpretation of data for *Squatina squatina.* The [Angel Shark Sightings Map](https://angelsharksmap.zsl.org/)[[19]](#footnote-20), hosted by the Angel Shark Conservation Network, is already established, open access and widely used and could be utilised for this purpose. | High | Ongoing | All Range States. |
| 2.2 Habitat modelling: Based on data from action 2.1, undertake Angelshark habitat modelling in national waters and regional seas, in order to better understand and predict Critical Angel Shark Areas (CASAs), including habitats used by key life-history stages, including nursery, mating grounds, spawning (pupping) and overwintering grounds. | High | Ongoing | All Range States. |
| 2.3 Environmental DNA (eDNA) sampling: undertake eDNA sampling of appropriate areas (i.e. former, current and potential Angelshark habitats identified in 2.2) to gauge potential presence of Angelshark in the region. | Medium | Medium | All Range States. |
| 2.4 Non-destructive site sampling: Depending on the results of 2.1, 2.2, and/or 2.3, undertake non-destructive surveys (e.g. underwater visual census) of contemporary/potential Angelshark habitat to determine whether effective non-extractive field programmes could be developed in order to monitor localised populations of Angelshark. | High | Medium/Long | All Range States. |
| 2.5 Role of current MPA network: Undertake appropriate sampling (e.g. eDNA sampling, underwater visual census) of existing Marine Protected Areas which may provide suitable habitat for Angelshark, in order to ascertain the likely presence/absence of Angelshark and the effectiveness of conservation measures in place in the current MPA network. | Medium | Long | All Range States. |
| 2.6 Occurrence on fishing grounds: Based on the results of 2.1, 2.2, and/or 2.3, initiate (or expand) observer programmes to ensure robust observer coverage of those commercial fleets that may interact with Angelshark, in order to improve contemporary data on the presence of Angelshark and their interactions with fisheries. | High | Medium | Range States where Angelsharks are extant. |

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| **Table 10: *Objective 3 -* Support and undertake scientific studies, including data collection and liaison with the fishing sectors, to improve scientific knowledge of Angelsharks *Squatina squatina*, including population trends.** | | | | |
| ***Result*** | ***Action*** | ***Priority*** | ***Time Scale*** | ***Range States Responsible*** |
| Improved scientific data from commercial fisheries on Angelsharks becomes available, to inform on the status of the species, pressures and enable more robust monitoring of population trends.  Improved scientific data from recreational fisheries and other recreational activities on Angelsharks becomes available, to inform on the status of the species, pressures and enable more robust monitoring of population trends. | 3.1 Commercial fishery-dependent catch-per-unit-effort data: Improved reporting of interactions with commercial fishing fleets, including data on the numbers of Angelsharks caught, fate (discarded alive or discarded dead), and associated biological information (length, gender, females that are pregnant or giving birth). Comparable data on fishing effort, especially for those fleets expected to have a higher number of interactions with Angelsharks, should also be recorded. Such work could utilise the existing reporting requirements of GFCM and potentially focus on a particular ‘reference fleet’ as a case study. | High | Short (Implementation)  Ongoing (monitoring) | Range States where Angelsharks are extant. |
| 3.2 Recreational fishery catch reporting: Introduce obligation of recreational fishers to report accidental captures of Angelsharks periodically to a governing body as a condition of obtaining a licence (where relevant). Encourage reporting of sightings to both the relevant national fisheries institute and the [Angel Shark Sightings Map](https://angelsharknetwork.com/%23map)[[20]](#footnote-21). Adapt and distribute code of conduct to safely release Angelsharks if accidentally caught (already developed by the Angel Shark Project) to the recreational fishing community. | High | Ongoing | Range States where Angelsharks are extant. |
| 3.3 Citizen science: Through awareness programmes developed in Action 1.3, encourage reporting of Angelshark sightings to both the relevant national fisheries institute and the [Angel Shark Sightings Map](https://angelsharknetwork.com/#map)20, whether amateur or commercial divers, recreational fishers or someone sighting them in a market.  Adapt and share [code of conduct for scuba and snorkel](https://angelsharknetwork.com/wp-content/uploads/sites/16/2018/08/Code-of-Conduct-English.pdf%20)[[21]](#footnote-22) (already developed by Angel Shark Project) to the diving community. | Medium | Ongoing | Range States where Angelsharks are extant. |
| 3.4 Fishery-independent survey trends: For any areas of localised Angelshark abundance or suitable Angelshark habitat (as surveyed under Actions 2.2, 2.3 and 2.4), initiate standardised, longer-term, non-destructive monitoring programmes to understand seasonal and annual trends in the presence and relative abundance of Angelsharks. Such work could involve collaborative studies with relevant stakeholder groups (e.g. commercial fishers, recreational fishers, divers etc.). | High | Medium (Implementation)  Ongoing (monitoring) | Range States where Angelsharks are extant. |
| 3.5 Quantification of discard survival and options for minimising discard mortality: Depending on the results of Action 3.1, detailed studies are needed to provide more robust estimates of discard survival (at-vessel mortality and post-release mortality) of Angelsharks from commercial fleets. Such work should be undertaken in conjunction with current levels and patterns of fleet activity and should be designed in such a way that would decrease fishing mortality on Angelsharks. Such work should also identify where changes in fisher behaviour (e.g. soak times of nets) can prevent or minimise mortality of incidentally caught Angelshark. | High | Long | Range States where Angelsharks are extant. |
| 3.6 Tagging: For any areas of localised Angelshark abundance (as surveyed under Action 2.4, consider the utility of visual and/or electronic tagging to inform on seasonality, habitat use, home range and movement. Such studies should be designed carefully and follow an ethical review process, in order to not increase mortality. | Medium | Long | Range States where Angelsharks are extant. |
| 3.7 Population structure and connectivity: Collect opportunistic tissue samples (e.g. from dead bycatch) and ensure appropriate longer-term archiving and storage. Subsamples of this material should be made available for scientific studies to facilitate Atlanto-Mediterranean genetic analyses to understand Angelshark connectivity in the region and global range. | Medium | Long | All Range States. |
| 3.8 Life-history studies: Depending on studies being undertaken under the Concerted Action Plan, relevant national institutes could usefully collect life-history information (length, sex, weight, maturity, collection of biological material for supporting studies, including genetic samples and parasites). In accordance with the “no taking” rule described in CMS Article III (5[[22]](#footnote-23)) such work should only be undertaken when based on specimens of incidental dead bycatch and under authorised derogation from relevant national regulatory frameworks (see Objective 1). Life-history studies based on euthanised specimens should not be undertaken. | Medium | Ongoing | Range States where Angelsharks are extant. |
| 3.9 Longer-term, historical population dynamics: Depending on the data available (see Action 2.1), undertake analyses of longer-term population trends of Angelsharks for national waters and regional seas to understand historical population trends. | Low | Long | All Range States. |

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| --- | --- | --- | --- | --- |
| **Table 11: *Objective 4 -* Sufficient resources secured for long-term Angelshark *Squatina squatina c*onservation actions** | | | | |
| ***Result*** | ***Action*** | ***Priority*** | ***Time Scale*** | ***Range States Responsible*** |
| Resources shall be secured on long-term basis for the implementation of the Single Species Action Plan. | 4.1 Provide Resources: National and regional governments secure the necessary funds for the implementation of the actions at national and regional levels. Parties shall strive to provide funds to implement priority actions in the plan and financially contribute to staff time and coordination. | High | Ongoing | All Range States. |
| 4.2 Establish international working group (IntWG) for the Mediterranean region: An IntWG will be established to coordinate and monitor implementation of this Single Species Action Plan. | High | Ongoing | All Range States. |
| 4.3 Increase protected areas: The existing MPA network is expanded to include any identified CASAs and the effectiveness of MPA networks is continually monitored. | Medium | Long | All Range States. |

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# ANNEXES

## Annex I: Goals, Objectives, and Actions adapted from Gordon et al., 2019. This table is adapted from the Mediterranean Angel Sharks: Regional Action Plan (Gordon et al., 2019). Only actions most relevant to this Single Species Action Plan have been included in Annex I, the original numbering and wording of each goal, objective and action remains.

|  |  |  |
| --- | --- | --- |
| **Goal 1: Fisheries-based Angelshark mortality is minimised in the Mediterranean.** | | |
|  | **Objective 1.1: Reporting and monitoring in all segments of Mediterranean fisheries, including recreational, is improved for the three species of angel shark.** | |
|  |  | Action 1.1.2: Develop guidance documents for reporting procedure in line with GFCM Recommendations for data recording and ensure the document is accessible to industry. |
|  |  | Action 1.1.5: Comply with existing GFCM and national reporting procedures. |
|  | **Objective 1.2: Incidental catch of angel sharks by all segments of Mediterranean fisheries is minimised.** | |
|  |  | Action 1.2.2: Ascertain the level of bycatch and incidental catch by gear type in order to inform further necessary action. |
|  |  | Action 1.2.4: Secure spatial/temporal management and gear restrictions based on collated data. |
|  | **Objective 1.3: Retention is reduced, and post-release survival enhanced, through information, training, and education for fishers.** | |
|  |  | Action 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. |
|  |  | Action 1.3.3: Develop training programmes to educate fishers about conservation status and prohibited status of Angelsharks, as well as best practice handling techniques. |
|  | **Objective 1.4: The extent of interaction between marine recreational fishing activities and angel sharks is ascertained and minimised.** | |
|  |  | Action 1.4.1: Quantify the level of recreational fishing activity in the Mediterranean, guided by GFCM recreational fisheries handbook. |
| **GOAL 2 Angelshark habitat is identified and protected.** | | |
|  | **Objective 2.1: Angel shark distribution is better understood.** | |
|  |  | Action 2.1.3: Use fisheries data and other reporting methods to improve spatial data on distribution. |
|  | **Objective 2.3: Angel shark habitat is identified, specifically Critical Angel Shark Areas (CASAs).** | |
|  |  | Action 2.3.3: Increase engagement with SPA/RAC habitat mapping programmes to identify potential CASAs. |
|  |  | Action 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. |
|  | **Objective 2.4: Angel shark habitat is reflected in marine spatial planning and coastal development.** | |
|  |  | Action 2.4.1: Engage with Environmental Impact Assessment (EIA) process prior to coastal developments near CASAs. |
|  |  | Action 2.4.2: Monitor coastal developments near CASAs and mitigate impacts where possible. |
|  |  | Action 2.4.3: Identify what spatial/temporal management measures would be most appropriate according to each subarea. |
|  |  | Action 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. |
| **Goal 3: National legislation for angel sharks is established, implemented and enforced.** | | |
|  | **Objective 3.1: Angelsharks are protected by regional and national management measures (where GFCM/42/2018/2 has been adopted, go to Action 3.1.5 or Objective 3.2).** | |
|  |  | Action 3.1.1: Review national legislation and identify gaps in the implementation of relevant international and regional obligations, including those under GFCM and CMS. |
|  |  | Action 3.1.2: Transpose GFCM/42/2018/2 into national legislation where lacking. |
|  |  | Action 3.1.3: Fulfil obligations under CMS App I & II listing and CMS Sharks MOU Annex I. |
|  |  | Action 3.1.5: Where absent, seek adoption of full protective measures to cover recreational activities and disturbance. |
|  | **Objective 3.2: Management measures are implemented and enforced.** | |
|  |  | Action 3.2.1: Implement and enforce GFCM/42/2018/2 & national legislations. |
|  |  | Action 3.2.2: Implement CMS Appendix I listing in all Mediterranean and Black Sea Range States. |
|  |  | Action 3.2.3: Reinforce compliance reporting processes at regional fora, requiring more detailed documentation. |
|  |  | Action 3.2.7: Ensure regulatory obligations are reflected in training for fishers, accommodating subregional constraints (see Action 1.3.3). |
|  | **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 3.3.2: Ensure CMS obligations are reflected in marine spatial planning (e.g. MPAs, FRAs, SPAs) and coastal development processes. |

## Annex II: Suggested field headings and descriptions for collation of data on Angelshark presence. The table includes a list of data fields and accompanying formats that could be used to collect information on sightings or captures of Angelsharks. The fields align with those captured through the Angel Shark Sightings Map, in addition to some others (denoted by \*), which may be useful. More fields are available through the Angel Shark Sightings Map, not included here for brevity, including the option to upload photos and videos.

|  |  |
| --- | --- |
| **Data field** | **Format and description** |
| Latitude | * Latitude in decimal degrees |
| Longitude | * Longitude in decimal degrees |
| \*Longitude (East/West) | * Whether longitude is East or West |
| Estimated/actual | * ‘Estimated’ [i.e. position was estimated from a place name] * ‘Actual’ [i.e. position was as recorded] |
| Country | * Insert country of record |
| GFCM GSA | * Insert GFCM Geographic Sub-Area (i.e. GSA1–GSA29) |
| Species | Text field, either   * *Squatina squatina* * *Squatina oculata* * *Squatina aculeat*a * *Squatina* spp. (indet.) |
| Accuracy of species identification | * ‘Verified’ [i.e. species identification is considered reliable] * ‘Tentative’ [i.e. species identification may not be accurate] |
| Day of sighting | * Day (1-31) or ‘NA’ if unavailable |
| Month of sighting | * Month (1-12) or ‘NA’ if unavailable |
| Year of sighting | * Year (YYYY) or ‘NA’ if unavailable |
| Season | * ‘Q1’ [January to March] * ‘Q2’ [April to June] * ‘Q3’ [July to September] * ‘Q4’ [October to December] * ‘NA’ if not available |
| How many angel sharks did you see | * Option to say more than one shark sighted together |
| Shark length | * Total length in ‘cm’ if known * ‘NA’ if length not available * Length categories if estimated * ‘39 cm or shorter’ * ‘40 – 60 cm’ * ‘61 – 100 cm’ * ‘101 cm or longer’ |
| Shark sex | * ‘Male’ * ‘Female’ * ‘Unknown’ |
| \*Maturity stage | * If a female 101 cm or longer, if possible, maturity can be described: * ‘Mature (gravid)’ [only applies to those females containing embryos] * ‘Mature (pupping)’ [only applies to females which contain term pups, or from which terms pups have been shed] * ‘Mature (post-partum)’ [applies to females that have recently given birth] * ‘Unavailable’ * If a male: * ‘Immature’ when claspers not or partly calcified * ‘Mature’ when claspers fully calcified, elongated and rotatable. * ‘Unknown’ |
| Shark depth | * Depth ‘in metres’ if known * Depth categories if estimated: * ‘0 – 10 m’ * ‘11 – 20 m’ * ‘21 – 40 m’ * ‘41 – 100 m’ * ‘101 m or deeper’ * ‘Unknown’ |
| \*Shark habitat | * ‘Mud’ * ‘Sand’ * ‘Gravel’ * ‘Rock’ * ‘Rock/Reef’ * ‘Mixed Habitat’ * ‘Seagrass’ * ‘Unknown’ * ‘Other’ [blank field option] |
| Shark Behaviour | * ‘Buried in the sand’ * ‘Resting on the surface’ * ‘Swimming’ * ‘Mating’ * ‘Pregnant’ |
| \*Photo/video documented | * ‘Yes’ * ‘No’ |
| \*How did you see the angel Shark? | * ‘Scientific fishing survey’ * ‘Commercial fishing vessel’ * ‘Commercial fishing from shore’ * ‘Fish market or landing port’ * ‘Recreational fishing vessel’ * ‘Recreational fishing from shore’ * ‘Spearfishing’ * ‘In-water sighting: diving, freediving, snorkelling’ * ‘Other’ [blank field option] |
| \*Gear type (if caught in commercial fishing gear) | * ‘Bottom trawl’ * ‘Bottom beam trawl or dredge’ * ‘Set nets (gill net, trammel net, tangle net)’ * ‘Bottom longline’ * ‘Other’ [blank field option] * ‘Unknown’ * ‘NA’ if Angelshark was not caught in commercial gear |
| \*Fate of Angelshark (if caught in a commercial gear) | * ‘Discarded alive’ * ‘Discarded dead’ * ‘Dead specimen retained for scientific purposes or museum’ * ‘Live specimen retained for aquarium’[[23]](#footnote-24) * ‘Other’ [blank field option] * ‘Unknown’ * ‘NA’ if Angelshark was not caught in commercial gear |
| \*Specimen and/or biological material | * Name of institute that has archived the material |
| \*Set time (if caught in commercial gear) | * Trawl duration or soak time less than 3 hours * Trawl duration or soak time 3 – 6 hours * Trawl duration or soak time 6 – 12 hours * Trawl duration or soak time greater than 12 hours * ‘Unknown’ * ‘NA’ if Angelshark was not caught in commercial gear |
| What is the name of the fish market |  |
| Any other comments on this sighting (including presence of tags) |  |

## Annex III: Legislation related to fishery or biodiversity. This table incudes national legislation of Range States in the Mediterranean, related to fishery or biodiversity, which is relevant for but not species-specific for Angelshark. Where available, species-specific legislation is included in Table 7.

|  |  |  |
| --- | --- | --- |
| **COUNTRY** | **LEGISLATION** | **ARTICLES** |
| ALBANIA |  |  |
| ALGERIA | Ordonnance n 06-05 du 19 Joumada Ethania 1427 correspondant au 15 juillet 2006 relative à la protection et à la préservation de certaines espèces animales menacées de disparition    Décret exécutif 12-235 du 3 Rajab 1433 correspondant au 24 mai 2012 fixant la liste des espèces animales non domestiques protégées.  Loi nº 01-11 relative à la pêche et à l'aquaculture  Loi n 15-08 du 12 Joumada Ethania 1436 correspondant au 2 avril 2015 modifiant et complétant la loi 01-11 |  |
| BOSNIA-HERZEGOVINA |  |  |
| CROATIA | See Table 7 for species-specific legislation | |
| CYPRUS | See Table 7 for species-specific legislation | |
| EGYPT | Constitution | Article 45 (unofficial translation of the Constitution):  “The State shall protect its seas, shores, lakes, waterways and natural protectorates. Trespassing, polluting or misusing any of them is prohibited. Every citizen is guaranteed the right of enjoying them. The State shall protect and develop the green space in the urban areas; preserve plant, animal and fish resources and protect those under the threat of extinction or danger; guarantee humane treatment of animals, all according to the law.” |
| Law No 102 of 1983 for Nature Protectorates | Article (2):  It is forbidden to commit actions (deeds or activities or undertakings) which will lead to the destruction or deterioration of the natural environment or harm the biota (terrestrial, marine or fresh water), or which will detract from the esthetic (beauty) standards within protected areas.    In particular, the following acts are forbidden:  “Catching transporting killing or disturbing wildlife;” |
| EUROPEAN UNION | See Table 7 for species-specific legislation | |
| FRANCE | See Table 7 for species-specific legislation | |
| GREECE | See Table 7 for species-specific legislation | |
| ISRAEL | See Table 7 for species-specific legislation | |
| ITALY | Legislative Decree No. 4 rearranging the national legislation on fisheries and aquaculture, 2012 | Article 7, comma 1, lett.c:  “It is prohibited to retain, land, transport and offer for sale the species, at any stage of growth, for which the capture is prohibited in violation of the current law in force. |
| LEBANON | Environment Protection Law 444/2002  decision 676/1 27/07/2011 - prohibiting fishing transporting selling and consuming some fish species | Article 48 |
| LIBYA | Law 14 – 1989: Basic legislation to establish marine wealth sector competition and regulation of marine wealth use and preservation  Law number 7 / 1982: Regarding the protection of environment  The third chapter addressed the protection of marine biology and the hazards of oil pollution on fish species | Article 4)  “à interdire la capture des espèces protégées ou la pêche dans les zones protégées” (source: http://webco.faocopemed.org/old\_copemed/vldocs/0000539/review\_reglementations.pdf) |
| MALTA | See Table 7 for species-specific legislation | |
| MONACO | See Table 7 for species-specific legislation | |
| MONTENEGRO |  |  |
| MOROCCO | Loi n° 11-03 relative à la protection et à la mise en valeur de l'environnement  Dahir n° 1-93-401 du 1er ramadan 1432 (2 août 2011) portant publication de la Convention sur la conservation des espèces migratrices appartenant à la faune sauvage, faite à Bonn le 23 juin 1979 | Articles 21 and 22 |
| SLOVENIA | See Table 7 for species-specific legislation | |
| SPAIN | See Table 7 for species-specific legislation | |
| SYRIA | Legislative Decree No. 30 on the protection of aquatic life (Deere! legislatif N0 30 sur la protection des etres aquatiques). - 25 August 1964 | Article 32  protection of public water against pollution |
| TUNISIA | [Loi n° 94-13 du 31 janvier 1994, relative à l'exercice de la pêche](http://www.citet.nat.tn/Portail/doc/SYRACUSE/40922/loi-n-94-13-du-31-janvier-1994-loi-n-94-13-du-31-janvier-1994-relative-a-l-exercice-de-la-peche-1-jo?_lg=fr-FR) | Article 12  “L'autorité compétente fixe par arrêté les espèces aquatiques dont la pêche est interdite. II est interdit d'enfreindre les dispositions relatives aux normes de qualité et aux conditions sanitaires des espèces aquatiques, et qui sont fixées par arrêté de l'autorité compétente. “  Article 13  “Les espèces aquatiques dont la pêche est interdite doivent être immédiatement rejetées à l'eau, ou en cas d'empêchement avant l'arrivée de l'unité au port. Toutefois, une part déterminée d'espèces dont la pêche est interdite, est tolérée parmi les quantités débarquées. Cette part est fixée par arrêté de l'autorité compétente. “  Article 14  “II est interdit de transporter, de vendre, de stocker, de transformer ou d'utiliser comme appât, les espèces aquatiques dont la pêche est prohibée, à l'exception de la part visée à l'article précédent. ” |
| TURKEY | See Table 7 for species-specific legislation | |
| UNITED KINGDOM OVERSEAS TERRITORIES | See Table 7 for species-specific legislation | |

1. Concerted Action 12.5 (Rev.COP13): https://www.cms.int/en/document/concerted-action-angelshark-squatina-squatina-1 [↑](#footnote-ref-2)
2. Mediterranean Angel Sharks: Regional Action Plan: https://www.cms.int/sites/default/files/document/Med-Angel-Sharks-Regional-Action-Plan\_2019\_EN.pdf [↑](#footnote-ref-3)
3. Taxonomic classification according to Fricke *et al.* (2022). [↑](#footnote-ref-4)
4. See Table 5 for list of Range States. [↑](#footnote-ref-5)
5. Bycatch mortality included the proportion that is dead when the gear is retrieved (at-vessel mortality) and the proportion of specimens released alive that subsequently die due to the capture process (post-release mortality). [↑](#footnote-ref-6)
6. Impact of plastic pollution is currently not well understood. Further research is required, and the risk category may be revised with further information. [↑](#footnote-ref-7)
7. Any localised overfishing may result in a greater threat on a local scale. [↑](#footnote-ref-8)
8. Possibly Extant according to Morey *et al.* (2019). [↑](#footnote-ref-9)
9. Presence Uncertain according to Lawson *et al.* (2019) and Morey *et al.* (2019). However, it is Extant due to recent literature and information on social media reporting occurrences of the species in Eastern Sardinian and South Sicilian waters (Marino Vacchi, personal communication). [↑](#footnote-ref-10)
10. Presence Uncertain according to Morey *et al.* (2019). [↑](#footnote-ref-11)
11. Morey *et al.* (2019) has not assessed the status of Angelsharks in Gibraltar. [↑](#footnote-ref-12)
12. https://www.fao.org/documents/card/en/c/cb2429en [↑](#footnote-ref-13)
13. 13 Presence Uncertain according to Lawson *et al.* (2019) and Morey *et al.* (2019). However it is Extant due to recent literature and information on social media reporting occurrences of the species in Eastern Sardinian waters (Marino Vacchi, personal communication). [↑](#footnote-ref-14)
14. Presence Uncertain according to Morey *et al.* (2019). [↑](#footnote-ref-15)
15. Angelsharks have not been assessed in the area by either Morey *et al.* (2019) or Lawson *et al.* (2019). However it is Extant due to recent literature and information on social media reporting occurrences of the species in South Sicilian waters (Marino Vacchi, personal communication). [↑](#footnote-ref-16)
16. Possibly extant according to Morey *et al.* (2019). [↑](#footnote-ref-17)
17. Present, but only in close proximity to GFCM GSA 28 (Jim Ellis, personal communication). [↑](#footnote-ref-18)
18. Recommendation GFCM/42/2018/2, on fisheries management measures for the conservation of sharks and rays in the GFCM area of application, amending Recommendation GFCM/36/2012/3. [↑](#footnote-ref-19)
19. Angel Shark Sightings Map: https://angelsharknetwork.com/#map [↑](#footnote-ref-20)
20. Angel Shark Sightings Map: https://angelsharknetwork.com/#map [↑](#footnote-ref-21)
21. Code of conduct for scuba and snorkel: https://angelsharknetwork.com/wp-content/uploads/sites/16/2018/08/Code-of-Conduct-English.pdf [↑](#footnote-ref-22)
22. CMS Article III (5):

    Parties that are Range States of a migratory species listed in Appendix I shall prohibit the taking of animals belonging to such species. Exceptions may be made to this prohibition only if:

    a) the taking is for scientific purposes;

    b) the taking is for the purpose of enhancing the propagation or survival of the affected species;

    c) the taking is to accommodate the needs of traditional subsistence users of such species; or

    d) extraordinary circumstances so require. [↑](#footnote-ref-23)
23. CMS Article III states that Parties that are Range States of a migratory species listed in Appendix I shall prohibit the taking of animals belonging to such species. Exceptions may be made to this prohibition if ‘the taking is for scientific purposes’ of benefit to the population or ‘the taking is for the purpose of enhancing the propagation or survival of the affected species. [↑](#footnote-ref-24)