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ANGEL SHARK PROJECT: WALES

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AWST 2020

WALES ANGELSHARK ACTION PLAN

AUGUST 2020

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YMLAEN / FOREWORD

Mae siarcod a morgathod yn rhan bwysig o amgylchedd morol anhygoel Cymru. Mae'r Maelgi sydd mewn Perygl Difrifol yn un o'r rhywogaethau prinnaf o siarcod a geir yn ein dyfroedd, ond mae o bwys gwyddonol a diwylliannol mawr i Gymru. Mae'n bleser gennyf gyflwyno Cynllun Gweithredu Maelgwn Cymru, sy'n darparu'r fframwaith ar gyfer deall a diogelu'r rhywogaeth hon yn well yng Nghymru. Rwyf yn edrych ymlaen at weld y cynllun yn cael ei gyflawni dros y pum mlynedd nesaf, a hynny drwy waith partneriaeth ledled Cymru a'r tu hwnt, er mwyn ategu ein nod hirdymor o 'gefnforoedd a moroedd glân, iach, diogel, cynhyrchiol ac amrywiol yn fiolegol'.

Lesley Griffiths AS
Gweinidog yr Amgylchedd, Ynni a Materion Gwledig

Sharks, skates and rays are an important part of Wales' incredible marine environment. The Critically Endangered Angelshark is one of the rarest shark species found in our waters, but has significant scientific and cultural importance to Wales. I'm pleased to present the Wales Angelshark Action Plan, which provides the framework to better understand and safeguard this species in Wales. I look forward to seeing its delivery over the next five years, through partnership working across Wales and beyond, to support our long term aim of 'clean, healthy, safe, productive and biologically diverse oceans and seas'.

Lesley Griffiths MS
Minister for Environment, Energy and Rural Affairs

CRYNODEB GWEITHREDOL
EXECUTIVE SUMMARY

Cymru yw un o'r unig fannau yng ngogledd-orllewin Ewrop lle y mae'r maelgi (Squatina squatina) sydd mewn perygl difrifol wedi'i weld yn rheolaidd dros y degawd diwethaf. Diogelir y rhywogaeth hon yng Nghymru drwy ei chynnwys yn y Ddeddf Bywyd Gwyllt a Chefn Gwlad ac yn Neddf yr Amgylchedd (Cymru) (Tabl 1), ond ychydig a wyddys am ei statws, ei hecoleg, neu leoliad cynefinoedd pwysig. Mae rhwydwaith cryf o gyrff anllywodraethol, asiantaethau llywodraethol a phrifysgolion wedi cydweithio i ddatblygu Cynllun Gweithredu Maelgwn Cymru ("y Cynllun Gweithredu"), gan roi cyfle unigryw i ddeall a diogelu'r rhywogaeth hon yn well ym Mharth Cymru (Ffigur 1). Bydd gwaith pellach hefyd yn parhau i hyrwyddo maelgwn yn un o rywogaethau blaenllaw Cymru, gan ysbrydoli cymunedau arfordirol i ymgysylltu â'r amgylchedd morol tanddwr a helpu i lywio mentrau sy'n ymwneud â maelgwn mewn rhannau eraill o'u hystod ddaearyddol.

Mae'r Cynllun Gweithredu hwn yn darparu rhestr flaenoriaeth o'r camau gweithredu sydd i'w cyflawni dros y pum mlynedd nesaf. Datblygwyd y camau gweithredu hyn yn dilyn cyfres o weithdai, a drafododd y bygythiadau (Ffigur 2) a'r bylchau yn y dystiolaeth yng nghyd-destun y mesurau rheoli a pholisi presennol ar gyfer maelgwn ym Mharth Cymru. Caiff y camau gweithredu hyn eu categoreiddio o dan bum nod: Cynefin a'r Amgylchedd, Pysgodfeydd, Cymuned, Cysylltedd Maelgwn ac Bylchau yn y Dystiolaeth. Drwy weithio gyda'n gilydd i gyflawni'r Cynllun Gweithredu hwn, gallwn symud tuag at ein gweledigaeth: poblogaeth lewyrchus o Faelgwn yng Nghymru.

Wales is one of the only places in north-west Europe with regular sightings of the Critically Endangered Angelshark (*Squatina squatina*) over the last decade. This species is protected in Wales, through inclusion on both the 'Wildlife and Countryside Act' and 'Environment (Wales) Act' (Table 1), but little is known about its status, ecology or location of important habitats. A strong network of NGOs, Government Agencies and Universities have worked together to build the Wales Angelshark Action Plan ("Action Plan"), providing a unique opportunity to better understand and safeguard this species in the Welsh Zone (Figure 1). Further work will also continue to promote Angelsharks as a flagship species for Wales, inspiring coastal communities to connect with the underwater marine environment and help inform Angelshark initiatives in other parts of its geographic range.

This Action Plan provides a priority list of Actions to be delivered over the next five years. These Actions were developed following a series of workshops, that discussed the threats (Figure 2) and evidence gaps in the context of existing policy and management measures, for Angelsharks in the Welsh Zone. These Actions are categorised under five Goals: Habitat and Environment, Fisheries, Community, Angelshark Connectivity and Evidence Gaps. By working together to deliver this Action Plan, we can move towards our Vision: a thriving population of Angelsharks in Wales.

BACKGROUND

ANGEL SHARKS ACROSS THEIR RANGE

Angel sharks (see Box 1) are a group of flat sharks that use their broad pectoral fins to bury into soft sediment to ambush prey. There are at least 22 species of angel shark, which form the third most threatened family of sharks, skates and rays in the world (Squatinidae) (Dulvy *et al.* 2014, Kyne *et al.* 2019). The Angelshark (*Squatina squatina*) is the only species of angel shark present in the Atlantic waters of north-west Europe, with a historic range spanning from the south west coast of Norway to the south coast of Western Sahara, including the Mediterranean and Black Seas. More information on this species can be found in these documents:

- The IUCN Red List of Threatened Species – *Squatina squatina*.
- Eastern Atlantic and Mediterranean Angel Shark Conservation Strategy.

The Angelshark is listed as Critically Endangered on the IUCN Red List of Threatened Species (Morey *et al.* 2019) and included on the OSPAR List of Threatened and Declining Species (OSPAR 2010). Although there has been a reduction in Angelshark distribution in other parts of north-west Europe (Lawson *et al.* 2020, Rogers and Ellis, 2000), including that recently documented in Ireland (Shepherd *et al.* 2019) and the southern North Sea (Bom *et al.* 2020), there is uncertainty regarding the status of Angelsharks in the Welsh Zone and connectivity with the Wider Region.

RED LIST
CRITICALLY ENDANGERED
CR

BOX 1

Throughout the action plan "Angel shark" refers to multiple species of angel shark in the family Squatinidae, whilst "Angelshark" refers to just one species – Squatina squatina.

ANGELSHARKS IN WALES

In Wales, it has been reported that there has been a decline in Angelshark records since the 1970's (Hiddink *et al.* 2019), however changes in fishing effort (e.g. number of fishers and vessels, frequency of fishing, fishing location, type and usage of gear, seasonal changes) and paucity of readily available historic data make it difficult to assess Angelshark population trends and indices of abundance in Wales. What we do know is that Angelsharks are still present in Wales, more so than other parts of north-west Europe, and they have been regularly recorded as accidental encounters by fishers in the Welsh Zone throughout the last decade (Barker *et al.* in prep.). This provides an important opportunity to better understand and safeguard this Critically Endangered species in the northern part of its range.


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ANGEL SHARK PROJECT: WALES (ASP:W):

ASP:W is a collaborative project led by Zoological Society of London (ZSL) and Natural Resources Wales (NRW). It was piloted in 2017, before formal launch in 2018 with the aim to better understand and safeguard Angelsharks in Wales through fisher participation, heritage and citizen science.

ASP:W worked with 75 fishers, trained 15 citizen scientists in archival research techniques and reached over 40 million people through a range of media outlets to increase public knowledge that Angelsharks are still present in the Welsh Zone. In total, the project gathered 2,182 Angelshark records (Figure 1) dating back to 1812 through:

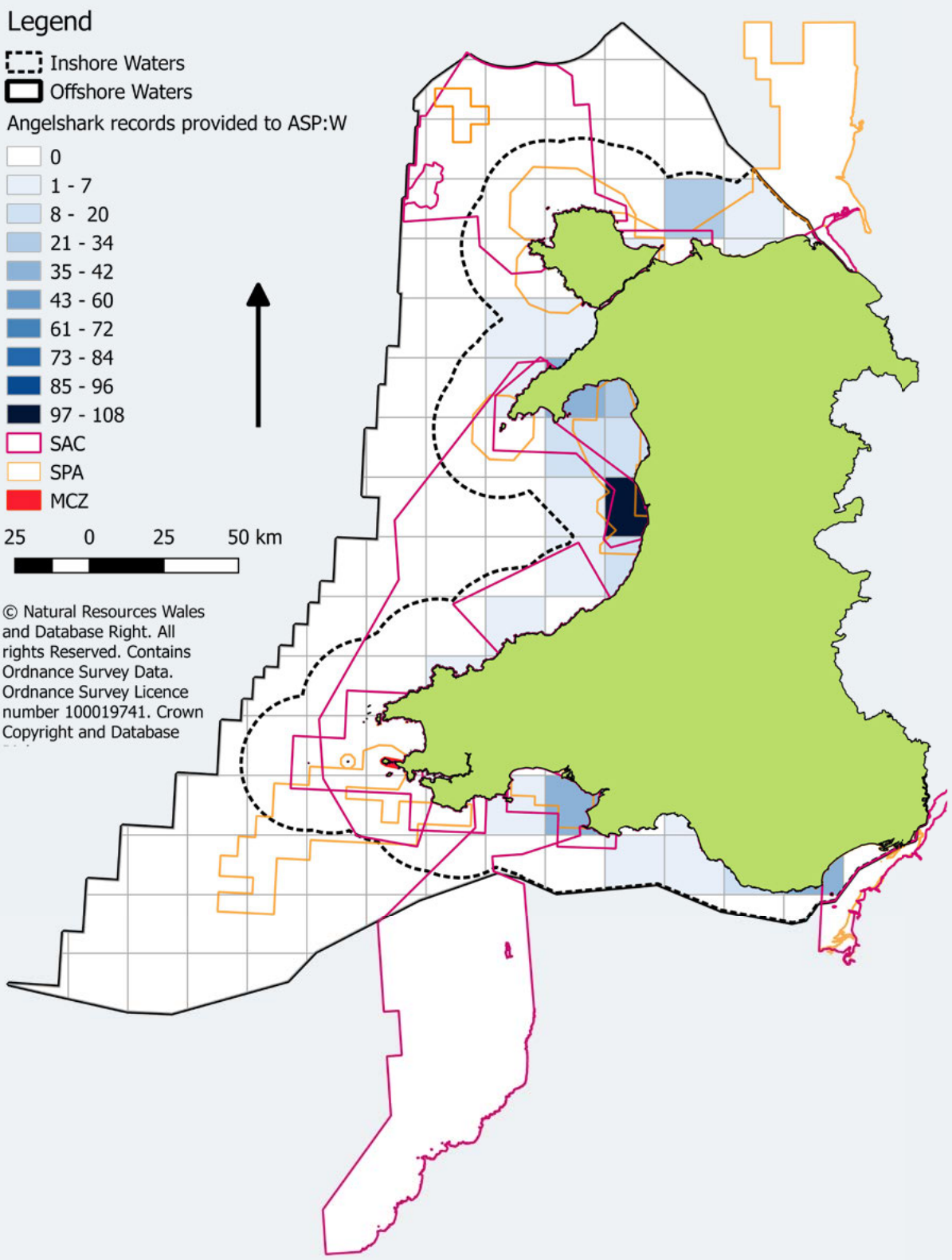
- working with fishers and their associations;
- engaging the public through five Angelshark History Roadshows;
- conducting archival research in libraries, archives and museums;
- compiling digital searches and records on social media;
- completing a pilot environmental DNA (eDNA) study (Barker *et al.* in prep.).

This research unlocked some important historical ecological knowledge. Several books, magazines and newspaper articles referred to Angelsharks as being a rare species in certain regions of Wales, in some cases being displayed to the public for a fee if caught, others identified hotspots where Angelsharks were more frequently recorded. A total of 16 different names for this species in Wales have been unearthed: Angelshark, maelgi (Welsh language), monkfish, monk, banjofish, angelfish, bafoon, shovelnose monkfish, devilfish, puppyfish, fiddlefish, jakie shark, shark-ray, kingston, abbot, and fiddler.

Since 1980, 1,642 Angelsharks have been reported in coastal waters of the Welsh Zone, including 79 juvenile records (39 cm or less in length) from areas around North Cardigan Bay and the Bristol Channel (Barker *et al.* in prep.). This demonstrates that Angelsharks are still present in the Welsh Zone and may use this region to give birth (Barker *et al.* in prep.).

Habitat analyses revealed that Angelsharks were more commonly recorded in shallow (<20 m depth), coastal areas with high productivity, often bays and outer estuaries (Barker *et al.* in prep.). However, the majority of fishers who reported Angelshark records to ASP:W only operate in inshore waters (Figure 1), which contributes to a degree of bias within the dataset. Species Distribution Modelling showed that most records were located on soft substrates, especially mud and sand, which is consistent with results from Angelsharks observed in the Canary Islands (Meyers *et al.* 2017).

FIGURE 1: "Welsh Zone" refers to both inshore waters (from mean high water spring tides out to 12 nautical miles) and offshore waters (beyond 12 nautical miles). This map shows the total number of Angelshark records provided to Angel Shark Project: Wales for each 20km grid square in the Welsh Zone. It also shows the overlap with designated European Marine Sites (EMS) – this includes Special Areas of Conservation (SAC) and Special Protected Areas (SPA) – and Marine Conservation Zones (MCZ), which are UK designated Marine Protected Areas (MPA).



WALES ANGELSHARK ACTION PLAN

The Action Plan was developed through eight online workshops held between April and July 2020 (attendees outlined on p.42) organised by ASP:W, with the support of a two-year grant from National Lottery Heritage Fund and Welsh Government (WG).

The Action Plan was developed in response to the limited understanding of the ecology and status of Angelsharks in Wales, to encourage coordinated delivery of priority Actions and address specific research gaps over the next five years. The Action Plan provides a prioritised list of activities based on current knowledge, it is not exhaustive, but instead should be viewed as an informed starting point from which to build and inform dynamic conservation.

The Action Plan sits underneath the umbrella of the Eastern Atlantic and Mediterranean Angel Shark Conservation Strategy (Gordon *et al.* 2017) and is part of a series of regional documents being developed by the Angel Shark Conservation Network (ASCN) and partners across this region.

The ASP:W Steering Group (members outlined on p.42) will track progress of the Action Plan, with the aim of conducting a second Action Plan workshop in 2025 to reflect on what has been learnt, and identify the next phase of priority Actions and partners to further progress work. ASP:W actively encourages organisations across Wales to help deliver the Action Plan – if interested, please email angelsharks@zsl.org and enquiries@naturalresourceswales.gov.uk to help coordinate activities.

LEGISLATION TO PROTECT ANGELSHARKS

Angelsharks are protected in the Welsh Zone and Wider Region under the following national and international legislation.

TABLE 1: National and International legislation to protect Angelsharks in Wales and the wider region

Regulation/ Legislation	Listing Date	What it Mandates
NATIONAL LEGISLATION RELATING TO THE WELSH ZONE		
Wildlife and Countryside Act (1981)	2008	Schedule 5 – It is an offence to; "*kill or injure, capture, possess or keep, transport or possess for sale or offer or expose for sale or advertise for sale and use a prohibited method to take or kill an Angelshark (within 12 nm of the Welsh and English coastline)*".
Environment (Wales) Act (2016)	2016	Section 6.1 – "*A public authority must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions*". Section 6.5 – "*In complying with subsection (1), a public authority other than a Minister of the Crown or government department must have regard to the list published under section 7*". Section 7.1 – Angelsharks are included in the Section 7: "*The Welsh Ministers must prepare and publish a list of the living organisms and types of habitat which in their opinion are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales*". Section 7.3 – "*Welsh Ministers must (a) take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and (b) encourage others to take such steps*".
NATIONAL LEGISLATION RELATING TO THE WIDER REGION		
Wildlife and Countryside Act (1981)	2008	Schedule 5 – It is an offence to; "*kill or injure, capture, possess or keep, transport or possess for sale or offer or expose for sale or advertise for sale and use a prohibited method to take or kill an Angelshark (within 12 nm of the Welsh and English coastline)*".
The Wildlife (Northern Ireland) Order 1985 "Animals which are protected at all times"	2011	Schedule 5 – It is an offence "*to intentionally or recklessly kill, injure or take*" Angelsharks within 6 nautical miles of the coast. "*Possession or control any live or dead*" Angelshark "*or any animal any part of, or anything derived from, it*" is an offence.
Sharks, Skates and Rays (Prohibition of Fishing, Transhipment and Landing) (Scotland) Order 2012.	2012	"*Prohibits the landing in Scotland of any specified species of shark, skate and ray caught by rod and line and hand-line (wherever caught)*", including Angelshark.

Regulation/ Legislation	Listing Date	What it Mandates
INTERNATIONAL LEGISLATION (APPLICABLE IN WELSH ZONE AND WIDER REGION)		
European Union Regulation No. 2019/1241 of the EU Parliament and the Council	2019	"*Prohibited to fish for, retain on board, tranship, land, store, sell, display or offer for sale*" Angelsharks – applies to all EU commercial fishing vessels and third country vessels in EU waters. This includes all UK registered vessels during and after the Transition Period ending 31st December 2020. "*When caught accidentally, species referred to in paragraphs 1 and 2 shall not be harmed and specimens shall be promptly released back into the sea, except for the purpose of allowing scientific research on accidentally killed specimens in accordance with applicable Union law.*" Technical Measure Regulation (EU) No. 2015/812 and Article 15(4) and (5) of Regulation (EU) No 1380/2013 of the European Parliament and of the Council state that "*Specimens shall be promptly released, with estimated discards" of all Angelsharks "recorded in vessel logbooks*". This is only relevant for the over 10 m UK commercial fishing fleet as under 10 m vessels do not have a statutory requirement to complete logbooks. Under 10 m vessels can record any accidental catches and returns of Angelshark in the Welsh Zone voluntarily through a new catch reporting app.
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	2017	Appendix I – "*Shall list migratory species which are endangered*". "*Parties that are Range States of a migratory species listed in Appendix I shall endeavour: a) to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction; b) to prevent, remove, compensate for or minimize, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; and c) to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species.*" Appendix II – "*migratory species which have an unfavourable conservation status and which require international agreements for their conservation and management, as well as those which have a conservation status which would significantly benefit from the international cooperation that could be achieved by an international agreement.*" Angelsharks are also included in Annex I – CMS Memorandum of Understanding on the Conservation of Migratory Sharks (CMS Sharks MOU).

POSSIBLE THREATS

Possible threats faced by Angelsharks were initially identified through reviewing other Regional Action Plans for this species (Barker *et al.* 2016; Gordon *et al.* 2017; Gordon *et al.* 2019). During the workshop, these threats were discussed and refined, with a focus on identifying possible threats faced by Angelsharks in the Welsh Zone (Figure 2). Consensus on threats was difficult to reach, as there are limited data on Angelshark distribution, habitat use and the level of different activities in the Welsh Zone and no current information on Angelshark status.

Discussions focused on two main areas:

- Possible incidental mortality of Angelsharks from accidental bycatch in fisheries (Box 2).
- Possible habitat loss or degradation at Critical Angelshark Areas (Box 3).

There are regulations that prevent target fisheries for Angelshark in the Welsh Zone (Table 1). There is also a perception that the current type and level of commercial and recreational fishing activity likely to impact Angelsharks is small, thus a relatively low risk to the species. In the last 50 years, there has been a significant reduction in the commercial fishing fleet operating in the Welsh Zone (See Goal 2 for more detail). The current inshore fleet now predominantly use static gears such as pots for crab, lobster and whelks, alongside high-value intertidal fisheries for mussels and cockles. A small number of vessels operate using towed gear (scallop dredges, otter trawls and beam trawls) (www.seafish.org).

It should be noted that possible threats identified in Figure 2 may change over time, depending on changes in the type and scale of human activities and scientific understanding of the impact of these activities.

BOX 2

"Fishers" or "fisheries" or "fishing" refers to all fishing sectors (i.e. commercial, recreational and charter boat fishers, registered in any country) fishing in the Welsh Zone. If a description or action is for a particular sector, this is clarified in the relevant text.

BOX 3

Critical Angelshark Areas are specific geographic areas that contain essential features for the life history of Angelshark e.g. nursery areas, aggregation areas, mating areas.

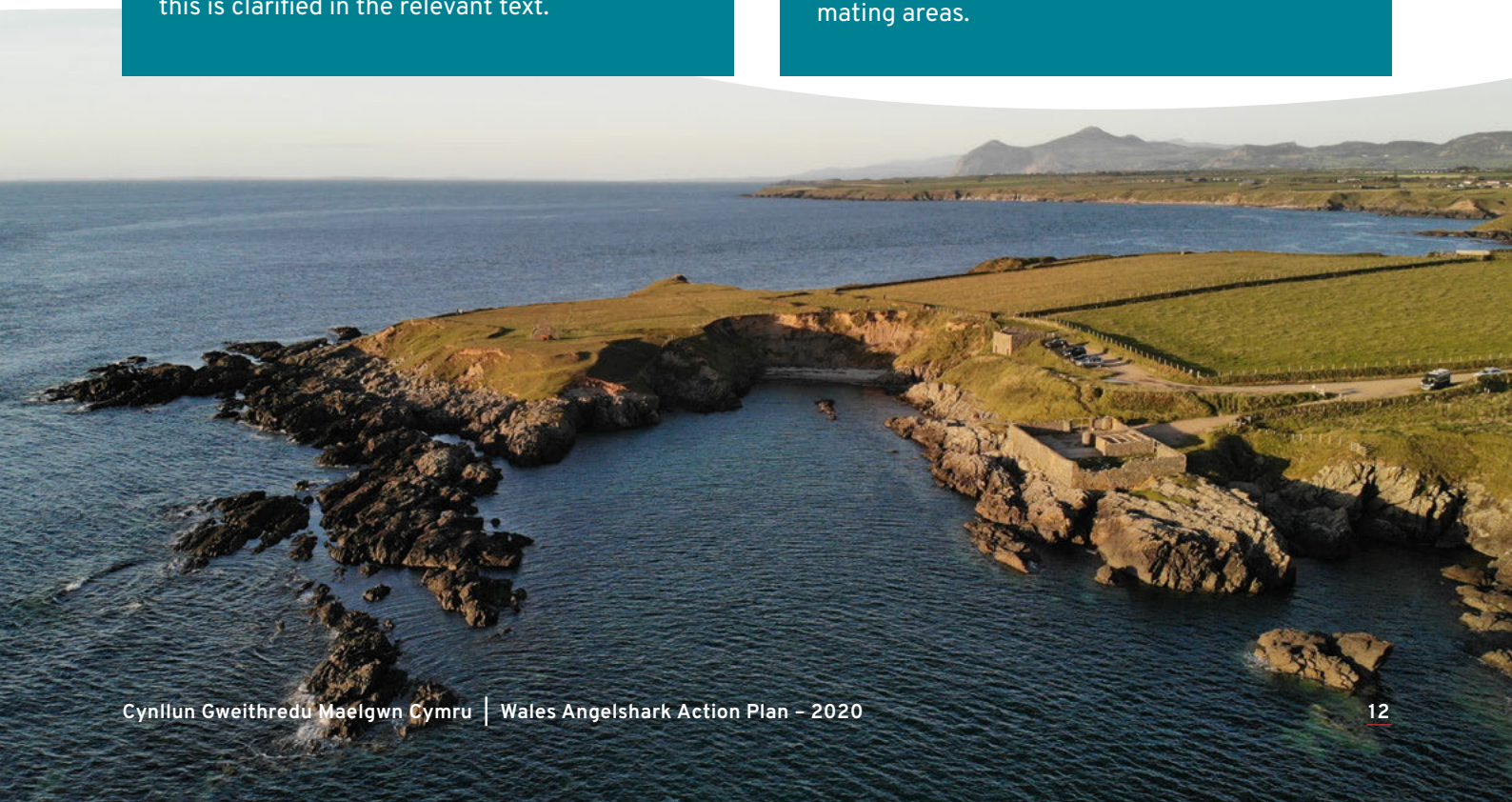


FIGURE 2: Possible threats faced by Angelsharks in the Welsh Zone, identified during the Wales Angelshark Action Plan workshop, organised by IUCN threat categories as classified by Salafsky *et al.* 2008

1 Residential & commercial development	Coastal building and infrastructure development	Extractive Industries (e.g. aggregate, capital, maintenance dredging)						
2 Agriculture & aquaculture	Agriculture run off from land	Marine aquaculture (intertidal & subtidal)						
3 Energy production and mining	Renewable energy (e.g. wind farms, underwater turbines, tidal lagoons) and associated infrastructure	Mining contaminants run off from land	Maritime mining, oil or gas operations					
4 Transportation & service corridors	Pipelines and electrical cables							
5 Biological resource use	Illegal, Unreported & Unregulated (IUU) fishing	Accidental capture and possible incidental mortality in commercial fisheries* operating in the Welsh Zone	Accidental capture and possible incidental mortality in commercial fisheries* operating in the Wider Region	Change in type of commercial fishing vessels operating in the Welsh Zone at the end of the Transition Period	Accidental capture and possible incidental mortality in recreational fisheries** operating in the Welsh Zone	Accidental capture and possible incidental mortality in recreational fisheries** operating in the Wider Region	Mortality through entanglement in lost nets (ghost fishing)	Alteration of food chain (overfishing of prey species)
6 Human intrusion & disturbance	Altered seafloor morphology	Anchor damage of habitats	Impact of beach users / activities on coastal Critical Angelshark Areas					
7 Natural system modifications	Coastal defences along shoreline	Habitat loss at Critical Angelshark Areas	Habitat modification at Critical Angelshark Areas	Habitat loss or modification prevents natural Angelshark movements				
8 Invasive & other problematic species & genes	Low genetic diversity (genetic bottlenecks/ population fragmentation)							
9 Pollution	Water pollution	Micro / macro plastics	Sewage	Oil spills	Eutrophication			
10 Geological events								
11 Climate change & severe weather	Oceanic temperature changes	Sea level rise	Acidification	Oceanographic cycles				

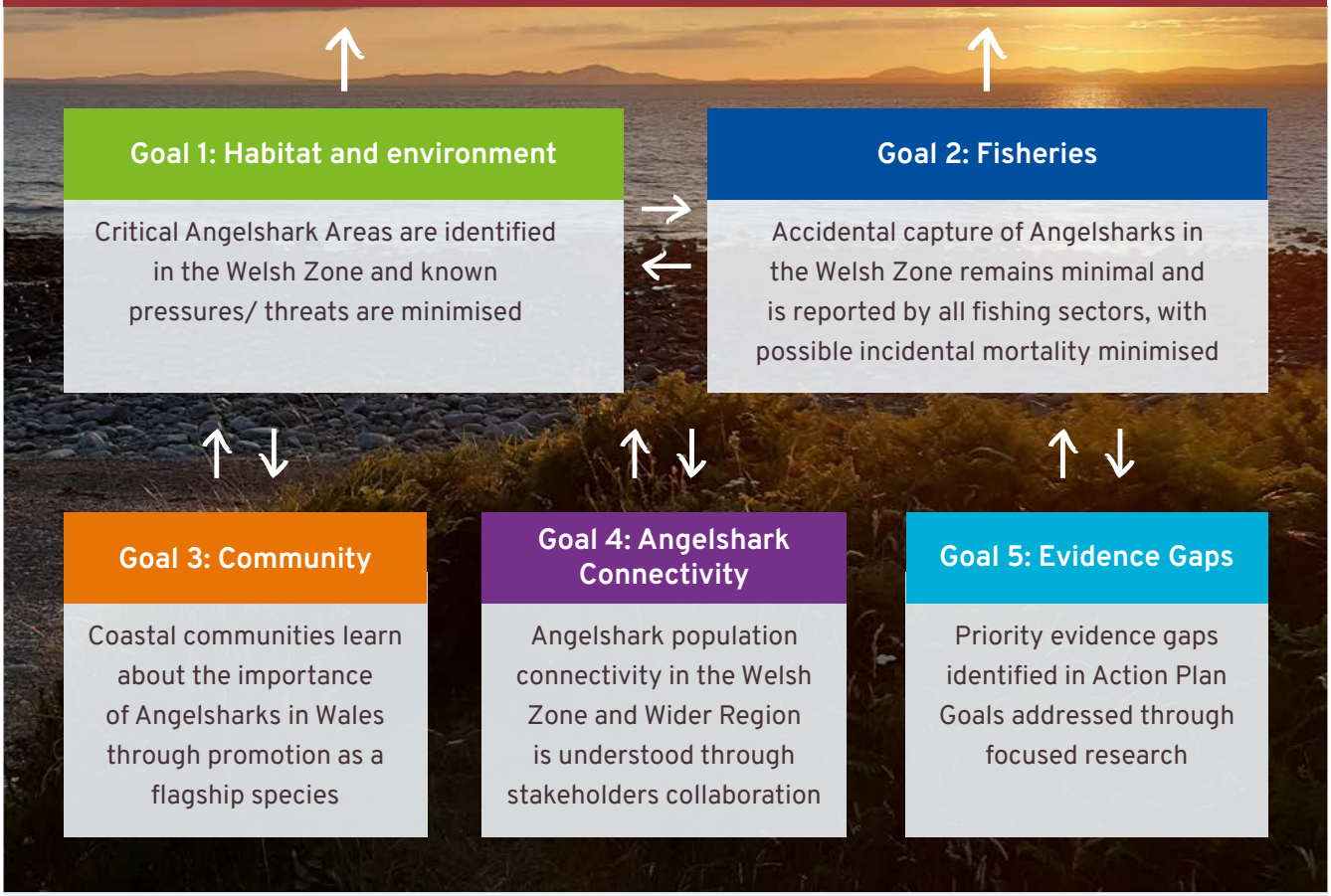
Key:

- First level threats as classified by Salafsky *et al.* 2008
- Considered a high possible threat for Angelsharks in Wales
- Considered a possible threat for Angelsharks in Wales
- * All commercial fishing (Under 10 m's; 10 – 12m's; over 12 m's) registered in any country
- ** All recreational fishing in the Welsh Zone (angling from boat, surfcasting, spearfishing, charter boat fishing)

VISION, GOALS AND OBJECTIVES

Vision:

A thriving population of Angelsharks in Wales



Goal 1: Habitat and environment

Critical Angelshark Areas are identified in the Welsh Zone and known pressures/ threats are minimised

Goal 2: Fisheries

Accidental capture of Angelsharks in the Welsh Zone remains minimal and is reported by all fishing sectors, with possible incidental mortality minimised

Goal 3: Community

Coastal communities learn about the importance of Angelsharks in Wales through promotion as a flagship species

Goal 4: Angelshark Connectivity

Angelshark population connectivity in the Welsh Zone and Wider Region is understood through stakeholders collaboration

Goal 5: Evidence Gaps

Priority evidence gaps identified in Action Plan Goals addressed through focused research

Each Action is prioritised using the following scale:

H = High Priority

M = Medium Priority

L = Lower Priority but still important

Each Action has an estimated cost associated with it:

£ = Low Cost (work could be carried out with minimal cost).

££ = Medium Cost (funding needs to be secured).

£££ = High Cost (a large funding application or multiple funding applications need to be secured).

Suggested groups to deliver the Action have been outlined in the "Who to complete" column based on the list below. In some cases, specific partners have been identified.

- RC = Research Community – academia, universities, research departments or institutes.
- NGOs = Non-Governmental Organisations, charitable organisations and advocacy groups.*
- GOs = Government Organisations – WG, NRW, Marine Management Organisation (MMO), Cefas.
- EIs = Educational Institutions – schools (primary and secondary), school groups, higher education, training facilities (not including universities, as listed in RC).
- MLAA = Museums/Libraries/Archives/Aquaria – national or local MLAA based in or close to Wales.
- Fishers = as per definition in Box 2 and fisher associations.

Each Action has a timeline associated with it:

- Ongoing = an Action that needs to be conducted regularly/continually.
- Short = can be completed immediately (when funding secured).
- Medium = requires some additional information before being completed.
- Long = requires considerably more information before being completed.

GOAL 1
HABITAT AND ENVIRONMENT

GOAL

Critical Angelshark Areas are identified in the Welsh Zone and known threats are minimised

INTRODUCTION

Marine environment in the Welsh Zone

The Welsh marine environment has a diverse range of species and habitats. The north-east and south coasts of Wales are dominated by the tidal influence of the Dee and Severn Estuaries, producing varied biological communities and tide-swept sand and rock (LUC, 2015). Cardigan Bay, dominating the west coast of Wales, is characterised by substantial glacial moraines that make up important reef habitats surrounded by gravel and sands (Evans *et al.* 2005). Across Wales, there are several large, productive estuaries, which support high abundances of juvenile fish species and provide shallow, semi-sheltered environments. Water quality in the Welsh Zone has significantly improved in the last 30 years, as outlined in Defra (2019) and Cefas (2020), through implementation of a number of focused plans/policies (e.g. Marine Strategy Framework Directive (MSFD) and Water Framework Directive (WFD)).

Angelshark habitat use in the Welsh Zone

There are limited data on Angelshark habitat use in the Welsh Zone. Critical Angelshark Areas have been shown to be used by this species in the Canary Islands (Meyers *et al.* 2017, Jiménez Alvarado *et al.* 2020), but have not been identified in the Welsh Zone to date. However, ASP:W habitat analysis revealed Angelsharks were more commonly recorded on soft sediments below 20 m depth (Barker *et al.* in prep.), which concurs with other habitat analyses for this species (Akyol *et al.* 2015, Meyers *et al.* 2017, Morey *et al.* 2019, Lapinski and Giovos, 2019, Barker *et al.* 2019, Jiménez-Alvarado *et al.* 2020) (Figure 1). Results of ASP:W Species Distribution Modelling showed that chlorophyll a, depth, and sea surface temperatures (SST) were significant in identifying Angelshark distributions in spring and summer months (Barker et al. in prep.). Additional research should focus on understanding Angelshark habitat preferences in the Welsh Zone to help identify Critical Angelshark Areas (See Goal 5).

Habitat conservation designations

Many marine habitats are listed as "*habitats of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales*" in the Environment (Wales) Act 2016 or are included in Annex I habitat features of the EU Habitats Directive (Council Directive 92/43/EEC). Habitats protected under the EU Habitats and Birds Directive require spatial protection as either a Special Area of Conservation (SAC) or Special Protected Area (SPA), together referred as a European Marine Site (EMS) (Figure 1). All plans and projects, subject to permissions from a competent authority and not connected to the conservation management of the site, with the potential to impact EMS features will require a Habitat Regulations Assessments (HRA).

Angelsharks could benefit from some level of de-facto protection from EMS or other designations if it is shown that they have a direct or indirect connection to the protected habitats. Although Angelshark habitat preference in the Welsh Zone is a major evidence gap (See Goal 5; Research Area (RA) 1), research on Angelshark habitat use in other parts of their range suggest that Angelsharks could use the following protected habitats:

EU Habitat Directive

- 1110 Sandbanks which are slightly covered by sea water all the time (Akyol *et al.* 2015, Meyers *et al.* 2017, Morey *et al.* 2019)
- 1130 Estuaries (Morey *et al.* 2019)
- 1140 Mudflats and sandflats not covered by seawater at low tide (Morey *et al.* 2019)
- 1150 Coastal lagoons (Lapinski and Giovos 2019)
- 1160 Large shallow inlets and bays (Morey *et al.* 2019, Barker *et al.* 2019, Jiménez-Alvarado *et al.* 2020)
- 1170 Reefs (Meyers *et al.* 2017)

Environment (Wales) Act

- Seagrass beds (Meyers *et al.* 2017)
- Subtidal sands and gravels (Akyol *et al.* 2015, Meyers et al. 2017, Morey et al. 2019)
- Subtidal mixed muddy sediments (Akyol *et al.* 2015, Meyers *et al.* 2017, Morey *et al.* 2019)
- Saline lagoons (Lapinski and Giovos 2019)

Marine activities in the Welsh Zone

Many activities undertaken in the Welsh Zone require a marine license. Marine licences are considered, determined and issued by NRW on behalf of WG. Licensable activities include: any deposit or removal of material or substance using a vehicle or vessel; construction, alteration or improvement works; scuttling vessels or floating containers; dredging; or incineration of objects or use of explosives. Fishing and most aquaculture activities are exempt from marine licence requirements. The licensing process in Wales is one mechanism where potential impacts on Angelsharks could be considered by developers should the relevant evidence become available. Fishing and most aquaculture activities are exempt from marine license requirements.

EVIDENCE GAPS

Outlined below are the key evidence gaps identified during workshop discussions on Habitat and Environment, specific research questions to address these are in Goal 5.

- The location of Critical Angelshark Areas in the Welsh Zone have not been identified due to limited data on Angelshark ecology and habitat preference.
- Prey species for Angelsharks in Wales have not been specifically identified – current knowledge suggests the species is an ambush predator feeding on a range of demersal fish (Ellis *et al.* 1996).
- Movement of Angelsharks (a) within the Welsh Zone and (b) across the Wider Region has not been investigated to date. Thus, there is very limited information on Angelshark habitat use, movements, seasonality, or connectivity with other populations to inform decisions.
- The potential impact of climate change, sea level rise, and oceanographic cycles on Angelshark occurrence in Wales has not been investigated.
- The impact of different fishing gears on Critical Angelshark Areas has not been investigated (See Goal 2).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POSSIBLE THREATS

- Habitat loss may negatively impact Critical Angelshark Areas.
- Habitat modification may negatively impact Critical Angelshark Areas.
- Change to environmental conditions and/or water quality may negatively impact Angelsharks and Critical Angelshark Areas.

CONSTRAINTS

- Critical Angelshark Areas may be degraded before their importance for Angelsharks is identified; research to identify Critical Angelshark Areas needs prioritisation.
- Assessing the potential impact of marine activities on Angelsharks and Critical Angelshark Areas is restricted due to limited data on Angelshark ecology and their habitat preference in Wales.
- The majority of Angelshark records have been provided by fishers, thus data are biased to areas that are, or were, associated to fishing. This could bias our understanding of what habitats are important for Angelsharks, however it is still likely to be a useful indicator. See Goal 2 for more information.

OBJECTIVES

The priority Objectives outlined below were identified during workshop discussions and should be implemented in concert with conducting further research (detail outlined in Goal 5).

OBJECTIVE TABLE 1: HABITAT AND ENVIRONMENT

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
OBJ.1.1	CRITICAL ANGELSHARK AREAS ARE IDENTIFIED AND ANGELSHARK HABITAT PREFERENCE IS BETTER UNDERSTOOD					
Action 1.1.1	Identify and investigate Critical Angelshark Areas in the Welsh Zone (See Goal 5; RA 1).	To provide the evidence base to enable or support other Actions outlined in this Goal.	H	£££	ASP:W Fishers NGOs RC	Short – Long (Depending on RA)
Action 1.1.2	Conduct research into Angelshark movement and connectivity in the Welsh Zone (See Goal 5; RA 2).	To provide the evidence base to support other Actions outlined in this Goal.	H	£££	ASP:W Fishers NGOs RC	Short – Long (Depending on RA)
Action 1.1.3	Investigate whether Angelsharks are adaptable to large-scale environmental change (See Goal 5; RA 7).	To provide the evidence base to support other Actions outlined in this Goal.	H	£££	Fishers NGOs RC	Short – Long (Depending on RA)
Action 1.1.4	Undertake ground-truthing of benthic habitats at Critical Angelshark Areas where necessary (once Action 1.1.1 complete).	To ensure habitat data are accurate and high confidence for Critical Angelshark Areas to inform Angelshark habitat preferences.	L	££	RC	Long
Action 1.1.5	Conduct a Marine Evidence based Sensitivity Assessment for Angelsharks in Wales (once Action 1.1.1 complete).	To evaluate Angelshark sensitivity to different types of disturbance and assess likelihood of recovery.	L	££	NGOs RC	Long
OBJ.1.2	CONSULTANTS, AGENCIES, DEVELOPERS AND AUTHORITIES INVOLVED IN LICENSABLE ACTIVITIES ARE AWARE OF ANGELSHARK PRESENCE AND PROHIBITED STATUS IN THE WELSH ZONE					
Action 1.2.1	Distribute Wales Angelshark Action Plan and outputs of research to key stakeholders and environmental consultant network.	To demonstrate what is known about Angelsharks to date and inform how Angelsharks are considered in marine licensable activities in the interim (before Action 1.1.1, 1.1.2 and 1.1.3 complete).	H	£	ASP:W GOs NGOs RC	Short
Action 1.2.2	Produce information on how to consider Angelsharks in marine licensable activities and relevant legislation once Action 1.1.1 complete. Distribute to key stakeholders and environmental consultant network.	To ensure Angelshark are considered when assessing marine licensable activities in the Welsh Zone.	M	£	ASP:W GOs	Medium
Action 1.2.3	Evaluate the potential impact of different marine licensable activities on Angelsharks in Wales.	To inform relevant NRW Advisory teams of the potential impact of marine licensable activities on Angelshark populations. This would benefit from Action 1.1.1, 1.1.2 and 1.1.3 being complete.	H	£	ASP:W GOs RC	Long

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
OBJ.1.3	ANGELSHARK DATA ARE INCLUDED ON DATABASES THAT INFORM CONSERVATION AND MANAGEMENT DECISIONS FOR MARINE LICENSABLE ACTIVITIES WHERE APPROPRIATE					
Action 1.3.1	Assess effectiveness of current protective measures for Angelsharks in the Welsh Zone (See Goal 5; RA 6.1, 6.2).	To provide the evidence base to support other Actions outlined in this Objective.	H	£££	Fishers NGOs RC	Short – Long (Depending on RA)
Action 1.3.2	Angelshark data disseminated to WG marine planning portal (LIe), Marine Environmental Data and Information Network (MEDIN), National Biodiversity Network (NBN) Atlas and other relevant databases which can be used in relevant biodiversity and marine planning policy.	To ensure Angelshark evidence is utilised in marine biodiversity and planning policy e.g. MPA management plans.	H	£	ASP:WGOs NGOs RC	Ongoing
Action 1.3.3	Provide Angelshark data outputs to relevant NRW and JNCC teams to be considered when providing advice on current MPAs where relevant in the Welsh Zone.	To ensure Angelsharks are considered in MPA advice where appropriate.	H	££	ASP:WGOs NGOs RC	Ongoing
Action 1.3.4	Provide Angelshark data outputs to relevant NRW and JNCC teams so they can be considered in any possible future MPA designations where appropriate in the Welsh Zone.	To ensure Angelsharks are considered in future MPA designation decisions where appropriate.	H	££	ASP:WGOs NGOs RC	Ongoing
Action 1.3.5	Provide Angelshark data outputs during review of Section 7 species list of the Environment (Wales) Act.	To ensure Angelsharks are considered as part of the Environment (Wales) Act 2016 Section 7 review.	H	£	ASP:WGOs	Short

GOAL 2
FISHERIES

GOAL

Accidental capture of Angelsharks in the Welsh Zone remains minimal and is reported by all fishing sectors, with possible incidental mortality minimised

INTRODUCTION

It is an offence to retain and land Angelsharks in Wales (Table 1). However, Angelsharks are occasionally encountered by recreational and commercial fishers through accidental captures, but are promptly released back in the water. In 2018, ASP:W collaborators developed a best practice guide to support the reporting and safe release of Angelsharks if accidentally caught; this has been distributed to commercial fishing vessels registered in Wales by the Welsh Fisherman's Association (WFA), WG and ASP:W, and to recreational fishers by the Welsh Federation of Sea Anglers (WFSA) and ASP:W.

Commercial fishing vessels registered in Wales

Commercial fishing for a range of fish and shellfish has always been an important industry in Wales. However, in the last 50 years there has been a significant change within the industry, which has led to a large reduction in fleet size (Elliot & Holden, 2018). For example, the over 10 m commercial fleet reduced from 128 vessels registered in 1995 to 30 vessels registered in 2018 (MMO 2018). Until the late 1990s the inshore fleet included a number of trawlers and netters that targeted a range of fin-fish, skate and ray. Today, most commercial fishers operate in inshore waters with vessels under 10 m and are polyvalent (i.e. will use multiple gears to target a range of species depending on the season and availability). Due to a number of factors including the changes in fish quota available, the majority of fishers target crab, lobster and whelks with pots year round, but there are also a limited number of high-value intertidal fisheries for mussels and cockles, seasonal netting for fin-fish and scallop dredging (www.seafish.org).

Commercial fisher catch and positional reporting in Wales varies depending on the size of the vessel, and is the responsibility of the skipper:

- Under 10 m vessels report through sales notes submitted to WG. Currently, there is no statutory requirement to report accidental bycatch, but a new catch reporting app was introduced in February 2020 (more information here). Inshore Vessel Monitoring System (iVMS) will be a mandatory requirement from 2021.
- 10-12 m vessels report through paper logbook records submitted to WG and have a requirement to report all catch (whether target or bycatch). VMS will be a mandatory requirement from 2021.
- Over 12 m vessels are required to report daily through electronic logbooks and have a requirement to report all catch (whether target or bycatch). VMS is installed.


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Commercial vessels not registered in Wales

Currently, a limited number of Belgian, French, Irish and UK commercial vessels are entitled to fish for certain species in specific areas 6 to 12 nm off the Welsh coast, due to historic fishing rights. Other EU commercial vessels can fish in offshore waters of the Welsh Zone, depending on the species, quota and effort allocation (KW/days). Although EU vessels are not subject to UK domestic legislation, which applies to inshore waters (i.e. the UK Wildlife and Countryside Act), the Angelshark remains a Prohibited species under EU Regulation (Table 1). At the end of the Brexit Transition Period (31 December 2020), the UK Fisheries Bill is anticipated to be enacted; this legislation is being finalised over the next 6 months from time of writing and may affect which EU vessels can fish in the Welsh Zone (updates here). WG is responsible for fisheries management in the Welsh Zone.

Recreational fishing in Wales

Recreational fishing remains a popular sport across Wales and uses a variety of techniques: angling from shore or boat is most frequently used, but there is also some spearfishing and recreational netting. There are several charter boats operating in Wales that take paying clients fishing, but there are limited data on the number of these vessels and how this activity has changed over time. Initial ASP:W analyses show that there has been a decline in the number of charter boats operating in Wales, from approximately 72 in 1973 to approximately 40 in 2019 (Barker *et al.* in prep.).

Fishing effort

As most Angelshark records have been provided by recreational and commercial fishers, understanding the changes in fishing effort (e.g. number of fishers and vessels, frequency of fishing, fishing location, type and usage of gear, seasonal changes) is vital to understanding and interpreting potential changes in Angelshark records in the Welsh Zone, and the extent to which records could infer abundance. Unfortunately, there are limited data on Angelshark presence and fishing effort in Wales, making it difficult to accurately understand Angelshark population trends. In addition, there may be large areas of seabed with suitable habitat for Angelsharks that are not fished by recreational or commercial fishers (thus no Angelshark records are provided).

ASP:W Fisher engagement

ASP:W has worked closely with recreational and commercial fishers, the WFSA, WFA and WG to collate Angelshark records. Engagement focused on direct meetings with fishers to build trust, explain reporting and train in best handling practices to safely release Angelsharks if accidentally caught. In addition, Angelshark mucus sampling kits were distributed to specific fishers, to allow genetic data to be collected from accidentally caught Angelsharks using a simple non-invasive sampling technique. Unfortunately, no samples have been taken to date, given the small number of Angelsharks accidentally encountered each year.

EVIDENCE GAPS

Outlined below are the key evidence gaps identified during workshop discussions on fisheries; specific research questions to address these are outlined in Goal 5.

- Angelshark population size and status in the Welsh Zone is unknown.
- It is not fully understood how many Angelsharks are accidentally encountered in the Welsh Zone each year.
- The post-release survival and fate of accidentally caught Angelsharks returned to the water from different fishing methods has not been evaluated. Anecdotal evidence suggests that incidental injury or mortality of Angelsharks will be minimised if fishers follow best practice handling, as they are known to be a hardy species.
- Seasonal susceptibility of accidental Angelshark capture in different fishing gears is not understood.
- The impact of different fishing gears on Angelshark populations and Critical Angelshark Areas has not been investigated.

POSSIBLE THREATS

There is a perception that current type and level of fishing activity in the Welsh Zone is a low risk to Angelsharks, but the following threats are still possible:

- Accidental capture of Angelsharks in recreational fisheries operating in the Welsh Zone leads to possible incidental mortality post-release.
- Accidental Angelshark capture in commercial fisheries operating in the Welsh Zone leads to possible incidental mortality post-release.

CONSTRAINTS

- Fishers may not be aware of the protected status of Angelsharks in the Welsh Zone, especially those not contacted by ASP:W team to date. Several other initiatives have been developed to increase knowledge of wider fisheries regulation/legislation across national borders:
    - Shark Trust Fisheries Advisories for elasmobranchs (available in multiple languages)
    - SeaFish Kingfisher Information Service project on MPA mapping for fishermen
- Fishers may not be aware that as a Prohibited species, all Angelsharks released after accidental capture have to be reported in accordance with EU regulation, including those under 50 kg in weight due to Regulation (EU) No. 2015/812 for vessels over 10 m in length (see Legislation section for more information).
- Angelsharks are known by 16 names in Wales, with Angelshark and monkfish commonly used across the country. Monkfish is also used as the common name of *Lophius* species (anglerfish), which might impact catch statistics e.g. ICES landing data from 1997 has been identified as likely mis-recorded anglerfish (ICES 2008).


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OBJECTIVES

The priority Objectives outlined below were identified during workshop discussions and should be implemented in concert with conducting further research (detail outlined in Goal 5).

OBJECTIVE TABLE 2: FISHERIES

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
OBJ. 2.1	**MINIMISE POSSIBLE INCIDENTAL ANGELSHARK MORTALITY FROM ACCIDENTAL CAPTURE IN FISHERIES OPERATING IN THE WELSH ZONE (LINKED WITH RA 5)**					
Action 2.1.1	Understand the fate of accidentally caught Angelsharks returned to the water through research (See Goal 5; RA 5).	To provide the evidence base to support other Actions outlined in this Objective.	H	£££	ASP:W Fishers NGOs RC	Short – Long (Depending on RA)
Action 2.1.2	Complete a national stakeholder mapping exercise to prioritise where best to disseminate information on Angelshark best practice handling and reporting (Action 2.1.4, 2.1.5) and mucus sampling (Action 2.3.3) to reach the greatest number of commercial and recreational fishers.	To identify different stakeholder groups within Wales and the Wider Region ensuring efficient communication channels and information dissemination.	H	£	ASP:W Fishers GOs NGOs	Short
Action 2.1.3	Coordinate engagement with any country with a right to fish in the Welsh Zone to collate records and minimise incidental Angelshark mortality with partners identified in Action 4.1.1.	To develop an Angelshark focused network between Wider Region countries enabling efficient sharing of information, knowledge, research.	H	££	ASP:W Fishers GOs NGOs	Short
Action 2.1.4	Inform commercial fishers operating in the Welsh Zone about Angelshark prohibited status, best practice handling and reporting (including discard reporting requirements) through associations identified in 2.1.2 and 2.1.3 and direct meetings.	To build on fisher-scientist relationships developed as part of ASP:W to minimise possible incidental Angelshark mortality.	H	££	ASP:W Fishers GOs NGOs	Ongoing
Action 2.1.5	Inform recreational fishers operating in the Welsh Zone about Angelshark protected status, best practice handling and reporting through associations identified in 2.1.2 and 2.1.3 and direct meetings.	To build on fisher-scientist relationships developed as part of ASP:W to minimise possible incidental Angelshark mortality.	H	££	ASP:W Fishers GOs NGOs	Ongoing
OBJ. 2.2	**ALL ACCIDENTAL ANGELSHARK CAPTURES IN THE WELSH ZONE REPORTED TO THE ANGEL SHARK SIGHTINGS MAP (LINKED WITH RA 1-5)**					
Action 2.2.1	Highlight importance of reporting accidental captures as part of Actions in Obj. 2.1.	To encourage future reporting of accidental Angelshark catch.	H	££	ASP:W Fishers NGOs GOs	Short
Action 2.2.2	Angelshark included in catch reporting app being rolled out to under 10m vessels in 2020.	To ensure accurate and regular reporting through existing and upcoming systems.	H	£	ASP:W GOs	Short

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
Action 2.2.3	MMO and WG provide Angelshark catch data on request for submission on to the Angel Shark Sightings Map. Data provided in Action 1.2.1 where appropriate.	To ensure all records are collated in a central system for robust analyses.	H	£	ASP:W GOs	Short
OBJ. 2.3	**COMMERCIAL AND RECREATIONAL FISHERS OPERATING IN THE WELSH ZONE INVOLVED WITH ANGELSHARK RESEARCH**					
Action 2.3.1	Research Actions completed with commercial and recreational fishers (where practicable and feasible) to enable fisher-led data collection (See Goal 5; RA 3,4,5).	To involve commercial and recreational fishers in research to understand Angelshark ecology in Wales.	M	££	ASP:W Fishers GOs NGOs RC	Ongoing
Action 2.3.2	Regularly feedback to commercial and recreational fishers how data are being used and results of any analyses (including use of accidental catch reporting data from Obj 2.2).	To encourage future involvement in research and reporting of accidental Angelshark catch.	H	££	ASP:W Fishers GOs NGOs RC	Ongoing
Action 2.3.3	Expand fisher-led mucus sampling programme as part of ASP:W project with specific named recreational fishers or commercial fishing vessels (subject to appropriate scientific derogations and licensing, as required).	To gather genetic data from accidentally encountered Angelsharks for molecular analyses (see RA 2.2, 2.3, 2.4).	H	£	ASP:W Fishers RC	Ongoing
OBJ. 2.4	**[ONLY IF RESULTS OF RESEARCH IN GOAL 5 IDENTIFIED A FISHING METHOD WITH HIGH LEVELS OF ANGELSHARK MORTALITY]: IDENTIFY WHETHER ADAPTATION TO FISHING PRACTICES COULD REDUCE ANGELSHARK MORTALITY**					
Action 2.4.1	Improve understanding of seasonal susceptibility of Angelsharks to capture and the fate of those encounters through research (See Goal 5; RA 3,5). Linked with Action 2.1.1.	To provide the evidence base to support other Actions outlined in this Objective.	H	£££	ASP:W Fishers NGOs RC	Short – Long (Depending on RA)
Action 2.4.2	If a fishing activity showed high levels of Angelshark mortality, assess the options for gear modification and/or changes to fishing behaviour and fishing activity to reduce Angelshark mortality.	NB: This Action will not be needed unless a high level of Angelshark mortality is identified. Using the results of RA 3 and 5.1, conduct focused research to understand if gear modifications and/or changes to fisheries could reduce Angelshark mortality.	M	£££	ASP:W Fishers GOs NGOs RC	Long (only if identified as necessary)

GOAL 3
COMMUNITY

GOAL

Coastal communities learn about the importance of Angelsharks in Wales through promotion as a flagship species

INTRODUCTION

Angelsharks as a flagship species

The Angelshark is a rare and charismatic species, which plays an important role in Wales' maritime heritage. Angelsharks could be used as an exciting flagship to promote the importance of the Welsh Zone for other shark, skate and ray species. This could cultivate an appreciation of the underwater marine environment with audiences who have yet to discover this part of Wales' natural heritage. Through working closely with target communities, further information of Angelsharks can be discovered and shared to help raise the profile of Angelsharks in Wales and deliver the Action Plan.

Over 60% of the population of Wales live and work in coastal regions, with all of Wales' major cities located on the coast (WWF Cymru 2012). In addition, Wales' coastline is the most popular visitor destination for tourists visiting Wales (Visit Wales, 2017). This provides an exciting opportunity to reach a large number of people living, working or visiting Wales with Angelshark engagement.

ASP:W community outcomes

Working with communities during ASP:W has been an essential process in gathering records to better understand Angelsharks in the Welsh Zone and increase knowledge of this species. Alongside taking part in events with project partners, ASP:W developed a series of five Angelshark history roadshows to provide an opportunity for communities to share their Angelshark stories. A press release to launch the roadshow reached over 40 million people; 500 people attended the roadshows and shared important data including 135 Angelshark records. To expand on the historic data collection, a team of 15 citizen scientists were recruited and trained to scour through libraries, archives and museums revealing a further 158 Angelshark records (Barker *et al.* in prep.).

To inspire the next generation, ASP:W developed the Angels of Wales eBook, launched in May 2020. This interactive eBook was designed for 7 to 11 year olds, bringing together project findings to share information on Angelshark ecology and history, Welsh maritime heritage and how people are working together to safeguard the future of this species. Key information from the eBook has also been transformed into display exhibits for local maritime museums.

Policy drivers important for working with communities

The Well-being of Future Generations (Wales) Act was launched in 2015 to provide the ambition, permission and legal obligation to improve social, cultural, environmental and economic well-being in Wales. Three elements of the Act closely align with this Goal:

- A resilient Wales: "*A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change.*"

- A Wales of vibrant culture and thriving Welsh language: "*A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.*"
- A globally responsible Wales: "*A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.*"

The National Curriculum for Wales 2022 is the first major overhaul of the curriculum in 30 years. It is divided into six areas of learning and experience: Expressive Arts; Health and Well-being; Humanities; Languages, Literacy and Communication; Mathematics and Numeracy; Science and Technology. It is important that any outputs focused on schools or schoolchildren align with this new curriculum, as done for the Angels of Wales eBook.

Target audiences

During the Action Plan Workshop, participants identified eight target audiences to focus Angelshark engagement:

- **Commercial and recreational fishers** – Fishers operating in the Welsh Zone and Wider Region have the greatest chance of accidentally encountering an Angelshark, thus working with the fishing community is of upmost importance. Fisher engagement is included within Goal 2 and Goal 4, and not duplicated in this Goal.
- **NGO volunteers in Wales** – For example, The North Wales Wildlife Trust (NWWT) and The Wildlife Trust of South and West Wales (WTSWW) have a number of volunteering opportunities and local groups, which would be interested in Angelshark-focused activities.
- **Users of the Wales Coast Path** – Wales is the first country to have a dedicated footpath that hugs the entire coastline, and it is estimated that 23,688 people walk on the Wales Coast Path every week (Natural Resources Wales, 2014).
- **Children and young people (aged 7 to 24)** – Wales had the UK's lowest average scores in a report evaluating children's connection to nature (RSPB, 2013). Should children continue to be disconnected from nature, the natural world will be under far greater threat.
- **Visitors to museums and aquaria in Wales, and nearby** – Wales has a large network of local maritime and heritage museums across the country, bolstered by the National Museum Wales network, which includes the National Waterfront Museum in Swansea. There are currently two aquaria in Wales (Anglesey Sea Zoo (that used to house an Angelshark) and Rhyl SeaQuarium), with two other aquaria (Blue Planet Aquarium and Bristol Aquarium) just across the border.
- **Divers and snorkellers in Wales** – Divers and snorkellers in Wales may encounter Angelsharks, thus should be engaged and learn about the ASP:W Angelshark Code of Conduct for scuba and snorkel.
- **Coastal Communities living in Wales** – 75% of people living in Wales agreed that the Welsh coast is an important part of their life (WWF Cymru, 2012), however few people are aware of the habitats and species found under the water's surface.
- **Visitors to the coast from the rest of Great Britain** – Each year Wales welcomes over 10 million overnight visits and 95.7 million day visits from GB residents. Only 941,000 trips are taken annually by international visitors (Welsh Government Tourism Research, 2019).

OBJECTIVES

The priority Objectives outlined below were identified during workshop discussions and should be implemented in concert with conducting further research (detail outlined in Goal 5).

OBJECTIVE TABLE 3: COMMUNITY

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
OBJ. 3.1	**NGO VOLUNTEER NETWORK HELP TO GATHER ANGELSHARK RECORDS IN WALES**					
Action 3.1.1	Develop and distribute an Angelshark citizen science pack, to show how volunteers can help gather Angelshark records, with NGOs and MLAAs across Wales.	To outline how NGO or MLAA volunteer networks can help gather Angelshark records and contribute to the Action Plan.	M	£	ASP:W MLAAs NGOs	Short
Action 3.1.2	Work alongside NGOs and MLAAs to deliver Angelshark focused citizen science projects with their volunteer network.	To provide volunteers with an opportunity to gather Angelshark records from MLAAs.	M	££	ASP:W NGOs MLAAs	Medium
OBJ. 3.2	**USERS OF THE WALES COASTAL PATH ARE AWARE OF ANGELSHARK PRESENCE IN THE WELSH ZONE**					
Action 3.2.1	Develop an Angelshark poster or sign to be added at key sections of the Wales Coast Path.	To educate coastal path users of Angelshark presence, protected status and encourage people to share any records in the Welsh Zones.	L	££	ASP:W NGOs GOs	Medium
OBJ. 3.3	**SCHOOLCHILDREN LEARN ABOUT ANGELSHARKS DURING FOCUSED LESSONS IN COASTAL PRIMARY SCHOOLS**					
Action 3.3.1	Gather feedback from teachers to identify what materials they would find useful to complement the Angels of Wales eBook.	To support teachers in using the Angels of Wales eBook as part of their lesson plans.	M	££	ASP:W ELs	Medium
Action 3.3.2	Develop these materials and distribute to teachers/schools/ education resources sites alongside the eBook.	To increase the number of schools using the Angels of Wales eBook.	M	££	ASP:W EIs NGOs	Medium
OBJ. 3.4	**YOUNG PEOPLE LEARN ABOUT THE IMPORTANCE OF WALES FOR ANGELSHARKS AND PROMOTE IT AS A CHAMPION SPECIES**					
Action 3.4.1	Develop new opportunities for young people to join Angelshark focused activities with partner groups (e.g. WFSA Youth team).	To target and educate young people about Angelsharks in Wales outside of the classroom, providing skill development and focussed activity opportunities.	M	££	ELs Fishers NGOs	Medium
Action 3.4.2	NWWT Youth Forum works with local politicians to encourage Angelsharks to be listed as a champion species in the Welsh Assembly via the Wales Environmental Link initiative.	To educate and inform the public and politicians of the importance of Angelsharks though championing the species, and dissemination of the Action Plan across the Welsh Assembly Government via the NWWT Our Wild Coast forum and Environmental Link Initiative.	M	££	NGOs	Short

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
OBJ. 3.5	**VISITORS TO MUSEUMS, LIBRARIES, ARCHIVES AND AQUARIA (MLAAS) LEARN ABOUT THE IMPORTANCE OF WALES FOR ANGELSHARKS**					
Action 3.5.1	Develop and distribute Angelshark information leaflets for display at MLAAs, focusing on Angelsharks being a flagship species for Wales.	To educate and inform members of the public about Angelsharks, protected status, historic research, where to report records, the eBook and other relevant information gathered on Angelsharks in the Welsh Zone.	M	££	ASP:W MLAAS NGOs	Medium
Action 3.5.2	Print and distribute further ASP:W display banners for MLAAs in Wales.	To educate and inform members of the public about Angelsharks, protected status, history research, where to report records, the eBook and other relevant information gathered on Angelsharks in the Welsh Zone.	M	£	ASP:W MLAAS	Short
Action 3.5.3	Create permanent or semi-permanent Angelshark exhibit for MLAAs in Wales.	To educate and inform members of the public about Angelsharks, protected status, history research, where to report records, the eBook and other relevant information gathered on Angelsharks in the Welsh Zone.	L	£££	ASP:W MLAAS NGOs	Long
OBJ. 3.6	**DIVERS AND SNORKELLERS IN THE WELSH ZONE FOLLOW THE ANGELSHARK CODE OF CONDUCT**					
Action 3.6.1	Angelshark Code of Conduct shared with local diving clubs and SeaSearch volunteer network.	To educate snorkellers and divers on how to identify and safely behave with Angelsharks if encountered in the Welsh Zone, and how they can contribute to sightings scheme.	H	£	ASP:W NGOs	Short
OBJ. 3.7	**COASTAL COMMUNITIES AND VISITORS TO WALES KNOW THAT ANGELSHARKS ARE PRESENT IN WELSH ZONE**					
Action 3.7.1	Social media campaign developed to promote Angelsharks as a flagship species for Wales.	To educate social media users of the importance of Wales for Angelsharks, enabling greater dissemination of Angelshark information across Wales.	L	£££	NGOs	Short
Action 3.7.2	Press releases developed to launch key outputs of Angelshark research or projects.	To include information on Angelsharks in local and national press (print, radio, TV) and inform coastal communities and visitors to Wales that Angelsharks are present in the Welsh Zone.	M	£	All Partners	Short
OBJ. 3.8	**EVALUATE THE IMPACT THAT ANGELSHARK ENGAGEMENT IS HAVING WITH TARGET COMMUNITIES**					
Action 3.8.1	Investigate behaviour change associated with greater Angelshark knowledge (See Goal 5; RA 8).	To understand the impact of community engagement and increased knowledge that Angelsharks are present in the Welsh Zone.	M	££	ASP:W MLAAs NGOs RC	Long

GOAL 4
ANGELSHARK CONNECTIVITY

GOAL

Angelshark population connectivity in the Welsh Zone and Wider Region is understood through stakeholder collaboration

INTRODUCTION

Angelsharks in the Wider Region

Historically, Angelsharks were found throughout the Northeast Atlantic and Mediterranean Sea (Morey *et al.* 2019), but their range has declined by approximately 58% in the last century (Lawson *et al.* 2020). The Canary Islands have been identified as a unique stronghold for this species (Barker *et al.* 2016) and there are scattered reports of Angelsharks across the Mediterranean (Gordon *et al.* 2019).

In the context of this Action Plan, the Wider Region is defined by the Exclusive Economic Zone (EEZ) of the UK, Belgium, France, Netherlands and Ireland (Figure 3). Recent research has indicated that mortality from fisheries may have led to local Angelshark declines in other parts of the Wider Region. A combination of incidental mortality in commercial fisheries and historical angling retention were identified to be major factors leading to Angelshark declines in Ireland (Shephard *et al.* 2019), whilst the decline of Angelsharks in the Southern North Sea occurred at a time of introduction of engine-powered fisheries, especially diesel-powered-beam-trawlers (Bom *et al.* 2020). Angelsharks are considered to be locally extinct in the North Sea (ICES 2005) and are infrequently encountered in other parts of the Wider Region.

Angelshark Connectivity

Connectivity of Angelsharks between the Welsh Zone and the Wider Region is currently unknown. However, it is thought that Angelsharks are likely to move between country jurisdictions in the Wider Region, and thus threats in the Wider Region could impact the Angelshark population(s) in Wales. Through collaborative working in the Wider Region, a better understanding of Angelshark connectivity can be obtained (see Goal 5; RA 2). In addition, collaboration in the Wider Region would help engage with EU fisheries operating in the Welsh Zone (See Goal 2).

The UK left the EU on 31 January 2020 through ratification of the withdrawal agreement; at time of writing we are in a “transition period” for UK-EU negotiations to determine the future relationship, with the transition period ending on 31 December 2020. As such, the UK Fisheries Bill is anticipated to be enacted and may affect which EU vessels can fish in the Welsh Zone.

EVIDENCE GAPS

- Angelshark movement and connectivity in the Wider Region is unknown.
- Movement of Angelsharks have not been investigated in the Welsh Zone, and there are limited data for the Wider Region. A visual ID tagging study completed by the Central Fisheries board in Ireland showed that 96% (n = 179) of Angelshark recaptures remained in Irish coastal waters, suggesting a localised distribution of this species (Quigley, 2006).
- There is very limited data on Angelshark habitat use, movements, seasonality, or connectivity with other populations to inform decisions.

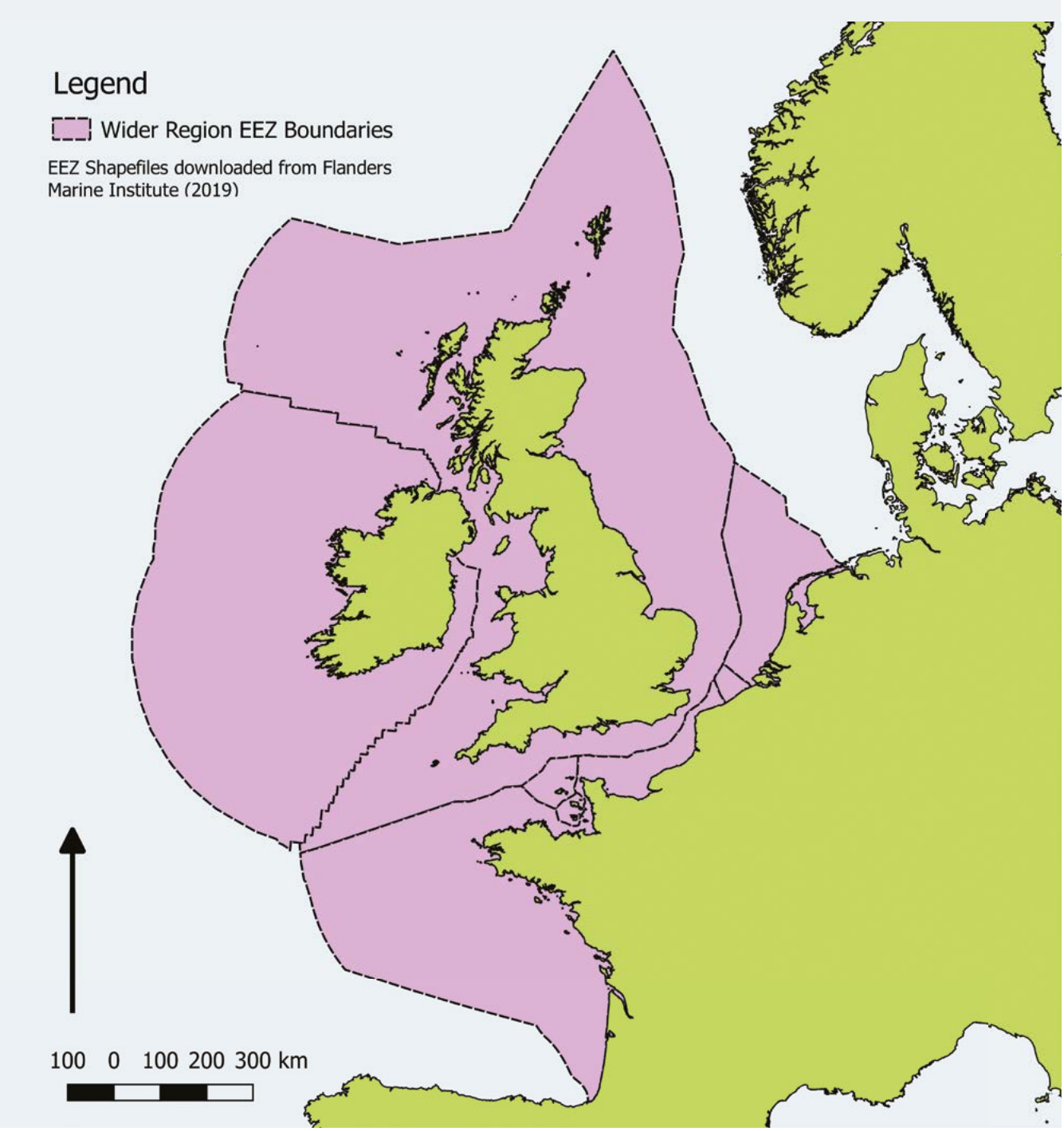
POSSIBLE THREATS

- Accidental capture of Angelsharks in commercial and recreational fisheries operating in the Wider Region leads to possible incidental mortality post-release.
- Habitat loss or modification in the Wider Region may negatively impact Angelsharks.

CONSTRAINTS

- Constraints outlined for Goal 1 and 2 are also applicable to the Wider Region.
- Greater resources and effort are needed to distribute Angelshark-focused materials across the Wider Region, due to the increased geographic area and different languages, unless a communication structure can be identified.

FIGURE 3: "Wider Region" is delineated by the purple region in this map. This is the Exclusive Economic Zone (EEZ) of the UK, Belgium, France, Netherlands and Ireland.



OBJECTIVES

The priority Objectives outlined below were identified during workshop discussions and should be implemented in concert with conducting further research (detail outlined in Goal 5).

OBJECTIVE TABLE 4: ANGELSHARK CONNECTIVITY

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
OBJ. 4.1	**IMPROVED UNDERSTANDING OF ANGELSHARK PRESENCE AND THREATS IN THE WIDER REGION THROUGH DELIVERY OF ANGELSHARK-FOCUSED WORK BY LOCAL PARTNERS**					
Action 4.1.1	Identify local partners interested in starting/building on Angelshark-focused activities in Wider Region countries.	To develop a network of partners interested in delivering Angelshark-focused activities using comparable techniques.	L	££	ASCN Fishers NGOs	Short
Action 4.1.2	Develop Angelshark information pack with best practices, advisory material on legislation, and advice to enable replication of similar initiatives to ASP:W in other regions.	To share advice and techniques to better understand Angelsharks in the Wider Region to develop potential partnership projects.	L	£	ASCN Fishers NGOs	Short
Action 4.1.3	Support identified local partners in securing funding and develop Angelshark-focused country initiatives.	To conduct comparable angel shark research and conservation across the Wider Region.	M	£££	ASCN Fishers NGOs	Medium
Action 4.1.4	Assess effectiveness of current protective measures for Angelsharks in the Wider Region (See Goal 5; RA 6.3 and 6.4).	To provide the evidence base to support other Actions outlined in this Objective.	H	£££	Fishers NGOs RC	Short – Long (Depending on RA)
OBJ. 4.2	**INCIDENTAL MORTALITY OF ANGELSHARKS CAUGHT IN THE WIDER REGION MINIMISED AND REPORTING COORDINATED**					
Action 4.2.1	Inform commercial fishers operating in the Wider Region about Angelshark status, best practice handling and reporting (including discard reporting requirements) through associations identified in 2.1.3 and partners identified in 4.1.1.	To reach a wider sub-set of fishers to coordinate reporting and minimise incidental Angelshark mortality in the Wider Region.	H	£	ASCN Fishers GOs NGOs	Short
Action 4.2.2	Inform recreational fishers operating in the Wider Region about Angelshark status, best practice handling and reporting through associations identified in 2.1.3 and partners identified in 4.1.1.	To reach a wider sub-set of fishers to coordinate reporting and minimise incidental Angelshark mortality in the Wider Region.	H	£	ASCN Fishers GOs NGOs	Short

Ref	Description	What it will achieve	Priority	Cost	Who to complete	Timeline
OBJ. 4.3	**FISHER-LED RESEARCH ENABLES IMPROVED UNDERSTANDING OF ANGELSHARK CONNECTIVITY IN THE WIDER REGION**					
Action 4.3.1	Expand fisher-led mucus sampling programme as part of ASP:W project with specific named recreational fishers or commercial fishing vessels at priority ports in the Wider Region, with partners identified in 4.1.1. (Subject to appropriate scientific derogations and licensing, as required).	To gather genetic data from accidentally encountered Angelsharks for molecular analyses (see RA 2.2, 2.3, 2.4).	H	£	ASP:W Fishers RC	Ongoing
Action 4.3.2	Investigate Angelshark movement and connectivity through research (see Goal 5; RA 2).	To provide the evidence base to support other Actions outlined in this Objective.	H	£££	ASP:W Fishers NGOs RC	Short – Long (Depending on RA)
OBJ. 4.4	**NORTHEAST ATLANTIC ANGEL SHARK ACTION PLAN DEVELOPED WITH PARTNERS TO IDENTIFY PRIORITY ACTIONS IN THE WIDER REGION AND BEYOND**					
Action 4.4.1	Develop schedule for Northeast Atlantic Angel Shark Action Plan development with Wider Region partners.	To identify when and where the Action Plan workshop will take place.	M	££	ASCN GOs NGOs	Medium
Action 4.4.2	Action Plan Workshop conducted and document published.	To develop Northeast Atlantic Angel Shark Action Plan; link with other angel shark focused strategies and action plans across the Eastern Atlantic and Mediterranean Sea.	M	££	ASCN GOs NGOs	Long

GOAL 5
EVIDENCE GAPS

GOAL

Priority evidence gaps identified in the Action Plan Goals addressed through focused research

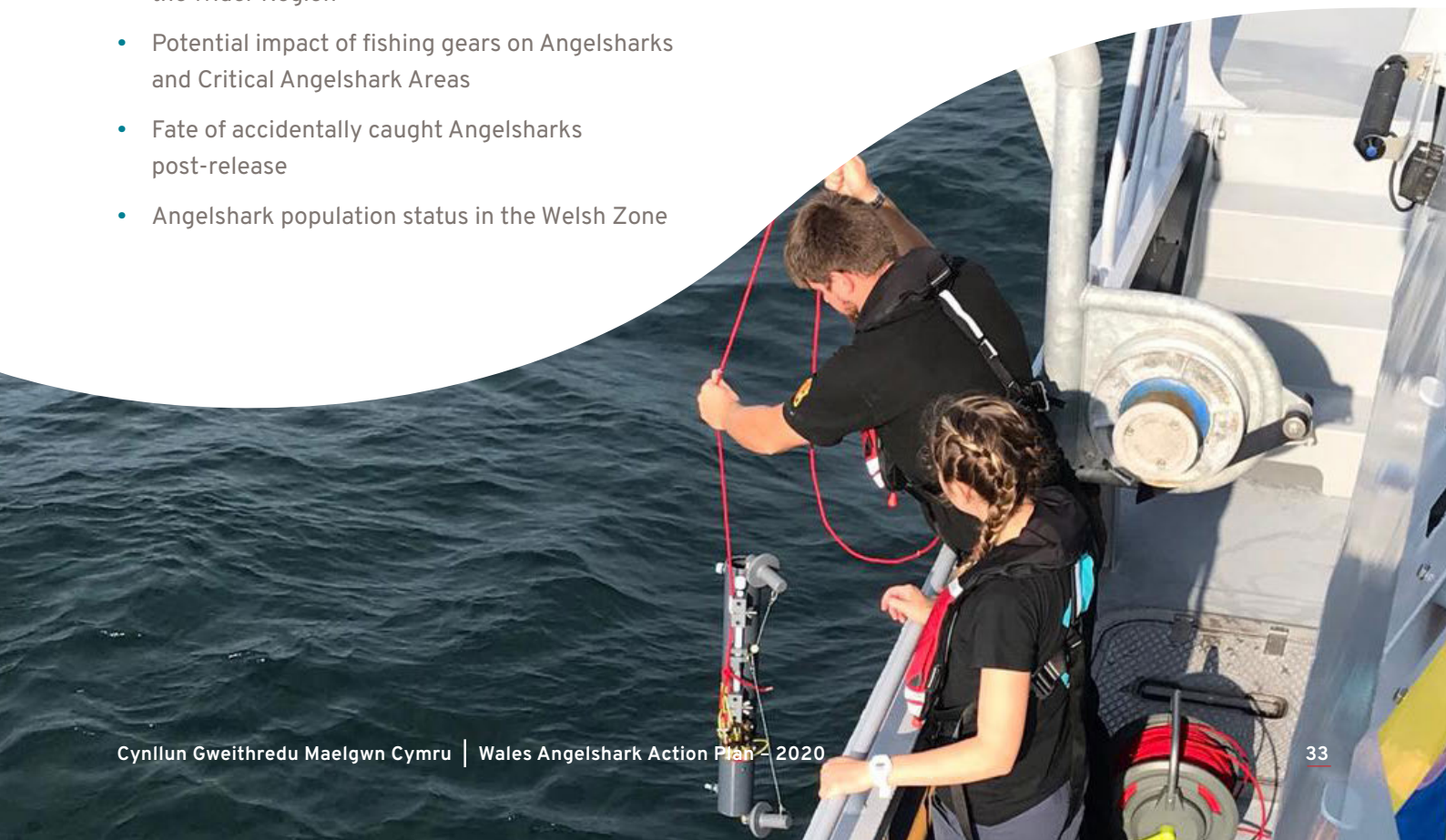
INTRODUCTION

Current understanding of Angelshark biology and ecology in the Welsh Zone is in its infancy. Only two projects have focused on Angelsharks in Wales to date – ASP:W (started in 2017) and a Bangor University study in 2018 (Hiddink *et al.* 2019). As outlined in the Evidence Gaps under each Goal, there are very limited data on Angelshark ecology and threats across all life stages. Key evidence gaps include:

- Angelshark habitat use and movement in the Welsh Zone
- Angelshark connectivity in the Welsh Zone and the Wider Region
- Potential impact of fishing gears on Angelsharks and Critical Angelshark Areas
- Fate of accidentally caught Angelsharks post-release
- Angelshark population status in the Welsh Zone

The research plan below lists the priority Research Areas (RA) needed to address these evidence gaps identified through the Action Plan Goals, to help us to make informed decisions to safeguard Angelsharks in Wales into the future. We encourage science-based departments, institutes and organisations to work together to deliver priority research on Angelsharks in Wales. ASP:W intends to host a Research Group in the future to enable collaboration, share research outputs and monitor progress towards the research plan.

Each RA has been broken down into priority research questions, with further detail provided in a separate column alongside priority, cost and timeline ratings (see p. 14 for more detail). This has been designed to encourage development of specific research methodology, but also to reflect that research will be incremental and results of one study will inform how to progress into the future. As such, this list is not exhaustive, but was developed from discussions during the Action Plan workshops to identify the most important research questions to address based on current knowledge.



OBJECTIVES

The priority Objectives outlined below were identified during workshop discussions and should be implemented in concert with conducting further research (detail outlined in Goal 5).

OBJECTIVE TABLE 5: RESEARCH TO FILL EVIDENCE GAPS

Ref	Research Question	Further detail	Priority	Cost	Goal linked to	Timeline
RA 1: IDENTIFICATION AND INVESTIGATION OF CRITICAL ANGELSHARK AREAS IN WALES						
RA 1.1	Where are juvenile Angelsharks present in Wales?	Analysis of Angelshark records to identify important areas for juvenile Angelsharks – use this to conduct focused research at these areas to investigate whether it is being used as a breeding area or nursery area (as defined by Heupel *et al.* 2007).	H	££	Goal 1	Medium
RA 1.2	What are the environmental conditions and habitats associated with Angelshark breeding and/or nursery areas in Wales?	Identification of breeding areas and/or nursery areas in the Welsh Zone (RA 1.1), will enable focused research into the environmental conditions and habitats present and investigations into what is driving this behaviour.	H	£££	Goal 1	Long
RA 1.3	What is the distribution of adult Angelsharks in the Welsh Zone and do they aggregate in particular areas?	Identify possible locations of Critical Angelshark Areas for adult Angelshark (e.g. possible mating areas or overwintering areas) using fisher-records and focused research.	H	£££	Goal 1	Medium
RA 1.4	What are the environment and habitat drivers for adult Angelshark distribution?	Identification of adult Angelshark distribution in Wales (RA 1.3), will enable further research into the environment and habitat drivers for Angelshark aggregations of key life history events.	M	££	Goal 1	Long
RA 1.5	Where are Angelsharks not present in the Welsh Zone?	Collate data available from repeat surveys and/or fisheries in the Welsh Zone where no Angelsharks have been encountered. Use this to help assess environment/habitat preference alongside RA 1.2 and RA 1.4.	H	£	Goal 1 & 2	Short
RA 1.6	Are there Critical Angelshark Areas in the Welsh Zone not identified via current surveys and/or fisheries?	Once important habitat and/or environmental conditions have been identified for Critical Angelshark Areas (RA 1.2 and RA 1.4.), conduct Species Distribution Modelling to predict location of other possible Critical Angelshark Areas in the Welsh Zone (not currently covered by fisheries/surveys) to help focus future research.	L	££	Goal 1 & 2	Long
RA 1.7	What are the main threats at Critical Angelshark Areas?	Identification of Critical Angelshark Areas (RA 1.1 to 1.4), will enable better assessment of the potential impact of threats at these locations.	H	£	Goals 1&2	Long

Ref	Research Question	Further detail	Priority	Cost	Goal linked to	Timeline
RA 2: INVESTIGATE ANGELSHARK MOVEMENT AND CONNECTIVITY						
RA 2.1	How do Angelsharks move in the Welsh Zone?	Determine whether Angelsharks are present throughout the year and/or complete all stages of their life history in the Welsh Zone (using outcomes of RA 1). Data on seasonal/repeat movements in the Welsh Zone will help to demonstrate this and inform future focused research around movement.	H	£££	Goals 1&2	Short
RA 2.2	Do Angelsharks move between the Welsh Zone and the Wider Region?	Investigate connectivity between Angelsharks across the Wider Region and the importance and/or function of the population(s) in the Welsh Zone. Identify whether Angelsharks are resident in the Welsh Zone.	H	£££	Goals 1, 2 & 4	Short
RA 2.3	What are the environmental drivers for Angelshark movement?	Identification of Angelshark movement (RA 2.1, 2.2), will enable further research into the environmental drivers for Angelshark movement.	M	££	Goal 1	Long
RA 2.4	Are Angelsharks present in the Welsh Zone and the Wider Region genetically related?	Genetic study to further investigate connectivity; specifically, whether Angelsharks in Wales are isolated, sink population, source population or part of a metapopulation across the Wider Region). Links with RA 2.2.	H	£££	Goals 2&4	Short
RA 2.5	What is the genetic structure of Angelsharks in Wales?	Population genetics study – could link with RA 2.2 and 2.3.	M	£££	Goals 2&4	Long
RA 3: IMPROVE UNDERSTANDING OF SEASONAL SUSCEPTIBILITY OF ACCIDENTAL ANGELSHARK CAPTURE IN CURRENT FISHERIES OPERATING IN THE WELSH ZONE						
RA 3.1	What is the current level of commercial fishing effort in the Welsh Zone?	Understand commercial fishing effort from 2018 onwards.	H	£	Goal 2	Short
RA 3.2	What is the current level of recreational fishing effort in the Welsh Zone?	Understand number of recreational fishers; type of gear used; how gear is fished; spatial/temporal changes in how gear used from 2018 onwards.	H	££	Goal 2	Medium
RA 3.3	What is the current level of charter boat fishing effort in the Welsh Zone?	Understand number of charter boat fishers; type of gear used; how gear is fished; spatial/temporal changes in how gear used from 2018 onwards.	H	££	Goal 2	Short
RA 3.4	How do different types of fishing affect probability of catching an Angelshark?	Using results of RA 3.1, 3.2, 3.3 alongside Angelshark records to investigate the probability of Angelshark catch in each fishing method and/or gear type.	H	£	Goal 2 & 4	Medium

Ref	Research Question	Further detail	Priority	Cost	Goal linked to	Timeline
RA 4: INVESTIGATE HOW FISHING EFFORT HAS CHANGED IN WALES TO UNDERSTAND THE STATUS OF ANGELSHARKS						
RA 4.1	How has commercial fishing effort changed in the Welsh Zone over the last 100 years?	Use Sea Fisheries Committee minutes and other historic databases to evaluate changes in historic commercial fishing effort across Wales.	L	££	Goal 2	Short
RA 4.2	How has recreational fishing effort changed in the Welsh Zone over the last 100 years?	Use fisher magazines, club memberships and complementary information to assess change in historic recreational fishing effort.	L	££	Goal 2	Short
RA 4.3	How has charter boat fishing effort changed in the Welsh Zone over the last 100 years?	Use fisher magazines, vessel registrations, advertisements and complementary information to assess change in historic charter boat fishing effort.	L	££	Goal 2	Short
RA 4.4	How have Angelshark records in the Welsh Zone changed over the last 100 years?	Collate information on fishing gear used, historic Angelshark data, fishing effort data (outputs of RA 3, 4.1, 4.2, 4.3) and datasets with no Angelshark records to investigate historic changes to Angelshark.	L	££	Goal 2	Medium
RA 5: UNDERSTAND THE FATE OF ACCIDENTALLY CAUGHT ANGELSHARKS RETURNED TO THE WATER						
RA 5.1	What is the level of incidental Angelshark injury or mortality from accidental capture in fishing gears used in the Welsh Zone?	Focused tagging study to understand whether Angelsharks are injured or survive being released after accidental capture and how different gear types/ usage affect survival. Results of RA 2 and 3 could be used to design study.	M	£££	Goal 2	Long
RA 5.2	If a recreational or commercial fishing activity showed high levels of Angelshark mortality, what options are there for changes to fishing activity or gear modification and/or to reduce Angelshark mortality?	NB: This Action will not be needed unless a high level of Angelshark mortality is identified. Using the results of RA 3 and 5.1, conduct focused research to understand if gear modifications and/or changes to fisheries could reduce Angelshark mortality.	L	£££	Goal 2	Short
RA 6: ASSESS TO WHAT EXTENT ANGELSHARKS ARE ALREADY PROTECTED IN THE WELSH ZONE AND THE WIDER REGION IN RELATION TO NON-FISHERIES-RELATED MARINE ACTIVITIES						
RA 6.1	Assess to what extent Angelsharks have de-facto protection from the MPA network designated in the Welsh Zone and the Wider Region?	Identify overlap of Critical Angelshark Areas (RA 1) with already designated MPAs and assess whether the MPA management measures offer de-facto protection for Angelsharks.	H	££	Goals 1&2	Long

Ref	Research Question	Further detail	Priority	Cost	Goal linked to	Timeline
RA 6.2	Are there opportunities to improve current management measures to better protect Angelsharks in the Welsh Zone in relation to non-fisheries-related marine activities?	Using the results of 6.1, assess whether additional management measure are needed to better protect Angelsharks in the Welsh Zone and what they would involve.	H	££	Goals 1&2	Long
RA 6.3	To what extent do existing management measures offer protection to Angelsharks in the Wider Region in relation to non-fisheries-related marine activities?	Identify overlap of Angelshark hotspots with MPAs in the Wider Region; assess coverage and whether they offer de-facto protection for Angelsharks in the Wider Region. Use results to identify opportunities to improve domestic protection via the anticipated North East Atlantic Action Plan (Objective 4.3).	M	££	Goals 1&2	Medium
RA 6.4	To what extent do threats in the Wider Region affect Angelshark population(s) in Wales?	Look at the possible impact of habitat loss and fisheries in the Wider Region and how this might impact the Angelshark population(s) found in Wales, once connectivity better understood (RA 2).	M	££	Goals 1, 2 & 4	Medium
RA 7: INVESTIGATE WHETHER ANGELSHARKS ARE ADAPTABLE TO LARGE-SCALE ENVIRONMENTAL CHANGE						
RA 7.1	Do Angelsharks show behavioural flexibility with regard to Critical Angelshark Areas?	Using results of RA 1 and 2, assess whether Angelsharks show adaptability / flexibility for different habitats and/or features based on environmental conditions and possible changes to prey present.	M	££	Goals 1&2	Long
RA 7.2	How will large-scale environmental changes impact Angelshark habitat preference in Wales?	Using results of RA 1 and 2, identify how climate change, sea level rise, acidification and long-term oceanographic cycles may impact Angelshark and their prey (this could be a predictive study using different climate change scenarios).	L	££	Goals 1	Long
RA 8: EVALUATE THE IMPACT THAT ANGELSHARK ENGAGEMENT IS HAVING WITH TARGET COMMUNITIES						
RA 8.1	To what extent are fishers willing to provide information on threatened species in Wales?	To what extent has the current ASP:W engagement work built trust with fishers using the Welsh Zone? Are different sectors more/less willing to provide information?	M	££	Goals 2&3	Short
RA 8.2	Do stakeholders change behaviour following increased understanding of Angelsharks?	Investigate behaviour change associated with greater Angelshark knowledge with different focal groups identified in the Communities Goal.	M	£££	Goal 3	Long
RA 8.3	Do Angelsharks inspire people to value the wider marine environment in Wales?	Investigate impact of Angelshark being used as a flagship species to raise awareness of the wider marine environment and/or other elasmobranch species.	L	£££	Goal 3	Long

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GLOSSARY

- "**Actions**" are the activities which need to be implemented to achieve the Objectives and, ultimately, its Goals and Vision.
- "**Angel shark**" refers to multiple species of angel shark in the family Squatinidae, whilst "Angelshark" refers to just one species – *Squatina squatina*.
- "**Constraint**" are factors which contribute to or compound the threats. (e.g. lack of knowledge or lack of law enforcement capacity).
- "**Critical Angelshark Areas**" are specific geographic areas that contain essential features for the life history of Angelshark e.g. nursery areas, aggregation areas, mating areas.
- "**European Marine Site**" (EMS) refers to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) that are covered by tidal waters and protect some of our most important marine and coastal habitats and species of European importance.
- "**Fishers**" or "**fisheries**" or "**fishing**" refers to all fishing sectors (i.e. commercial, recreational and charter boat fishers, registered in any country) fishing in the Welsh Zone. If a description or action is for a particular sector, this is clarified in the relevant text. For example:
    - Some Actions specifically relate to fishers registered to a particular country (e.g. "UK registered vessels");
    - "recreational fishers" refers to recreational activities in marine and estuarine waters (i.e. angling from shore, angling from boat, spearfishing or subsistence fishing where anglers or spearfishers do not return their catch).
- "**Goal**" is a description in operational terms to capture what needs to be done where to save the species.
- "**Marine Protected Area**" (MPA) refers to any area designated under legislation for the conservation of habitats, species or other natural features. Including European Marine Sites (EMS) (Special Protection Areas (SPAs), Special Areas of Conservation (SACs)), Marine Conservation Zone (MCZs), Sites of Special Scientific Interest (SSSIs) and Ramsar sites (Welsh Government, 2018).
- "**North-west Europe**" refers to the following International Council for the Exploration of the Sea (ICES) sea areas: 4, 5, 6, 7 and 8.
- "**Objective**" is a Summary of the approach to be taken to achieve the Vision and Goals, normally relating to a set of threats and constraints.
- "**Threat**" is a factor which causes (or may cause) either a substantial decline in numbers of individuals of a species, or a substantial contraction of the species' geographic range.
- "**Vision**" is a short inspirational statement describing the desired future state for the species.
- "**Welsh Zone**" refers to both the inshore (from mean high water spring tides out to 12 nautical miles (nm)) and offshore region (between the 12 nm territorial seas limit and the UK-Ireland median line or the Northern Ireland adjacent waters limit). See Figure 1.
- "**Wider Region**" refers to the Exclusive Economic Zone of countries proximate to Wales: the rest of the UK (England, Guernsey, Jersey, Northern Ireland, Scotland, Isle of Man), Belgium, France, Netherlands and Ireland. See Figure 3.

ABBREVIATIONS

ASCN	Angel Shark Conservation Network
ASP:W	Angel Shark Project: Wales
eDNA	Environmental DNA
EEZ	Exclusive Economic Zone
EMS	European Marine Sites
EIs	Educational Institutions
EU	European Union
GO	Government Agency
ICES	International Council for the Exploration of the Sea.
IUCN	International Union for Conservation of Nature
iVMS	Inshore Vessel Monitoring System
JNCC	Joint Nature Conservation Committee
MCZ	Marine Conservation Zones
MEDIN	Marine Environmental Data and Information Network
MLAA	Museums/Libraries/Archives/Aquaria
MMO	Marine Management Organisation
MPA	Marine Protected Area
MSFD	Marine Strategy Framework Directive
NBN	National Biodiversity Network
NGOs	Non-Governmental Organisations
NRW	Natural Resources Wales
NWWT	North Wales Wildlife Trust
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
RA	Research Area
RC	Research Community
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SSSI	Sites of Special Scientific Interest
WFA	Welsh Fisherman's Association
WFSA	Welsh Federation of Sea Anglers
WG	Welsh Government
WWF	World Wide Fund for Nature
ZSL	Zoological Society of London

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