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ANGEL SHARK ACTION PLAN FOR THE CANARY ISLANDS

Summary:

This document is related to the Proposal for a Concerted Action for the Angelshark available in UNEP/CMS/COP12/Doc.26.2.5.

It contains the complete Angelshark Action Plan for the Canary Islands, providing a framework to conserve the three Critically Endangered Angelshark species found in the region.



Angelshark Action Plan for the Canary Islands

2016

Partnership

Authors:



Collaborators:



Funders:



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Angelshark Workshop Participants



We are hugely grateful to all the participants of the Angelshark Conservation Workshop in June 2016, for their detailed discussion, enthusiasm and expertise that enabled the development of the Angelshark Action Plan for the Canary Islands. In particular, the attendance of delegates from *Gobierno de Islas Canarias* and *Ministerio de Agricultura, Alimentación y Medio Ambiente (MAGRAMA)* del Gobierno de España, was vital for the success of the Action Plan. Thank you to Professor Ricardo Haroun Tabraue and Professor José Juan Castro Hernández and the research institute ECOAQUA at *Universidad de Las Palmas de Gran Canaria* for hosting the workshop.

The information documented in this Action Plan has been collated from a number of different sources and individuals over the last few years, and we would like to thank everyone who participated at different stages of the process. In addition we would like to thank Alison Debney and Matthew Gollock for their detailed review of earlier drafts. A special thank you to Carlos Suarez and Michael Sealey for providing photographs of Angelsharks to use in the Action Plan.

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Introduction

The Angelshark (*Squatina squatina*) has been eliminated throughout much of its historical range over the past century and is listed as **Critically Endangered** on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Ferretti *et al.* 2015). However, the Angelshark is still frequently encountered in the Canary Island archipelago, giving hope that this species can be saved from extinction. As such, the protection of this species in its last remaining stronghold is of utmost importance.

The Angel Shark Project (a joint project created by the Universidad de Las Palmas de Gran Canaria, Zoological Society of London, and Zoologisches Forschungsmuseum Alexander Koenig), the IUCN Shark Specialist Group and the Shark Trust organised a four-day workshop in Gran Canaria in June 2016 to develop the **Angelshark Action Plan for the Canary Islands**. The workshop brought together a multi-disciplinary group of stakeholders (divers, scientists, conservation organisations, local and international

shark experts alongside the Canary Island Government and Spanish Government), to identify and address the major threats to Angelshark populations. The Angelshark Action Plan is a living document; organisations or individuals are welcome to help or lead the implementation of each action and to add new priorities to the plan if identified (See Angel Shark Conservation Network (ASCN) page 27). All interested parties are invited to help achieve the actions set out in the Angelshark Action Plan, working with a joint vision that **Angelsharks in the Canary Islands are abundant and protected in their unique stronghold**.

The Angelshark Action Plan is a key component of the wider Eastern Atlantic and Mediterranean Angel Shark Conservation Strategy, developed to conserve the three Critically Endangered angel shark species found in the region: Angelshark (*Squatina squatina*), Smoothback Angelshark (*Squatina oculata*) and Sawback Angelshark (*Squatina aculeata*). This document will eventually play an important role in a Global Conservation Strategy for all species of angel shark.



Angelshark (*Squatina squatina*)

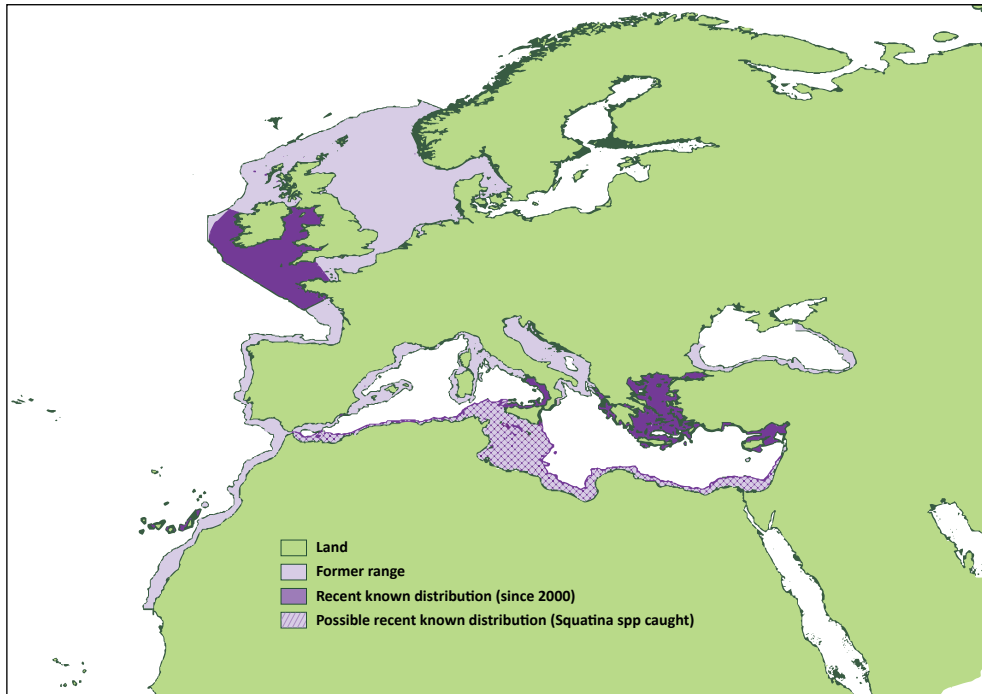


Figure 1: Angelshark (*Squatina squatina*) former range, recent known distribution (at least one *Squatina squatina* individual positively identified since 2000) and possible recent known distribution (where an angel shark was identified since 2000, but not to species level). All distributions are shown to a 1,000m depth contour to aid interpretation. Created on QGIS 2.6.1-Brighton in November 2016. Depth contour shapefiles were downloaded from Natural Earth naturalearthdata.com.

The Angelshark is a dorsoventrally flattened shark, normally found on benthic soft sediments to at least a 150 m depth (Ferretti *et al.* 2015). This species uses its broad pectoral fins to bury itself in the sand and ambush unsuspecting fish that swim within reach. It can reach up to 2.4m in length (Compagno 1984, Tonachella 2010, Ebert and Compagno 2013), and opportunistically feeds on a range of fish, crustaceans and molluscs. The Angelshark is ovoviviparous and give birth to between 7 and 25 pups, after an 8 to 10 month gestation period (Tortonesi 1956, Bini 1968, Capapé *et al.* 1990, Ebert and Compagno 2013, Tonachella 2010, Osaer 2015). Estimates for Angelshark size at maturity vary and range from 80 – 132cm for males (Lipej *et al.* 2004) and 126–169cm for females (Capapé *et al.* 1990).

The Angelshark was once widespread throughout the coastal and outer continental shelf areas of the Northeast Atlantic Ocean, Mediterranean and Black Seas. In the 1900s, this species was caught as incidental catch in a variety of fisheries across their range and was also targeted in parts of the Mediterranean Sea (Marchesetti 1882, Fortibuoni *et al.* 2010). However, during the past century, the Angelshark has suffered steep declines throughout its historic range due to the intensification of demersal fishing practices (Ferretti *et al.* 2015). Industrial-scale trawling and dredging directly and indirectly impact the populations and habitats of benthic species, such as the Angelshark. The distribution range of this slow-growing and late-maturing species

has contracted, and it is likely no longer present along much of the coastal shelf of Europe (Rogers and Ellis 2000, Ferretti *et al.* 2015) (Fig. 1). In 2008, International Council for the Exploration of the Sea (ICES) noted that Angelshark was probably absent from the North Sea and eastern English Channel based on a lack of contemporary records, although there are occasional sightings from the western sea boards of the British Isles (ICES 2008) (Fig.1). In 2006 and 2015, the Angelshark was assessed as Critically Endangered on the IUCN Red List of Threatened Species (updated by Ferretti *et al.* 2015).

The angel shark family (Squatinidae) were identified as the second most threatened of all the world's sharks and rays (chondrichthyans) after a global review of extinction risk by the IUCN Shark Specialist Group (Dulvy *et al.* 2014). In the 2015 European Red List of Marine Fishes report, the Angelshark was amongst the 2.5% of species assessed as Critically Endangered (Nieto *et al.* 2015). This European assessment was based on estimated and suspected past declines of at least 80% over three generations and the likelihood of continued future declines (Nieto *et al.* 2015).

Today, the Angelshark is only regularly observed in the Canary Islands, but here too they are under threat and urgent action is required to protect them in their last remaining stronghold. Conservation and management activities are currently limited, in part due to lack of data on Angelshark ecology, abundance and distribution.

The Canary Islands

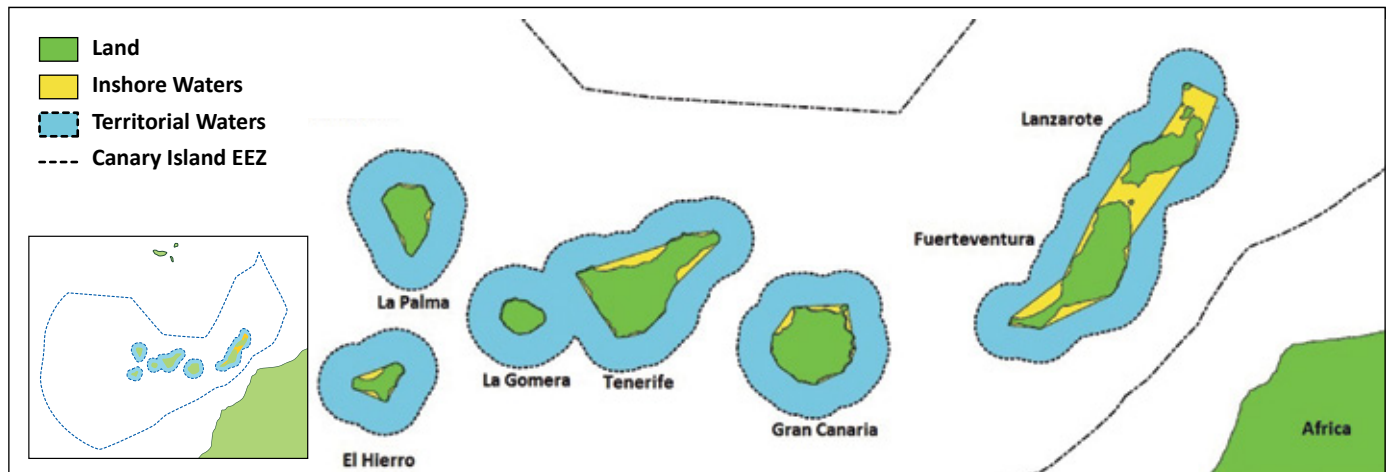


Figure 2: Inshore Waters, Territorial Waters and the Canary Island Exclusive Economic Zone (EEZ). Created on QGIS 2.6.1-Brighton in September 2016. EEZ shapefile downloaded from: VLIZ (2014). Maritime Boundaries Geodatabase, version 8. Available online at <http://www.marineregions.org/>. Consulted on 2016-09-06

Environment

The Canary Islands are a Spanish archipelago located in the North Atlantic Ocean, 100km west of Morocco and Western Sahara. The archipelago consists of seven volcanic islands: Tenerife, Fuerteventura, Gran Canaria, Lanzarote, La Palma, La Gomera and El Hierro, and four islets: Alegranza, La Graciosa, Lobos and Montaña Clara (Fig. 2). Each island has a unique environment, predominantly influenced by the height and location of volcanic mountains, a dominant trade wind that blows from the North East and the irregular translocation of sand from the Sahara Desert.

The Canary Islands have over 1,500 km² of coastline and a submarine platform covering 2,256 km² (Pascual 2004). Due to close proximity to the African coastal upwellings, there is an oceanographic gradient between the eastern and western islands. This affects water temperature, nutrient concentration and primary productivity (Barton *et al.* 1998). This gradient influences the composition and structure of marine species, which has resulted in a biodiverse marine environment and the presence of both temperate and tropical species (Brito *et al.* 2001, Sansón *et al.* 2001, Tuya and Haroun 2009, Haroun 2001). Due to the volcanic nature of the islands, abyssal depths separate each island except for Fuerteventura and Lanzarote, which share the same volcanic basin.

From a biogeographical point of view, the Canary Islands are part of the Macaronesia region, a collection of four archipelagos that include the Azores, Madeira, Canary Islands and Cape Verde. Macaronesia has been identified as a hotspot, having the highest diversity of fish species and the greatest concentration of threatened fish species in European waters (Nieto *et al.* 2015).

Government

The Canary Islands are an autonomous community of the Spanish Kingdom and are split into two provinces: **Santa Cruz de Tenerife** governs Tenerife, La Palma, El Hierro and La Gomera, whilst **Las Palmas** governs Gran Canaria, Fuerteventura and Lanzarote. In addition, each island is ruled by an island council called the *Cabildo Insular*.

Marine legislation and management can be divided into three zones, as per the United Nations Convention on the Law of the Sea (UNCLOS III):

- **Inshore Waters** under sovereign control of the Canary Island Government (2,347 km² area between the coast and the straight baseline around each islands, except for La Gomera which has no Inshore Waters) (Fig.2);
- **Territorial Waters** under sovereign control of the Spanish Government (31,753 km² area between the straight baseline and the 12 nautical mile boundary around the coast) (Fig.2);
- **Canary Island Exclusive Economic Zone (EEZ)** under sovereign rights of the Spanish Government (496,586 km² area delineated by a 200 nautical mile boundary around the coast. If the EEZ of two or more countries overlap, these states delineate a maritime boundary to divide the EEZs, usually equidistant between the countries.) (Fig.2).

Within the Inshore Waters, Territorial Waters and Canary Islands EEZ, regulations set by the Canary Island or Spanish Government cannot be more permissive than those set by the European Union.

Threats to Angelshark in the Canary Islands

The IUCN Red List Threat Classification Scheme was used as a guide to identify threats to the Angelshark in the Canary Islands during the Angelshark Conservation Workshop (<http://www.iucnredlist.org/technical-documents/classification-schemes/threats-classification-scheme>). In total, 29 threats were listed and grouped into nine major threat categories; four priority threat categories were then identified as those most detrimental to the Angelshark (Fig.3). These comprise of Biological Resource Use, Human Intrusion & Disturbance, Natural System Modification, and Pollution.

Many of the threats grouped under Biological Resource Use reflect the complex fishing industry in the Canary Islands (See Goal 1 for more detail). The combined fishing pressure from poorly regulated and monitored fisheries has led to significant levels of overfishing in the archipelago (Castro 2014, Pramod *et al.* 2006). The 'Sea Around Us Project' reconstructed the total catch within the Canary Island EEZ and estimated that annual catches peaked in the mid-1980s at approximately 95,000 tonnes and increased again to 65,300 tonnes in the late-2000's, following several years of either declining or stable catches (Castro *et al.* 2015). Although the Angelshark is not targeted, this species is incidentally caught in some sectors.

The threats grouped under Human Intrusion & Disturbance; Natural System Modification and Pollution are in part associated with rapid growth in the Canary Island tourism industry since 1960. The close proximity to mainland Europe coupled with the favourable climate make the Canary Islands a popular holiday destination, with the number of tourists visiting the archipelago likely to increase in the coming years. The total number of tourists visiting the Canary Islands increased from 4.87 million in 1990 to 12 million in 2015 (www.gobiernodecanarias.org/istac/, Gran Canaria 2015). In 2015, six times as many tourists visited the Canary Islands than the total resident population (2 million people) (Gran Canaria 2015).

The increase in tourism led to the rapid development of new infrastructure, accommodation and facilities in coastal areas. Many of these developments were reported as not abiding with regulatory procedure, for example completing Environment Impact Assessments (Pascual 2004). Potential impacts of these activities include habitat loss or degradation, increased water pollution, and change in sediment transportation. In addition, the increased number of tourists has led to a greater number of people participating in recreational activities in the water (e.g. beach users, SCUBA diving, fishing and boating), which have increased interactions between the Angelshark and humans.



Priority threat categories				Additional threat categories				
Biological Resource Use	Human Intrusions & Disturbance	Natural system modification	Pollution	Agriculture & Aquaculture	Climate change & severe weather	Invasive & other problematic species, genes & diseases	Residential & commercial development	Transportation and Service Corridors
Illegal, Unreported and Unregulated (IUU) fishing	Increasing number of tourists	In-water developments changing natural coastal dynamics (e.g. breakwaters)	Water pollution, including runoff and sun cream	Indirect impact of aquaculture cages	Increasing water temperature	Pathogens affecting biology	Coastal building and infrastructure development	Pipelines and electrical cables
Commercial fishing	Physical disturbance or harm by beach users		Micro/macro plastics		Storms destroying habitat	Invasive species leading to increased competition	Port development	Resonance from electrical cables
Recreational fishing charter vessels	Diver disturbance		Desalination plant pollution leading to hypersaline water production		Water runoff from land destroying habitat			
Recreational fishing (spearfishing/rod and line fishing)	Degradation of seagrass habitat leading to less sediment		Sewage (untreated effluent entering the water)					
Overfishing of prey species	Impact of beach users/activities on coastal nursery areas		Oil spills (either during drilling or through transportation)					
	Anchor damage of important habitats		Antibiotics in the water course					
	Persecution due to shark bites							

Figure 3: Identified potential threats to the Angelshark in the Canary Islands grouped using the IUCN Red List Threat Classification Scheme

Angelshark Action Plan for the Canary Islands

The Angelshark Action Plan for the Canary Islands was developed during the Angelshark Conservation Workshop held in June 2016. The aim of the Action Plan is to direct conservation action towards achieving a common Vision where **Angelsharks in the Canary Islands are abundant and protected in their unique stronghold**. To achieve this Vision, six Goals have been developed to reduce the threats identified in the priority threat categories. Three Goals focus on the proximate threats of fisheries, habitat and pollution, and human interaction; while a further

three goals provide the underlying support to reduce these threats: legislative change, research, and community engagement.

***Critical Angelshark Area:** A specific geographic area that contains essential features for the conservation of Angelshark. This may include an area that is not currently occupied by the species that will be needed for its recovery or conservation. For example: nursery areas, mating areas, aggregation areas, foraging areas.

VISION

Angelsharks in the Canary Islands are abundant and protected in their unique stronghold

Goal 1: Fisheries

Angelshark fishing mortality is minimised in all sectors

Goal 2: Habitat & Pollution

Critical Angelshark Areas are in good condition and threats are minimised

Goal 3: Human Interaction

The Angelshark and humans co-exist with minimal negative interactions

Goal 4: Legislation

The Angelshark and their habitats are protected through Canary Island, Spanish and International legislation

Goal 5: Research

Robust data inform effective Angelshark conservation

Goal 6: Community Engagement

The resident and tourist communities are aware of and actively support Angelshark conservation measures

How to use the Action Plan

The Angelshark Action Plan for the Canary Islands will be publically available on partner websites. To ensure coordination of actions and to minimise overlap, please contact marineandfreshwater@zsl.org if you are interested in participating in the Action Plan or if you want to become part of the Angel Shark Conservation Network (see page 27). Below are some key explanations to aid interpretation of the Action Plan:

- When Spanish words are used for accurate description of equipment or groups, they are written in italics and an explanation can be found in the Glossary.
- All acronyms are fully explained in the Glossary.
- The order of the Goals does not associate with their relevant importance or in the order they should be completed. Objectives and Actions from different Goals could be completed concurrently.
- Some of the Objectives and Actions link to other Objectives or Actions in the Action Plan or need to be completed in chronological order. Any linkages or orders are clearly explained in the text.
- Some Actions have additional information written underneath as bullet points, to guide the delivery of the Action.
- Each Action is prioritised using the following scale:
 - H = High Priority
 - M = Medium Priority
 - L = Lower Priority but still important
- Each Action also has an estimated predicted cost associated with it:
 - € = Low Cost (work could be carried out immediately, with minimal cost)
 - €€ = Medium Cost (funding needs to be secured to allow work towards this Action)
 - €€€ = High Cost (a large funding application or multiple funding applications need to be successful for work towards this Action)
- Monitoring Evaluation and Learning (MEL) is included within the Objectives and Actions to track progress towards achieving the Vision. A separate MEL strategy has been written up in more detail and will be available on partner websites.



Goal 1: Angelshark fishing mortality is minimised in all sectors

Fisheries in the Canary Islands are classified into two sectors: commercial and recreational fisheries. The recreational fisheries can be further broken down into individual recreational fishers and recreational fishing charter vessels where paying clients charter a boat to fish. Management of recreational and commercial fisheries is shared between the Canary Island Government (responsible for Inshore Waters) (Fig.2), the Spanish government (responsible for the Territorial Waters and the EEZ) (Fig.2), and the European Union through the Common Fisheries Policy (CFP). The CFP Total Allowable Catch (TAC) and Quota system is only applied for 'highly migratory fish' (as listed in EU Regulation 2016/72, Annex ID) in the Canary Islands. Angelshark is listed as prohibited to fish for, to retain on board, to tranship or to land for both EU and third party vessels across EU waters, including the Canary Islands (Article 13 and Article 46 respectively, EU Regulation 016/72).

There is a lack of data on catch and fishing effort for all sectors; the 'Seas Around Us Project' showed that the total reconstructed catch for all fishing methods within the Canary Island EEZ was estimated at 65,300 tonnes per year in the late-2000s; seven times what was officially reported (Castro *et al.* 2015).

Commercial fisheries are divided into two fishing fleets: the small-scale fishing fleet that operate within the EEZ and the industrial fishing fleet that operate outside the EEZ (Castro *et al.* 2015). The small-scale fishing fleet is composed of small boats with a variety of fishing gears; target species change throughout the year but mainly focus on benthic-demersal species, small pelagic species and tuna (Castro *et al.* 2015). The industrial fishing fleet comprise of much larger boats and typically exploit the productive fishing grounds off West Africa (e.g. cephalopod and sardine fishing) (Castro *et al.* 2015). There are approximately 850 registered commercial fishing vessels in the Canary Islands (Popescu and Ortega 2013). There are no targeted fisheries for Angelshark, but incidental catch of Angelshark is thought to be a concern in the small-scale fishing fleet, especially when *Cazonal* or trammel nets are used (use is restricted to Gran Canaria, Tenerife and La Palma).

Commercial fisheries are managed by a complex hierarchical system. Fisherman group together as part of a local *Cofradía*, each *Cofradía* has an elected *Patrón Mayor* to represent the fishermen. There are two *Federaciones Provinciales de Cofradías de Pescadores* (FPCP), one for each province of the Canary Islands to oversee the *Cofradías*, and each of these has an elected President. The two FPCPs are part of the *Federación Regional de Cofradías de Pescadores* (FRCP), which overview the entire management system. In addition, there is one *Grupos de Acción Local Pesqueras* (GALP) in each island which functions independently to the *Cofradía* system to develop local initiatives related to fisheries. A system for reporting commercial fisheries catch was only implemented in 2006 but there is still severe under-reporting (Castro *et al.* 2015). Data are reported to the Food and Agriculture Organisation of the United Nations (FAO) through the Fishery Committee for the Eastern Central Atlantic (CECAF) as part of FAO Major Fishing Area 34. Elasmobranch landings are absent from this reporting.

There are approximately 90 registered recreational fishing charter vessels in the Canary Islands that take paying clients on recreational angling fishing trips. These recreational fishing charter vessels have to renew their license every three years through the Canary Island Government. Although there is no official reporting mechanism, analysis of recreational fishing charter vessel websites and information gathered by researchers show that the Angelshark is caught, especially when bottom fishing methods are used (David Jiménez Alvarado *pers comms.*).

Recreational fishers are classified as Trolling (Class 1), Spearfishing (Class 2) and Rod and Line Fishing (Class 3). In total, over 130,000 licenses are issued each year (Castro *et al.* 2015), allowing fishers to catch up to 5kg of fish each day; both resident and visitors are able to apply for a license, regulated by *DECRETO 182/2004, de 21 de Diciembre, Reglamento de la Ley de Pesca de Canarias*. Anecdotal evidence indicates that the Angelshark is caught in all classes of recreational fishing method. Despite restrictions to breath-hold diving, the skill of many spearfishers also enables them to target fish at depths frequented by Angelsharks.

Goal 1	Angelshark fishing mortality is minimised in all sectors	Priority	Cost	Timeline
Objective 1.1	Reporting and monitoring of catch/landing data in commercial fisheries is improved from 2017 and there is a reduction in Angelshark mortality through incidental capture in commercial fisheries by 2019.			2020
Sub-Objective 1.1.1	Fisher knowledge of Angelshark conservation status is improved and data on incidental catch are collected (50% coverage by 2020). *Actions in Sub-Objective 1.1.1 are written in chronological order.			2020
Action 1.1.1.1	Map the <i>Cofradías</i> , <i>Grupos de Acción Local Pesqueras</i> (GALP) and <i>Federación Regional de Cofradías de Pescadores</i> (FRCP) on each island and identify representatives (Presidents/ <i>Patrón Mayor</i>) of the fishing community and relevant government officials.	H	€	
Action 1.1.1.2	Meet and work with the <i>Cofradías</i> , GALPs and FRCPs to identify information on Angelshark catch (gear type, time, location etc.) and ways to increase catch reporting. Regions with <i>Cazonal</i> or trammel net fisheries are prioritised (See Sub-Objective 1.1.2). <ul style="list-style-type: none"> The <i>Cofradías</i> are requested to report monthly (electronically to <i>Dirección General de Pesca del Gobierno de las Islas Canarias</i> and <i>Dirección General de Pesca del Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente</i>). 	H	€	
Action 1.1.1.3	Incidental catch and effort (e.g. catch per day) is reported to <i>Cofradías</i> .	H	€	
	<ul style="list-style-type: none"> The <i>Cofradías</i> are requested to report monthly (electronically to <i>Dirección General de Pesca del Gobierno de las Islas Canarias</i> and <i>Dirección General de Pesca del Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente</i>). 			
Action 1.1.1.4	Develop a Commercial Fishing Outreach Kit for Angelshark, including: conservation status, best practice for safe handling and release, incidental catch reporting, and incidental catch reduction. <ul style="list-style-type: none"> Collate information on Angelshark biology and status. Develop catch reporting form. Develop reporting App (reporting to <i>Dirección General de Pesca del Gobierno de las Islas Canarias</i> and <i>Dirección General de Pesca del Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente</i>). Incorporate material into fishermen's academy training programme. 	M	€€	
Action 1.1.1.5	Propose inclusion of Angelshark on Appendix II of the <i>Decreto 182/2004</i> to support management authorities to act on cases of illegal retention of Angelshark (see Objective 4.4).	H	€	
Action 1.1.1.6	Ensure ongoing liaison with <i>Cofradías</i> , GALPs and FRCPs to maintain interest and address emerging issues regarding Angelshark conservation. <ul style="list-style-type: none"> Have regular direct and personal contact through inspectors, Non-Governmental Organisations (NGOs), researchers and implement regular official meetings. Re-evaluate Commercial Fishing Outreach Kit (See Action 1.1.1.4) (if necessary). 	M	€	
Action 1.1.1.7	Conduct a 12 month assessment of incidental catch rates; determine the level of concern for each fishing activity and suggest actions needed to mitigate impacts (see Action 5.4.1).	M	€€	
Action 1.1.1.8	Actively and widely communicate positive engagement of <i>Cofradías</i> , GALPs and FRCPs through Angelshark Promotional Campaign (see Goal 6).	M	€	

Goal 1	Angelshark fishing mortality is minimised in all sectors	Priority	Cost	Timeline
Action 1.1.1.9	Liaise with GALPs regarding inclusion of Angelshark in the strategic document for local development of fishing activity being developed for 2016-2020.	M	€	
Sub-Objective 1.1.2	Incidental catch of Angelshark in <i>Cazonal</i> and trammel nets are quantified by 2018 (See Action 1.1.1.2).			2018
Action 1.1.2.1	Identify the <i>Cofradías</i> , GALPs and FRCs that legally use the <i>Cazonal</i> or trammel net fishing method (restricted to Gran Canaria, Tenerife, La Palma) and quantify incidental catch levels.	H	€	
Action 1.1.2.2	Work with management authorities to identify cases of illegal <i>Cazonal</i> or trammel net fishing across the Canary Island archipelago. • Extrapolate incidental catch levels of illegal nets to contribute to population model.	M	€	
Action 1.1.2.3	Overlay <i>Cazonal</i> and trammel net fishing grounds with Critical Angelshark Areas (See Action 5.3.1) to rank potential level of impact on Angelshark populations and meet with <i>Cofradías</i> , GALPs, FRCs and management authorities to address this issue. (Dependent on Action 1.1.2.1 and Action 1.1.2.2).	M	€	
Objective 1.2	Incidental catch and associated mortality of Angelshark by recreational fishing charter vessels is reduced and all live animals are promptly released, through adoption of the best practice guide to catch and release and enrolment in responsible fishing certification scheme.			2020
Sub-objective 1.2.1	95% of recreational fishing charter vessels follow best practice guidelines for catch and release by December 2020 and are certified as ‘responsible fishing’ by 2020. *Actions in Sub-Objective 1.2.1 are written in chronological order.	H	€	2020
Action 1.2.1.1	Compile comprehensive list of recreational fishing charter vessels engaged in fishing activities.	H	€	
Action 1.2.1.2	Develop Recreational Fishing Outreach Kit to educate on prohibited status of Angelshark, promote best practice catch and release and importance of reporting sightings. • Develop catch reporting form. • Develop reporting App (reporting to <i>Dirección General de Pesca</i> of Canary Island Government and other relevant management authorities).	M	€€	
Action 1.2.1.3	Directly engage with recreational fishing charter vessels, providing Recreational Fishing Outreach Kit (See Action 1.2.1.2).	M	€€	
Action 1.2.1.4	Conduct a 12 month assessment of incidental catch levels; determine the level of concern for each activity and suggest actions needed to mitigate impacts (see Action 5.5.1).	M	€€	
Action 1.2.1.5	Develop certification programme for recreational fishing charter vessels, using The Wildlife Safe (WiSe) scheme as a guide. • Promote certification programme. • Encourage high profile for certification as quality standard.	L	€€€	
Action 1.2.1.6	Identify relevant tourist offices to promote recreational fishing charter vessel programme and Recreational Fishing Outreach Kit (See Action 1.2.1.2).	M	€	
Action 1.2.1.7	Identify fishing tackle shops and provide Recreational Fishing Outreach Kit to be delivered in each sale of fishing equipment (e.g. rods, spear guns, etc.) (See Action 1.2.1.2).	H	€	

Goal 1	Angelshark fishing mortality is minimised in all sectors	Priority	Cost	Timeline
Sub-objective 1.2.2	Potential clients are aware of Angelshark status and actively choose to take fishing trips on registered recreational fishing charter vessels using the Recreational Fishing Outreach Kit (See Action 1.2.1.2) and enrolled on the responsible fishing certification scheme.			2018
Action 1.2.2.1	<p>Work with relevant management authorities and recreational fishing charter vessel operators to identify unregistered vessels.</p> <ul style="list-style-type: none"> • Identify unregistered vessels. • Arrange meetings with unregistered vessel captains and highlight the importance of Angelshark conservation and the need for vessels to register. • Implement fines for unregistered vessels if registration not completed. 	M	€€	
Action 1.2.2.2	Tourists are educated on the importance of the Canary Islands for Angelshark conservation and choose recreational activities with the least impact (see Goal 6).	M	€€	
Objective 1.3	Recreational fishing activities follow guidance detailed in Recreational Fishing Outreach Kit (See Action 1.2.1.2), reducing Angelshark mortality by 90% and increasing reports of Angelshark sightings by 80% by 2020.			2020
Action 1.3.1	Promote the status of Angelshark, best practice and the need to report sightings to the wider recreation fishing sector.	M	€€	
Action 1.3.2	<p>Promote the Recreational Fishing Outreach Kit (See Action 1.2.1.2) to Class 2 license holders (spearfishers) and further encourage reporting of sightings.</p> <ul style="list-style-type: none"> • Identify sales point for spearguns. • Survey to ascertain number of active licences. • Incorporate Recreational Fishing Outreach Kit (See Action 1.2.1.2), training and reporting requirements into licence package. • Encourage sightings reports. • Encourage best practice. • Reach non-licenced spearfishers by providing Recreational Fishing Outreach Kit (See Action 1.2.1.2) in equipment outlets. 	M	€	
Action 1.3.3	<p>Promote the Recreational Fishing Outreach Kit (See Action 1.2.1.2) to Class 3 license holders (rod and line) and further encourage reporting of sightings.</p> <ul style="list-style-type: none"> • Identify number of tackle shops/recreational marinas. • Survey to ascertain the number of active licences and rod fishing effort. • Incorporate Recreational Fishing Outreach Kit (See Action 1.2.1.2) and training into licence package. • Discourage use of bottom lines. • Encourage incidental catch reporting. • Address non-licensed rod and line users through posters in sales outlets/tackle shops and marinas. 	M	€	

Goal 2: Critical Angelshark Areas are in good condition and threats are minimised

The Angelshark is normally encountered on or near to the seabed, from close inshore (0.3 metres) in the intertidal or subtidal zone, to at least 150 m in depth (Ferretti *et al.* 2015, OSPAR 2010, Meyers *et al.* in press). The Angelshark is known to prefer sandy substrate, but also occurs in seagrass and Rhodolith algal beds. Outside of the Canary Islands, Angelshark may occasionally enter estuaries and brackish water (OSPAR 2010). Given its preference for inshore shallow habitats, human-induced habitat degradation poses a significant threat to this species. During the Angelshark Conservation Workshop, participants listed the following activities as causes of habitat degradation in the Canary Islands and therefore of potential threat to the Angelshark: **anchoring, desalination plant development and outfalls, breakwater development, pipeline development, sewage, light pollution, illegal developments and other coastal infrastructure**. Currently, there is no specific agency in the Canary Islands solely focusing on planning in the marine environment, therefore all actions must liaise with the relevant local government(s), the Canary Islands government and the Spanish government. The following objectives and activities focus around Critical Angelshark Areas, so that the actions to prevent habitat degradation are targeted on the most important areas for Angelshark conservation.

Goal 2	Critical Angelshark Areas are in good condition and threats are minimised	Priority	Cost	Timeline
Objective 2.1	Critical Angelshark Areas are mapped together with the location of known potential threats. Areas of overlap are surveyed using a standardized rapid assessment methodology [timeline based on when Critical Angelshark Areas are identified, see Action 5.3.1] *Actions in Objective 2.1 are written in chronological order.			20**
Action 2.1.1	Prioritise Critical Angelshark Areas (See Action 5.3.1) in need of rapid assessment (those with the greatest number of potential threats), develop a standardised methodology for surveying Critical Angelshark Areas (See Action 5.3.1) to assess the impact of the habitat threat, and preform assessment at priority sites.	H	€€	
Action 2.1.2	Communicate results of rapid assessment to appropriate authorities (local government, Canary Islands government and Spanish government), flag areas of non-compliance, and discuss and identify mitigating actions. <ul style="list-style-type: none"> Possible mitigation actions for areas prone to flooding include developing natural barriers (such as planting trees), and conducting frequent coastal clean ups to remove large plastics and other debris. Inform local government, Canary Islands government and Spanish government of Critical Angelshark Areas (See Action 5.3.1) so that they are aware of potential conflict with planned coastal development projects. 	M	€	
Action 2.1.3	Work with authorities in areas where anchoring poses a threat to Critical Angelshark Areas (See Action 5.3.1) to prioritise areas where mooring buoys should be established, chart all mooring points and forbidden areas, and ensure management plans include no anchoring.	L	€€€	

Goal 2	Critical Angelshark Areas are in good condition and threats are minimised	Priority	Cost	Timeline
Objective 2.2	Ensure that new infrastructure does not detrimentally impact Critical Angelshark Areas [timeline based on when Critical Angelshark Areas are identified, see Action 5.3.1].			20**
Action 2.2.1	<p>Write briefing note for relevant local governments, the Canary Islands government and Spanish government about legal obligations to Angelshark protection, location of Critical Angelshark Areas (See Action 5.3.1), and outline potential impacts to Critical Angelshark Areas (See Action 5.3.1).</p> <ul style="list-style-type: none"> • Legal obligations for sewage treatment, in accordance with the goal stated by the European Union Water Framework Directive, is to achieve “Good” ecological status of coastal waters (equivalent to second treatment stage), with the ideal of reaching fourth treatment stage. • Desalination plants have a legal obligation to comply with the Spanish Ministry for the Environment recommendation that the salinity increment be less than 2 psu for 5% of observations. Achieving an ideal recommended salinity level of less than 36 psu for 25% of the time and less than 38.5 psu should be encouraged. • All desalination discharge points should be at a distance greater than 500 metres from Critical Angelshark Areas (See Action 5.3.1). 	M	€	
Action 2.2.2	<p>Intervene during Public Participation Period for any legal coastal development project that may pose a threat to Critical Angelshark Areas (See Action 5.3.1).</p> <ul style="list-style-type: none"> • Ensure that potential impacts on Critical Angelshark Areas (See Action 5.3.1) are identified in Environmental Impact Assessments, and suggest mitigation measures as needed. 	M	€	
Action 2.2.3	Local representatives of the Angel Shark Conservation Network (see page 27) will notify entire network if coastal development is planned which has the potential to impact Critical Angelshark Areas (See Action 5.3.1).	M	€	
Action 2.2.4	Author a letter from the Angel Shark Conservation Network, which highlights the impact of illegal coastal developments on protected Angelshark and send to relevant local/national authorities within one week of notification.	M	€	

Goal 3: The Angelshark and humans co-exist with minimal negative interactions

Angelshark are often encountered in popular dive sites and use coastal shallow areas (especially sandy, sheltered areas) as pupping grounds. Some of these sandy, sheltered beaches also have the highest density of beach users (residents and tourists) in the Canary Islands.

Educating the community and monitoring the possible effects that interaction from divers and/or beach users may have on the behaviour and habitat of Angelsharks is vital to protect the species.

Goal 3	The Angelshark and humans co-exist with minimal negative interactions	Priority	Cost	Timeline
Objective 3.1	Diver-related disturbance of Angelshark is eliminated by 2022. *Actions in Objective 3.1 are written in chronological order, except for Action 3.1.8.			2022
Action 3.1.1	Identify and contact registered dive centres across the Canary Islands and engage in a diver education programme. <ul style="list-style-type: none"> Obtain list of official registered dive centres from the Canary Island Government Fisheries Department. Contact dive centres in order to gauge interest in diver education programme and request input. 	M	€	
Action 3.1.2	Hold at least one meeting in each province with representatives from dive centres to generate collaborative input and content for a best practice guide for responsible diving with Angelsharks.	M	€€	
Action 3.1.3	Create and widely distribute best practice guide for responsible diving interactions. <ul style="list-style-type: none"> Use existing best practice guides for reference and obtain input from divers (through Action 3.1.1 and Action 3.1.2) in order to fully develop guide. Includes design, print, distribution. 	M	€€	
Action 3.1.4	Create an Angelshark education programme for dive centres. <ul style="list-style-type: none"> Develop course content (presentation, best practice etc.). Test course content at key dive centres. 	L	€€€	
Action 3.1.5	Identify a certification mechanism for accredited dive centres and meet with relevant authorities to include new commitments for certification. <ul style="list-style-type: none"> Meet with regional governments to discuss dive centre certification. Meet with <i>Reserva de la Biosfera</i>. Add the following stipulations for certification: <ul style="list-style-type: none"> Use of best practice guide for all diving activity. Angelshark sightings data reported into a collaborative database. Be part of a local diver network. Distribute new informative material (e.g. flyers) to clients. Train new staff in best practice. Complaints regarding diver disturbance will be reported to local government under Catalogue regulation (if successful, Objective 4.1) and to the relevant dive body (e.g. CMAS, PADI, SSI). 	L	€	

Goal 3	The Angelshark and humans co-exist with minimal negative interactions	Priority	Cost	Timeline
Action 3.1.6	<p>By 2022 deliver a diver education programme to 50% of all dive centres across the Canary Islands, and subsequently accredit them (based on results of Action 3.1.5).</p> <ul style="list-style-type: none"> • Hold a training course for dive centres on each island. • Review course/annual meetings. • Distribute flyers/leaflets. • Diver questionnaire for clients (ongoing). • Provide updates for network of dive clubs/centres. • Include this course within <i>Eco-buceo</i> materials and MPA guidance documents. 	M	€€€	
Action 3.1.7	<p>Develop website of accredited dive centres.</p> <ul style="list-style-type: none"> • Host website. • Create content. • Advertise. 	L	€€	
Action 3.1.8	<p>Evaluate the prevalence of negative diver/shark interactions (see Action 5.6.2).</p> <ul style="list-style-type: none"> • Study impacts of divers on Angelshark populations and behaviour. • Diver census to calculate how many divers visit each area. • Quantify diver interest through questionnaires e.g have divers come to dive specifically to dive with Angelsharks? Was diving the main focus of their holiday? etc. • Estimate the economic value of the dive industry to the Canary Island economy (See Action 5.7.1). 	H	€€€	
Objective 3.2	The impact of beach users in Critical Angelshark Areas (See Action 5.3.1) is assessed and minimised by 2022			2022
Action 3.2.1	Identify and map the most popular beaches alongside Critical Angelshark Areas (See Action 5.3.1) to evaluate the level of overlap. Present this information to <i>Demarcaciones de Costas del MAGRAMA</i> .	M	€	
Action 3.2.2	<p>Educate beach users about the presence of Angelshark at priority beaches.</p> <ul style="list-style-type: none"> • Identify appropriate areas to display Angelshark signs based on number of beach user/Angelshark interactions. • Engage with local governments, the Canary Islands Government, the Spanish Government and NGOs to fund or support the placement of beach signs. • Design and install beach signs/display boards. • Complete questionnaires before and after education campaign to evaluate success. 	H	€€	
Action 3.2.3	Work with established beach cleaning groups to raise awareness of Angelshark among beach users.	L	€	
Action 3.2.4	Identify lifeguards/red cross organisations on beaches; brief and provide educational materials on Angelsharks.	M	€	

Goal 4: The Angelshark and their habitats are protected through Canary Island, Spanish and International legislation

To improve legal protection of the Angelshark in the Canary Islands, it is necessary to propose legislative change in both environmental and fisheries legislation at a National (Spanish) and regional (Canary Island) scale. Any changes to National or regional legislation needs to be undertaken concurrently, to ensure consistency between different laws, allowing the best degree of protection for the Angelshark.

Current Spanish environmental legislation only protects the Angelshark in the Mediterranean, through its inclusion in the *El Listado de Especies Silvestres en Régimen de Protección Especial* (LESRPE). To ensure greater protection for all Angelshark populations, the Angelshark must be included in the *El Catálogo Español de Especies Amenazadas* (CEEa), which provides comprehensive protection and the obligation to develop recovery plans between three to five years (depending on whether the CEEa declares the Angelshark to be Vulnerable or Endangered). If this initiative is not successful, an alternative would be for the Atlantic population of Angelshark to be added to the LESRPE. At a later stage, it would also be important to include Angelshark on the *Catálogo de Especies Protegidas de Canarias* (CEPC) to ensure a stronger local commitment for the protection and conservation of this species. Both the CEEa and the LESRPE are under the law 42/2007 of Natural Heritage and Biodiversity. The CEPC is under the law 4/2010 of the Canary Islands Government.

Current EU fisheries legislation protects the Angelshark through Council Regulation (EU) No. 23/2010: Angelshark is listed as prohibited to fish for, to retain on board, to tranship or to land for both EU and third party vessels across EU waters, including the Canary Islands (Article 13 and Article 46 respectively, EU Regulation 2016/72). It is important to clarify the enforcement of EU Law in the Canary Islands and also understand its application to recreational fishing charter vessels. In addition, it would be necessary to include the Angelshark in Annex II of prohibited species in Canary Islands Fisheries Regulation (*Decreto 182/2004 del Reglamento de la Ley de Pesca de Canarias* (PC)) and state a clear mandate that this regulation will apply to commercial and recreational fisheries both in Inshore Waters and Territorial Waters (Fig. 2).

Currently there are no measures to protect Angelshark habitat in the Canary Islands. Improvements could be made by including the Critical Angelshark Areas (See Action 5.3.1) in Marine Protected Areas (MPAs) and Nature 2000 Special Areas of Conservation (SACs) management plans. It is also necessary to protect Critical Angelshark Areas (See Action 5.3.1) outside of the current MPA and SAC regulation.

Goal 4	The Angelshark and their habitats are protected through Canary Island, Spanish and International legislation	Priority	Cost	Timeline
Objective 4.1	The Angelshark is included in <i>El Catálogo Español de Especies Amenazadas</i> (CEEa). *Actions in Objective 4.1 are written in chronological order.			2018
Action 4.1.1	Identify what criteria must be met for the Angelshark to be listed as Endangered or Vulnerable on CEEa.	H	€	
Action 4.1.2	Identify individuals/organisations with relevant data and contact with plan for CEEa listing.	H	€	
Action 4.1.3	Form a working group to guide, support and communicate listing process. <ul style="list-style-type: none"> • First online but potentially with a physical meeting. • Working group complete advocacy work in Canary Island Government. • Working group write letters to other environmental departments. • Working group raise awareness of application (see Action 4.1.6 and 4.1.8). 	M	€	
Action 4.1.4	Complete research to address any missing criteria using the Angelshark Conservation Workshop outputs as a starting point. <ul style="list-style-type: none"> • Need to define the threats and see how they relate to population status. 	M	€€	
Action 4.1.5	Create a draft <i>Modelo Argumentación Científica en CEEa</i> based on versions created by SUBMON, Angel Shark Project and Asociación Tonina, with the support of working group.	M	€€	
Action 4.1.6	Present draft <i>Modelo Argumentación Científica en CEEa</i> to technicians in Canary Island Government and Spanish Government to gather feedback.	M	€	
Action 4.1.7	Submit <i>Modelo Argumentación Científica en CEEa</i> to the <i>Comité de Fauna y Flora Silvestre</i> and then to the <i>Comisión Estatal para el Patrimonio Natural y la Biodiversidad</i> . Send copies to key individuals at the Canary Island Government & Spanish Government.	M	€	
Action 4.1.8	Raise awareness of plans to include on CEEa via press release and social media.	L	€	
Objective 4.2	The Atlantic Population of the Angelshark to be included in <i>El Listado de Especies Silvestres en Régimen de Protección Especial</i> (LESRPE) *Only completed if Objective 4.1 is unsuccessful; if this is the case, Actions in Objective 4.2 will be prioritised to H. *Actions in Objective 4.2 are written in chronological order.			
Action 4.2.1	Identify what criteria must be met for Angelshark to be listed on LESRPE.	L	€	
Action 4.2.2	Identify individuals/organisations with relevant data and contact with plan for LESRPE listing.	L	€	
Action 4.2.3	Use working group established for CEEa to guide, support and communicate listing process (See Action 4.1.3). <ul style="list-style-type: none"> • First online but potentially with a physical meeting. • Working group complete advocacy work in Canary Island Government. • Working group write letters to other environmental departments. • Working group raise awareness of application (see Action 4.2.6 and 4.2.8). 	L	€	
Action 4.2.4	Complete research to address any missing criteria using Angelshark Conservation Workshop outputs as a starting point.	L	€€	

Goal 4	The Angelshark and their habitats are protected through Canary Island, Spanish and International legislation	Priority	Cost	Timeline
Action 4.2.5	Present draft proposal to technicians in Canary Island Government and Spanish Government to gather feedback.	L	€	
Action 4.2.6	Letters written to members of <i>Comisión Estatal para el Patrimonio Natural y la Biodiversidad</i> to pre-empt arrival of proposal, summarising the scientific case. <ul style="list-style-type: none"> Identify (key) members of the <i>Comisión Estatal para el Patrimonio Natural y la Biodiversidad</i> to send the letter. Letters written from external organisations, NGOs, Universities, Federation of responsible angling, diver association, commercial fishing association. 	L	€	
Action 4.2.7	Submit proposal and send copies to key individuals at the Canary Island Government & Spanish Government.	L	€	
Action 4.2.8	Raise awareness of plans to include on LESRPE via press release and social media.	L	€	
Objective 4.3	Angelshark included in <i>El Catálogo de Especies Protegidas de Canarias</i> (CEPC). *This will automatically occur if Objective 4.1 is successful. *Actions in Objective 4.3 are written in chronological order.			2019
Action 4.3.1	Identify what criteria must be met for the Angelshark to be listed on CEPC.	H	€	
Action 4.3.2	Use working group established for CEEA to guide, support and communicate listing process (See Action 4.1.3). <ul style="list-style-type: none"> First online but potentially with a physical meeting. Working group complete advocacy work in Canary Island Government. Working group write letters to other environmental departments. Working group lead on a petition to government (see 4.1.6 and 4.1.8). 	M	€	
Action 4.3.3	Complete research to address any missing criteria using Angelshark Conservation Workshop outputs as a starting point.	M	€€	
Action 4.3.4	Present draft proposal to technicians in Canary Island Government to gather feedback.	M	€	
Action 4.3.5	Letters written to Canary Island Government to pre-empt arrival of proposal, summarising the scientific case. <ul style="list-style-type: none"> Letters written from external organisations, NGOs, Universities, Federation of responsible angling, diver association, commercial fishing association. 	M	€	
Action 4.3.6	Raise awareness of plans to include on CEPC via press release and social media.	M	€	
Objective 4.4	The Angelshark will be included in Annex II of prohibited species in the Canary Islands Fisheries Law (<i>Decreto 182/2004 del Reglamento de la Ley de Pesca de Canarias</i> (PC)). *This will automatically occur if Objective 4.1 is successful. *Actions in Objective 4.4 are written in chronological order.			2018
Action 4.4.1	Identify what criteria must be met for the Angelshark to be listed on PC.	H	€	
Action 4.4.2	Use working group established for CEEA to guide, support and communicate listing process (See Action 4.1.3). <ul style="list-style-type: none"> First online but potentially with a physical meeting. Working group complete advocacy work in Canary Island Government. Working group lead on a petition to Canary Island Government (see 4.1.6 and 4.1.8) but just for Canary Islands Government. 	H	€	
Action 4.4.3	Present draft proposal to technicians in Canary Island Government Fisheries department to gather feedback.	M	€	

Goal 4	The Angelshark and their habitats are protected through Canary Island, Spanish and International legislation	Priority	Cost	Timeline
Action 4.4.4	Letters written to Canary Island Government to pre-empt arrival of proposal, summarising the scientific case. • Letters written from external organisations, NGOs, Universities, Federation of responsible angling, diver association, commercial fishing association.	M	€	
Objective 4.5	The Angelshark will be included in management plans of <i>Zonas de Especial Conservación</i> (ZECs) [= SACs (Special Areas of Conservation) *Actions in Objective 4.5 are written in chronological order.			2017
Action 4.5.1	Identify the procedure to include Angelshark in the management plans.	H	€	
Action 4.5.2	Create a working group to prepare the proposal.	H	€	
Action 4.5.3	Present draft proposal to technicians of the Ministry to gather feedback.	H	€	
Action 4.5.4	Submit the proposal.	H	€	
Action 4.5.5	Attend participatory workshops organised to discuss new management plans of ZECs.	H	€	
Objective 4.6	The Angelshark will be included on marine protected area management plans *timing of this depends on cycle of updating plans. *Actions in Objective 4.6 are written in chronological order.			2017
Action 4.6.1	Use information gathered in 4.2.6 to send a letter of request to marine reserve managers.	H	€	
Action 4.6.2	Meet with marine reserve managers to discuss details and timeline for inclusion.	H	€	
Objective 4.7	The Angelshark will be listed on Appendix I and/or Appendix II of the Convention of Migratory Species (CMS). *Actions in Objective 4.7 are written in chronological order.			2020
Action 4.7.1	Identify what criteria must be met for Angelshark to be listed on CMS Appendix I and/or CMS Appendix II.	H	€	
Action 4.7.2	Establish a working group to prepare the listing proposal.	H	€	
Action 4.7.3	Gather data on migratory behaviour and Identify individuals/organisations with relevant data for input on the CMS listing proposal.	H	€€€	
Action 4.7.4	Identify a proponent country (European or West African) and supporting countries for the proposal.	H	€	
Action 4.7.5	Liaise with proponent country to prepare the listing proposal.	M	€	
Action 4.7.6	Develop an outreach campaign to promote species proposal.	M	€	
Action 4.7.7	Support listing proposal at the next relevant CMS meeting (i.e. COP12 or Sharks MOS3).	H	€	

Goal 5: Robust data inform effective Angelshark conservation

There is a lack of data on the life history, distribution and habitat requirements of the Angelshark and further research is imperative for the successful conservation of the species. During the Angelshark Conservation

Workshop, the following research priorities were identified as the most important to inform Angelshark conservation and management decisions in the Canary Islands.

Goal 5	Robust data inform effective Angelshark conservation	Priority	Cost	Link with Goal/Actions
Objective 5.1	Understand Angelshark abundance and distribution in the Canary Islands.			Goal 4
Action 5.1.1	Analyse the collated set of Angelshark public sightings in the Canary Islands (ongoing activity).	M	€	Link with Action 1.2.1.2 and Action 3.1.1
Action 5.1.2	Determine the relative abundance and distribution of Angelshark in the Canary Islands (including inaccessible areas).	H	€€€	
Action 5.1.3	Estimate historical Angelshark abundance in the Canary Islands using literature, museum collections, university specimens, and fishing records.	M	€	
Objective 5.2	Understand Angelshark demography in the Canary Islands.			Goal 4
Action 5.2.1	Research Angelshark growth rate and longevity through tagging and other techniques.	M	€€	
Action 5.2.2	Investigate Angelshark age at maturity and reproductive output; use this information to conduct a productivity analysis to determine maximum intrinsic rate of population increase.	M	€€	
Action 5.2.3	Complete an Angelshark Population Viability Analysis in the Canary Islands, through the use of age-structured movement models and other methods.	M	€€€	Dependent on Actions 5.1.1, 5.1.2, 5.2.1 and 5.2.2
Action 5.2.4	Conduct a food web analysis to understand Angelshark predator/prey relationships at all life stages.	L	€€	
Objective 5.3	Understand Angelshark movement in the Canary Islands and connectivity across the wider Angelshark range.			Goal 4
Action 5.3.1	Research Angelshark habitat preference and identify Critical Angelshark Areas in the Canary Islands (mating grounds, nursery areas, aggregation sites). Define the major characteristics of Critical Angelshark Areas.	H	€€€	Link with Action 1.1.2.3, Goal 2, Objective 3.2, Goal 4
Action 5.3.2	Investigate the movement between and among Critical Angelshark Areas and Angelshark survival in each.	H	€€€	Link with Action 1.1.2.3, Objective 2.1, Action 3.2.1. Dependent on Action 5.3.1.

Goal 5	Robust data inform effective Angelshark conservation	Priority	Cost	Link with Goal/Actions
Action 5.3.3	Understand Angelshark movement and connectivity within and between islands in the Canary Island archipelago.	H	€€€	Linked with Action 5.3.4
Action 5.3.4	Understand Angelshark movement and connectivity between the Canary Islands and the rest of the Angelshark distribution range (including trans-national movement).	H	€€€	Linked with Action 5.3.3
Action 5.3.5	Develop an understanding of Angelshark vertical migration, depth range and habitat use.	H	€€€	Linked with Action 5.3.3 and 5.3.4
Objective 5.4	Understand the impact of commercial fisheries on Angelshark in the Canary Islands.			Objective 1.1
Action 5.4.1	Analyse incidental catch of Angelshark by the commercial fishery in the Canary Islands, including a comparison of gear type and sea area.	H	€€€	Action 1.1.1.7
Action 5.4.2	Understand the historical volume and composition of elasmobranch catch in Cazonal & trammel net nets before and after the prohibition of these gears occurred in the Canary Islands.	H	€€	Objective 1.1
Action 5.4.3	Investigate Angelshark retention rate and post-release mortality rates in commercial fisheries.	M	€€€	Objective 1.1 Dependent on 5.4.1
Objective 5.5	Understand the impact of recreational fisheries on Angelshark in the Canary Islands.			Objective 1.2 and 1.3
Action 5.5.1	Analyse Angelshark catch data in recreational fisheries in the Canary Islands, including the recreational fishing charter vessels (Ongoing action).	M	€€	Action 1.2.1.4
Action 5.5.2	Investigate Angelshark retention rate and post-release mortality rates in recreational fisheries.	M	€€	Action 1.2.1.4. Dependent on Action 5.5.1
Objective 5.6	Assess the impact of human disturbance on Angelshark in the Canary Islands.			Goal 2 and 3
Action 5.6.1	Research the possible impact of pollution on Angelshark in the Canary Islands.	L	€€	
Action 5.6.2	Complete a behavioural study of Angelsharks in the Canary Islands, including their reproductive behaviour, to understand possible impact of human disturbances.	L	€€€	Action 3.1.8
Action 5.6.3	Understand the effect of aquaculture fish farms/nets on the Angelshark in the Canary Islands, including possible increased abundance and changes to Angelshark health and/or behaviour.	L	€€	
Objective 5.7	Complete Angelshark Economic Analysis			Goal 6
Action 5.7.1	Complete top-line economic analysis to estimate the economic value of the Angelshark for both diving and recreational fishing industries in the Canary Islands.	H	€	

Goal 6: The resident and tourist communities are aware of and actively support Angelshark conservation measures

The resident population of the Canary Islands are 2 million people (as of 1 Jan 2015), with the majority living in Gran Canaria and Tenerife (Gran Canaria 2015). However, the archipelago is heavily influenced by the tourism industry, which has flourished since the 1960s and is the major contributor to the Canary Island economy. In 2015, 12 million tourists visited the Canary Islands, spending over 15 billion Euros during their stay and enabling over 300,000 jobs in the tourism industry (Gran Canaria 2015). Several small fishing villages have been heavily developed over the last 50 years to provide the infrastructure needed to support the tourist industry.

It is vital to educate the resident and tourist communities in the Canary Islands about the status of the Angelshark populations and the importance of the Canary Islands as the remaining stronghold for this species.

(Fisher focused communication/education work is included in Goal 1. Diver and beach-user focused communication/education work is included in Goal 3.)

Goal 6	The resident and tourist communities are aware of and actively support Angelshark conservation measures	Priority	Cost	Timeline
Objective 6.1	Over 50% of the resident population of the Canary Islands understand the importance and status of the Angelshark by 2022.			2022
Action 6.1.1	Identify and develop an Angelshark Promotional Campaign for the Canary Islands. <ul style="list-style-type: none"> • Focused campaign around Angelshark being a flagship species of the archipelago. • Encourage a competition in schools/colleges in how to build the profile of the species. • Develop key messages and call to action. • Evaluate effectiveness of campaign during a controlled/pilot launch. 	H	€€€	
Action 6.1.2	Promote the Angelshark Campaign through media (including Spanish, English and German speaking channels). <ul style="list-style-type: none"> • Create a short video to be distributed through local TV channels. • Complete radio interviews. • Complete TV new interviews. • Publish information in local newspapers, magazines, brochures. 	H	€	
Action 6.1.3	Design, print and distribute Angelshark Campaign materials (T-shirts, leaflets, posters, stationary etc.).	L	€€	
Action 6.1.4	Provide material for Ministry representatives to take to public engagement events.	M	€	
Action 6.1.5	Develop materials for primary and secondary school children to learn about Angelshark in the classroom. <ul style="list-style-type: none"> • Create Angelshark guidance books for teachers. • Create interactive Angelshark workbooks. • Incorporate Angelshark information during school visits and set up Angelshark competitions. • Meet with education board to promote Angelshark as part of the “Local Knowledge” curriculum. • Encourage study of diversity of species (including Angelshark) at secondary school. • Encourage education field trips (snorkel safaris/boat tours etc.) 	H	€€€	

Goal 6	The resident and tourist communities are aware of and actively support Angelshark conservation measures	Priority	Cost	Timeline
Action 6.1.6	Evaluate success of the campaign through comparing the results of standardised questionnaires before and after the Angelshark Promotional Campaign asking questions about Angelshark conservation status.	M	€	
Action 6.1.7	<p>People engaged with the Angelshark Campaign passionately promote the successful conservation of Angelsharks in the Canary Islands outside of the archipelago.</p> <ul style="list-style-type: none"> • Simple electronic badge developed for social media sites and websites for people to promote conservation of Angelsharks. • Competition initiated to see how many places physical copies of badge can be pictured around the world. • Thunderclap developed and promoted throughout the Campaign to raise awareness of Angelshark conservation to a wider audience. 	M	€€	
Objective 6.2	Over 50% of the tourist population of the Canary Islands understand the importance and status of the Angelshark by 2022.			2022
Action 6.2.1	<p>Determine what the visions, goals and objectives are for the tourism industry by 2022.</p> <ul style="list-style-type: none"> • Obtain statistics from local government website. • Meet with Ministry of Tourism. • Ascertain plans as to whether a new airport, more hotels etc. are being considered. 	M	€	
Action 6.2.2	Map out tourist operators, ferry companies, flight carriers, tourist information centres, hotels and identify priority targets for Angelshark Campaign.	M	€	
Action 6.2.3	<p>Work with priority targets to enhance Angelshark Campaign and promote relevant outcomes of Angelshark Conservation Action Plan by 2022.</p> <ul style="list-style-type: none"> • Promote accredited dive centres. • Promote certified recreational fishing charter vessels. • Promote Recreational Fishing Outreach Kit. 	M	€€	
Action 6.2.4	<p>Work with local tourist destinations to promote Angelshark Campaign.</p> <ul style="list-style-type: none"> • Create list of major tourist destinations and prioritise where to focus effort. • Provide information to include in displays/new exhibit development. • Monitor development of new aquarium in Las Palmas. <ul style="list-style-type: none"> • Make contact and find out timescale for development. • Discover if aquarium plans to display Angelshark and if so, liaise with other aquariums that house Angelshark and obtain advice. • Encourage factual signage, information and outputs of Angelshark Conservation Workshop. 	M	€	

Angel Shark Conservation Network (ASCN) and Call for Support

The success of the Angelshark Action Plan for the Canary Islands is ultimately down to the individuals/organisations working together towards a common Vision that **Angelsharks in the Canary Islands are abundant and protected in their unique stronghold**. If you would like further information, would like to be part of the Angel Shark Conservation Network (ASCN) or have interest in implementing a specific action, please contact marineandfreshwater@zsl.org.

All interested parties are invited to join the ASCN and receive updates on angel shark conservation. The purpose of the ASCN is to:

- Host an email-group to send updates, providing information on activities in progress or completed as part of the Angelshark Action Plan for the Canary Islands.
- Facilitate dialogue and information sharing on all matters concerning Angelshark in the Canary Islands, including collaborative projects and joint funding opportunities.
- Facilitate information sharing on angel shark conservation efforts across the former range of the three species (*Squatina squatina*, *Squatina oculata* and *Squatina aculeata*)
- Contribute towards the Eastern Atlantic and Mediterranean Angel Shark Conservation Strategy for *Squatina squatina*, *Squatina oculata* and *Squatina aculeata*
- Ensure that consistent and clear messages regarding the Angelshark Action Plan are delivered to the wider community.
- Encourage a core group of individuals/organisations to attend a second Angelshark Conservation Workshop in 2020.

Attendees of Angelshark Conservation Workshop: 20-23 June 2016

Name	Surname	Organisation
Mikel	Arraste López	Fisheries Department, Canary Island Government
Jaime	Baleyrón Ferrer	Ministry of Agriculture, Food and Environment (MAGRAMA)
Joanna	Barker	Zoological Society of London / Angel Shark Project
Àlex	Bartolí	Submon / Consultant
Isabel Tamia	Brito Izquierdo	Marine Reserves Officer, Ministry of Agriculture, Food and Environment (MAGRAMA)
José Juan	Castro Hernández	Universidad de Las Palmas de Gran Canaria
Martin	Clark	Workshop Facilitator
Alison	Debney	Zoological Society of London
Nicholas	Dulvy	IUCN Shark Specialist Group
Alejandro	Escánez	Universidad La Laguna
Cat	Gordon	Shark Trust
Ricardo	Haroun Tabraue	ECOQUA, Universidad de Las Palmas de Gran Canaria
Rogelio	Herrera Pérez	Environment Department, Canary Island Government
Ali	Hood	Shark Trust
David	Jiménez Alvarado	ECOQUA, Universidad de Las Palmas de Gran Canaria / Angel Shark Project
Julia	Lawson	IUCN Shark Specialist Group
Jacobo	Marrero	Asociación Tonina
Eva	Meyers	Zoologisches Forschungsmuseum Alexander Koenig / Angel Shark Project
José Manuel	Ortiz Sánchez	Área de Agricultura y Pesca, Ministry of Agriculture, Food and Environment (MAGRAMA)
Francisco	Otero Ferrer	ECOQUA, Universidad de Las Palmas de Gran Canaria
Alberto	Ramírez	Alianza Tiburones Canarias
Carlos	Suárez	Diving community

Monitoring, Evaluation and Learning

The ASCN is responsible for monitoring progress and success of the Angelshark Action Plan for the Canary Islands. The Action Plan itself is a 'living document' and the ASCN will maintain it so that progress can be tracked for each Goal, Objective and Action. The proposed second Angelshark Conservation Workshop in 2020 will be a key milestone in reviewing progress and will enable the ASCN to evaluate whether the common Vision has been achieved or is on track.

Monitoring, Evaluation and Learning (MEL) is integrated throughout the approach set out in this plan. This is important as the Action Plan was developed with minimal data on the distribution, habitat requirements and threats faced by the Angelshark. This is addressed through the proposed research agenda set out in Goal 5, which is essential for establishing a baseline for MEL as well as other aspects to deliver effective conservation. Detailed MEL elements will be incorporated in project proposals and associated funding applications developed to progress elements of this plan. A full Angelshark Action Plan MEL strategy has been written and will be available on partner websites.



Glossary

Angelshark: This refers to the common name of a species: “Angelshark” *Squatina squatina*, “Sawback Angelshark” *Squatina aculeata* and “Smoothback Angelshark” *Squatina oculata*.

Angel Shark: Refers to the angel shark family.

Ayuntamiento: The city hall of the local government. The leader is the Mayor (elected every 4 years) who has several councillors reporting to him.

Cabildo Insular: Governing bodies that administer and represent each of the Canary Islands. It is at a higher level than the *Ayuntamiento*, but lower than Autonomous Community. Representatives are elected every four years.

El Catálogo de Especies Protegidas de Canarias (CEPC): Canary Island Catalogue of Endangered Species.

El Catálogo Español de Especies Amenazadas (CEEa): Spanish Catalogue of Threatened Species.

Cazonal fisheries: Fisheries made with a kind of gillnet with a single panel fixed to the bottom to catch large fishes, in particular smooth hound. It is one of the most common fishing gears used in the Canary Islands, but is restricted seasonally and in some islands (Tenerife, Gran Canaria and La Palma).

Cofradías: This is a Fishermen’s Association. They are non-profit corporations of the public sector, which act as bodies for consultation and collaboration with the Administration on extractive fishing and trading, representing economic interests of workers and owners of fishing vessels in the fishing sector, mainly in inshore artisanal sectors. The most important role, among others, is the sales management of the catches of their associates. These Fishermen’s Associations always act at local level but could be joined in a higher level as Federations of Fishermen’s Associations. The person who leads the management board of the *Cofradías* is called *Patrón Mayor*.

Comisión Estatal para el Patrimonio Natural y la Biodiversidad: The State Commission for the Natural Heritage and Biodiversity (Spanish Government).

Comité de Fauna y Flora Silvestre: The Committee on Wildlife (Spanish Government).

Critical Angelshark Area: A specific geographic area that contains essential features for the conservation of Angelshark. This may include an area that is not currently occupied by the species that will be needed for its recovery or conservation. For example: nursery areas, mating areas, aggregation areas, foraging areas.

Demarcaciones de Costas: Coastal demarcations

Dirección General de Pesca del Gobierno de las Islas Canarias: General Director of Fisheries in the Canary Islands.

Dirección General de Pesca del Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente: General Director of Fisheries in MAGRAMA (Spanish Government).

Eco-buceo materials: Eco-dive group materials.

Federaciones Provinciales de Cofradías de Pescadores (FPCP): Provincial Federation of Fishermen’s Association.

Federación Regional de Cofradías de Pescadores (FRCP): Regional Federation of Fishermen’s Association.

Grupos de Acción Local Pesqueras (GALP): Fisheries Local Action Groups (FLAG).

Gobierno de Islas Canarias: Canary Island Government

Gobierno de España: Spanish Government

Incidental catch: The portion of a commercial fishing catch that consists of marine animals caught unintentionally.

Inshore Waters: Waters that range between the coast and the straight baseline around each islands (the inshore boundary of the Territorial Waters). Canary Island Inshore Waters under sovereign control of the Canary Island Government (La Gomera has no Inshore Waters).

El Listado de Especies Silvestres en Régimen de Protección Especial (LESRPE): List of Wild Species under Special Protection.

Management authorities: Different bodies which have the responsibility for the advocacy and enforcement of the laws and representation. In the case of fisheries, for example, the Ministry of Agriculture, Food and Environment has the competences on fisheries at national level or, the Department of Agriculture, Cattle Industry, Fisheries and Water of Canary Islands has the competences on fisheries in Canary Islands.

Ministerio de Agricultura, Alimentación y Medio Ambiente (MAGRAMA): Ministry of Agriculture, Food and Environment for the Spanish Government

Modelo Argumentación Científica: Scientifically justified text.

Canary Island Exclusive Economic Zone (EEZ): Waters that range from the 12 nautical mile boundary (the outer boundary of the Territorial Sea) and 200 nautical mile boundary around the coast. If the EEZ of two or more countries overlap, these states delineate a maritime boundary to divide the EEZs, usually equidistant between the countries). The Canary Island EEZ is under sovereign rights of the Spanish Government.

Patrón Mayor: The highest representative of the management board of a Fishermen’s Association, elected every four years.

Recreational fishing charter vessel: Boats that take paying clients recreational fishing.

Reserva de la Biosfera: UNESCO Biosphere Reserves.

Recreational fishing: Recreational fishing, also called sportfishing, is fishing for pleasure or competition. It can be contrasted with commercial fishing, which is fishing for profit, or subsistence fishing, which is fishing for survival. The most common form of recreational fishing is done with a rod, reel, line, hooks and baits. The practice of catching or attempting to catch fish with a hook is known as angling.

Territorial Waters: Waters that range from the straight baseline to 12 nautical mile boundary around the coast. Canary Island Territorial Waters are under sovereign control of the Spanish Government.

The Wildlife Safe (WiSe) scheme: A scheme set up to minimise unintentional disturbance of marine mammals by vessels.

Trammel Net: Consists of two or three layers of netting with a slack inner netting (with smaller mesh size) between two layers of larger mesh netting. These net are cast vertically in the water, using floats and weighted lines, and are often set in groups or strings.

Acronyms

ASCN: Angel Shark Conservation Network

CECAF: Fishery Committee for the Eastern Central Atlantic

CEEa: *Catálogo Español de Especies Amenazadas*

CEPC: *Catálogo de Especies Protegidas de Canarias*

CFP: Common Fisheries Policy

CMS: Convention on Migratory Species

CMAS: World Confederation of Underwater Activities

COP: Conference of the Parties

EEZ: Exclusive Economic Zone

EU: European Union

FAO: Food and Agriculture Organisation of the United Nations

FRCP: *Federación Regional de Cofradías de Pescadores*

GALP: *Grupos de Acción Local Pesqueras*

ICES: International Council for the Exploration of the Sea

IUCN: International Union for Conservation of Nature

LESRPE: *Listado de Especies Silvestres en Régimen de Protección Especial*

MEL: Monitoring, Evaluation and Learning

MOS3: Third Meeting of the Signatories to the CMS Sharks MoU

MPA: Marine Protected Area

NGO: Non-Governmental Organisations

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

PADI: Professional Association of Diving Instructors

PC: *Decreto 182/2004 del Reglamento de la Ley de Pesca de Canarias*

SCUBA: Self-Contained Underwater Breathing Apparatus

SSI: Scuba Schools International

TAC: Total Allowable Catch

WiSE: The Wildlife Safe scheme

ZECs: *Zonas Especiales de Conservación* = **SACs:** Special Areas of Conservation

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