



Background Document for Angel shark
Squatina squatina



OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l'Espagne.

Acknowledgement

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Photo acknowledgement

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Background document for Angel shark *Squatina squatina*

Executive Summary

This Background Document on the Angel shark *Squatina squatina* has been developed by OSPAR following the inclusion of this species on the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008-6). The document provides a compilation of the reviews and assessments that have been prepared concerning this species since the agreement to include it in the OSPAR List in 2008. The original evaluation used to justify the inclusion of *S.squatina* in the OSPAR List is followed by an assessment of the most recent information on its status (distribution, population, condition) and key threats prepared during 2009-2010. Chapter 7 provides proposals for the actions and measures that could be taken to improve the conservation status of the species. In agreeing to the publication of this document, Contracting Parties have indicated the need to further review these proposals. Publication of this background document does not, therefore, imply any formal endorsement of these proposals by the OSPAR Commission. On the basis of the further review of these proposals, OSPAR will continue its work to ensure the protection of *S.squatina*, where necessary in cooperation with other competent organisations. This background document may be updated to reflect further developments or further information on the status of the species which becomes available.

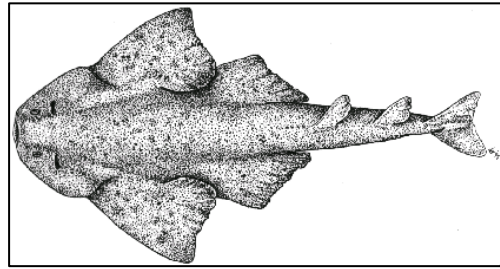
Récapitulatif

Le présent document de fond sur l'Ange de mer a été élaboré par OSPAR à la suite de l'inclusion de cette espèce dans la liste OSPAR des espèces et habitats menacés et/ou en déclin (Accord OSPAR 2008-6). Ce document comporte une compilation des revues et des évaluations concernant cette espèce qui ont été préparées depuis qu'il a été convenu de l'inclure dans la Liste OSPAR en 2008. L'évaluation d'origine permettant de justifier l'inclusion de l'Ange de mer dans la Liste OSPAR est suivie d'une évaluation des informations les plus récentes sur son statut (distribution, population, condition) et des menaces clés, préparée en 2009-2010. Le chapitre 7 fournit des propositions d'actions et de mesures qui pourraient être prises afin d'améliorer l'état de conservation de l'espèce. En se mettant d'accord sur la publication de ce document, les Parties contractantes ont indiqué la nécessité de réviser de nouveau ces propositions. La publication de ce document ne signifie pas, par conséquent que la Commission OSPAR entérine ces propositions de manière formelle. A partir de la nouvelle révision de ces propositions, OSPAR poursuivra ses travaux afin de s'assurer de la protection de l'Ange de mer, le cas échéant avec la coopération d'autres organisations compétentes. Ce document de fond pourra être actualisé pour tenir compte de nouvelles avancées ou de nouvelles informations qui deviendront disponibles sur l'état de l'espèce.

1. Background information

Name of species

Angel shark (*Squatina squatina*) Linnaeus, 1758.



Squatina squatina is endemic to the coastal, continental and insular shelf of the North-East and Eastern Central Atlantic, Mediterranean and Black Seas. It was formerly common over large areas of its historic range, which extended from southern Norway, Sweden and the Shetland Islands to West Sahara and the Canary Islands. The Angel shark undertakes seasonal migrations in at least part of this range. It is biologically highly sensitive to exploitation in target and bycatch fisheries. Intensive demersal fishing pressure throughout its range has resulted in significant declines, local extirpations and contraction of its original range over the past 50–100 years, inside and outside the OSPAR Area. It is classified as “Critically Endangered” globally on the IUCN Red List of Threatened Species. *S. squatina* was added to the OSPAR List of threatened and/or declining species and habitats in 2008.

2. Original evaluation against the Texel-Faial selection criteria

List of OSPAR Regions and Dinter biogeographic zones where the species occurs

OSPAR Regions: II, III, IV

Dinter Biogeographic Zones: West Norwegian subprovince, Skagerrak subprovince, Boreal, Boreal-Lusitanian, Lusitanian-Boreal, Warm Lusitanian subprovince, Cool Lusitanian subprovince

List of OSPAR Regions where the species is under threat and/or in decline

All Regions where it occurs:

Original evaluation against the Texel-Faial criteria for which the species was included on the OSPAR List

S. squatina was nominated for inclusion in the OSPAR List in 2006 by Germany.

Table 1: Summary assessment of Angel shark (*Squatina squatina*) against the Texel-Faial criteria

Criterion	Comments	Evaluation
Global importance	Populations of <i>Squatina squatina</i> occur in OSPAR Regions II, III and IV, which encompass approximately half of the historic global distribution of this species. For this reason, ICES WGEF (2007) did not consider that the OSPAR Area is of global importance to the species.	Possibly qualifies; increasingly likely to qualify in future.

	<p>The global historic distribution outside the OSPAR Area lies within the adjacent Atlantic off Morocco, Western Sahara and the Canary Islands, and in the Baltic, Mediterranean and Black Seas. Although information on the current distribution of <i>S. squatina</i> is limited, best available information indicates that the populations that historically occurred in these areas have undergone serious declines and in some cases (including the Baltic, Black Sea, northern Mediterranean and West Africa) extirpation. These declines are ongoing and are unlikely to cease or be reversed under current or foreseeable management regimes. The exception is in the Canary Islands, where it is reportedly still relatively common.</p> <p>Although populations have also been seriously depleted (and in some locations extirpated) within the OSPAR Area, the possibility cannot be excluded that the remaining stocks here may now represent 75% of the global population. There is also potential for management to improve the status of <i>S. squatina</i> within the OSPAR Area, increasing its global importance in future.</p>	
Regional importance	Since <i>S. squatina</i> is reported to be locally abundant, it is possible that the surviving populations within the OSPAR Area could be of regional importance. Lack of information on current distribution and abundance makes it impossible, however, to determine whether 90% of the population in the OSPAR Area is now restricted to a small number of locations, or to identify these areas.	Possibly qualifies
Rarity	This species is now only very rarely recorded within its historic distribution in the OSPAR Area and elsewhere. ICES WGEF (2007) noted that it could now be considered as rare due to its absence in research vessel surveys and extreme scarcity in commercial catches.	Qualifies
Sensitivity	Very sensitive biology (very low resistance and very low resilience). <i>S. squatina</i> reach maturity at a large size and likely several years old, give birth to a relatively small number of large pups after a long gestation and have a low intrinsic rate of population increase. They are therefore very slow to recover from depletion. Their large size and morphology also make Angel sharks highly vulnerable to bycatch in trawl and net fisheries from birth.	Qualifies – very sensitive
Keystone species	May formerly have been sufficiently common and important a demersal predator to have had a controlling influence upon its community, but now probably ecologically-extinct in the OSPAR Area.	Unknown
Decline	Severely declined in all three of the OSPAR coastal regions where it occurs during the past 50–100 years and elsewhere in its global range. Now extirpated from substantial areas of its former range and extremely uncommon throughout most of the remainder of this range. The population increasingly fragmented and records are now extremely infrequent.	Qualifies

3. Current status of the species

Distribution in OSPAR Maritime Area

Squatina squatina was historically common over large areas of the coastal, continental and insular shelf of the North-East Atlantic, from Norway, Sweden and the Shetland Islands to Morocco, West Sahara and the eastern Canary Islands (but not Madeira), and the Mediterranean and Black Seas (Figure 1) (Fricke *et al.* 2007, Wirtz *et al.* 2008). Its population is now highly fragmented, with extirpation reported in several parts of its range, particularly OSPAR Regions II, III, IV, Baltic, Black Sea and the northern Mediterranean. It is very rare in Sweden and may no longer occur in Region I.

The species occurs on or near mud or sandy seabed from close inshore to the outer shelf (5 m to at least 150 m depth) and may penetrate estuaries and brackish water. Seasonal migrations occur in the northern part of its range, with animals moving north as water temperatures warm during the summer (CMS 2008, Compagno *et al.* 2005). A tagging study in Ireland reported almost 20 % of recaptures from other locations in Ireland and from England, France and Spain (Green 2007, Figure 2). Although there are no recent reports, historic records indicate that *S. squatina* reached the northern edge of its distribution in Region I, on the Norwegian coast, possibly during seasonal migrations rather than year-round. Warming sea temperatures should make these coastal waters more suitable for this species, enabling a northward extension of its summer range and possibly also year-round distribution.

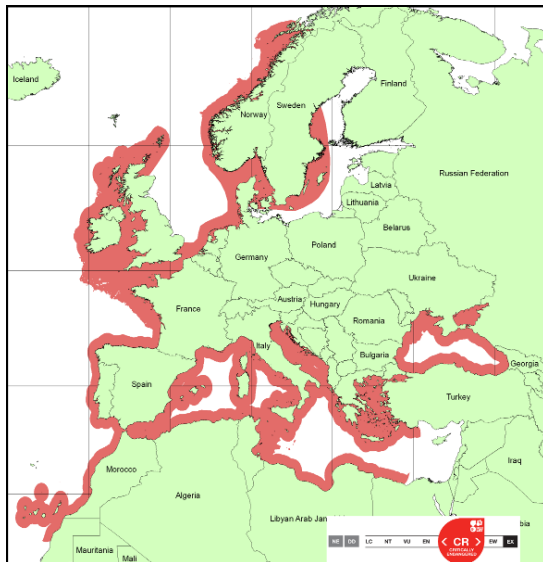


Figure 1: Historic global distribution of *Squatina squatina*

Source: www.iucnredlist.org

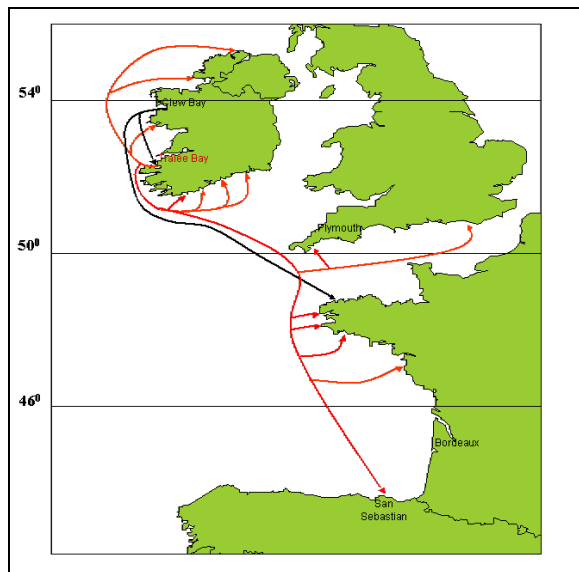


Figure 2: Angel shark (*Squatina squatina*) migration patterns, 1970–2006.

1027 individuals tagged

190 individuals recaptured

Source: Irish Central Fisheries Board, in ICES WGEF 2007

Population (current/trends/future prospects)

There are no current or historic population estimates for this species. However, records in the historic literature, fisheries landings, research survey data and angling data indicate that this shark was formerly relatively abundant in coastal waters but is now very rare. These observations may be used as a metric for abundance and trends. For example, ICES WGEF (2004) reviewed landings records for the whole of the North-East Atlantic from 1978 to 2002. These declined from 15 to 20 t in the 1980s, to 1 to 2 t in the 1990s, with the last reported landing in 1998. The WGEF has noted that *S. squatina* is now absent from research vessel surveys (ICES WGFE 2006) and extremely scarce in commercial catches (ICES WGEF 2006). Some commercial catch records of Angel sharks since 1990 are considered to be other species, misreported, (e.g. anglerfish, ICES WGEF 2009).

OSPAR Region II: *S. squatina* was formerly common, or at least frequently or regularly recorded, in the North Sea and Channel during the 19th and early 20th Centuries. There are also historic records from the Kattegat and Skagerrak in the east (HELCOM 2005). Yarrell (1835-36) and Day (1880-84) report that Angel sharks were common on the south and east English coasts, in the North Sea, on the Dogger Bank and in Cornwall, southwest England. The species was still being caught regularly and considered common in the UK at the beginning of the 20th Century (Garstang 1903), and was 'relatively abundant in Start Bay during surveys in 1901–1902' (Rogers and Ellis 2000).

Its distribution in this region has contracted significantly over the past 50–100 years as a result of intensive demersal fishing pressure and its high vulnerability to bycatch. There are very few recent records and remaining occurrence must now be extremely patchy in this region. For example, the species is now extirpated in the North Sea, although it may still occur in the Eastern Channel (ICES WGEF 2009). Recent surveys throughout the British continental shelf rarely encounter this species

and it no longer appears in surveys in Start Bay (Rogers and Ellis 2000). Populations have also declined steeply on the French coast (Quero and Cendrero 1996; Quero 1998; Capapé *et al.* 2000).

OSPAR Region III: The pattern of historic *versus* present distribution in this region is similar to that in Region II. It formerly occurred throughout this Region, but huge declines have been reported over the past 100 years. There is, however, thought to be a very small remaining population, because records are still occasionally made.

Day (1880-84) reported that the species was common in the Bristol Channel and Cornwall in south-western England, and 'by no means uncommon' in the Firth of Clyde, West coast of Scotland. It was still being caught regularly and considered common in the UK at the beginning of the 20th Century (Garstang 1903). During the early 1900s, an average of one specimen was taken during every ten hours of trawl survey on the British coast, but this species has virtually vanished in recent years (Rogers and Ellis 2000). CEFAS surveys occasionally recorded Angel sharks in Cardigan Bay (where it was formerly abundant) during the 1980s (Ellis *et al.*, 1996) but report just one juvenile captured during the last 15 years (Ellis *et al.* 1994), with local extinction in the Irish Sea and Bristol Channel, and virtual disappearance from UK waters (Rogers and Ellis 2000). A small number of animals have been by-caught in commercial fishing vessels off the Welsh coast in recent years (Shark Trust data). Commercial landings data compiled by the ICES Working Group on Elasmobranch Fishes demonstrate a decline in Celtic Seas landings from over 30 t in the 1970s to 0.227 t in the most recent year for which data are available (Figure 3, ICES WGEF 2009).

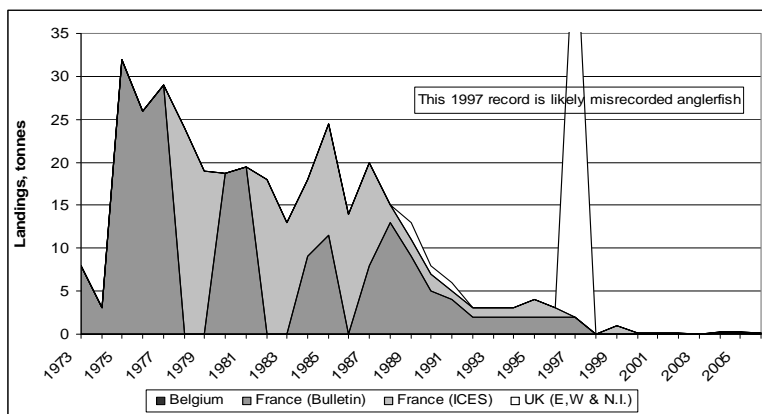


Figure 3: Landings in the Celtic Seas from 1973 to 2006

Source: ICES WGEF 2008

(The UK record in 1997 is probably misrecorded anglerfish (*Lophius*) and has now been excluded from ICES records)

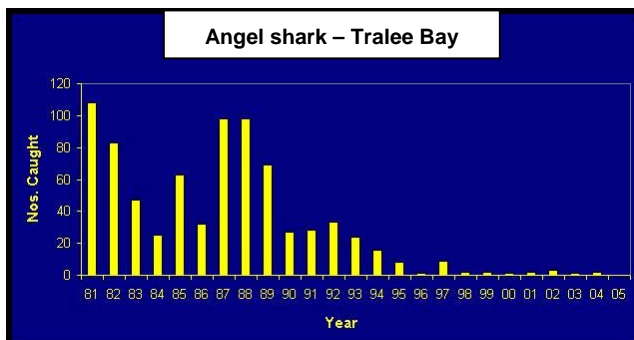


Figure 4: Captures by two charter boats in Tralee Bay 1981–2005 of Angel shark *Squatina squatina*.

Source: Irish Central Fisheries Board, from ICES WGEF 2008

The Irish Central Fisheries Board has recorded effort by charter-angling vessels in Tralee Bay since 1981. Catches of *S. squatina* by two vessels declined from over 100 per year in 1981, to 20 in 1984, before increasing to 100 again in the late 1980s. Catches subsequently declined to very low levels in the 1990s and there have been none at all in the most recent years (ICES WGEF 2008, Figure 4).

OSPAR Region IV: Very little information was obtained for this region, which lies in the centre of the historic range of this species. Lozano Rey (1928) reported Angel sharks were common off the Atlantic Iberian coast. Steep population declines are reported from the French coast (Quero and Cendrero 1996; Quero 1998; Capapé *et al.* 2000). French landings declined from >20 t in 1978 to 1 t in 2000. Surveys since 1983 on the continental shelf of Galicia and the Cantabrian Sea have not recorded this species (Annex I). The most recent ICES WGEF (2009) review of records since 1996 within ICES Subarea VIII (northern part of OSPAR Region IV) did not identify any landings. Spain reported 66 t from ICES Subarea IXa (southern part of OSPAR Region IV) in 2002, but none since (this may be misreported).

Condition (current/trends/future prospects)

The condition of any remaining populations of this species is likely extremely poor. The Angel shark is assessed as “Critically Endangered” by IUCN because of these past and continuing population declines (Morey *et al.* 2007). Populations will not recover unless strictly protected from mortality in commercial and recreational fisheries at all stages of its life history, although protection of large mature females is particularly important (larger females give birth to larger numbers of pups and contribute more to stock recovery). However, as noted by ICES WGEF (2008), this inshore species is distinctive and may have a relatively good discard survivorship, meaning that the mandatory return of bycatch would yield conservation benefits for the population.

Even if species protection is achieved throughout the OSPAR Area, population depletion has been so severe that recovery of this low productivity species will take many decades, even in locations where a core population survives. The migratory nature of Angel sharks (Figure 3) may, however, enable populations to become re-established in areas from which it has been extirpated.

The species’ habitat is heavily fished and may be damaged by mobile fishing gears (particularly beam trawls and scallop dredges, e.g. ICES ACME 2001). Significant reductions in fishing effort and changes to lighter gears that are less damaging to seabed features will reduce these impacts in coming decade, but habitat condition was probably not significant for this species (it is removal in fisheries that has caused stocks to decline). Angel sharks may also penetrate estuaries and brackish water, where habitat quality is more likely to have deteriorated, but these habitats are probably marginal.

Limitations in knowledge

This species is now so rarely reported that there is very limited knowledge available on its present distribution, the location of remaining self-sustaining populations, or the size of stocks. Biological data (for example age, growth, maturity) are also lacking precisely because so few animals are reported and because both commercial and sports fishers now tend to release by-caught animals.

4. Evaluation of threats and impacts

Mortality in fisheries is the key threat to this large-bodied species. Angel sharks are vulnerable to fisheries long before old enough to reproduce. They may be by-caught in trawls and static (gill or tangle) nets and by hook and line (commercial by-catch and recreational angling). Some animals in public aquariums have been obtained from live bycatch landed as a curiosity (because of its rarity). It is unknown whether there is any targeting of these animals for aquarium display (this will in future need a license in British waters – see section 5). The distribution of the threat posed by fisheries

mortality is linked to the intensity of coastal and shelf net fisheries in OSPAR Regions where the species still persists. Recolonisation of areas from which Angel sharks have been extirpated will be threatened by fisheries activity. As noted above, however, decreasing fishing effort is likely to reduce this threat, to some extent, in future years. This species is also distinctive and may have a relatively good discard survivorship (ICES WGEF 2008), making it a good candidate for conservation management. ICES therefore recommended a zero TAC for ICES Subareas VII–VIII. Rising seawater temperature may encourage (re)colonisation into the north of Region II and Region I. Habitat damage due to pollution/eutrophication was considered as another threat factor (Fricke *et al.* 2007).

Table 2: Summary of key threats and impacts to Angel shark (*Squatina squatina*)

Type of impact	Cause of threat	Comment
Excessive mortality	Removal of all life stages through bycatch in fisheries	Fisheries mortality affects all life stages, from newborn to adult, and exceeds the natural rate of population increase for the species.
Habitat damage	Mobile fishing gears, pollution, eutrophication	Likely a minor impact compared with excessive mortality rates in fisheries.
Prey availability	Fisheries harvesting prey species	A minor impact compared with fisheries mortality.

5. Existing management measures

ICES WGEF (2008) noted the benefits that could be derived from a zero TAC in view of this species' distinctive appearance and likely relatively good discard survivorship. This advice was implemented in 2009 by the European Commission. Council Regulation (EC) 43/2009, Annex III Part B states "Angel shark in all EC waters may not be retained on board. Catches [...] shall be promptly released unharmed to the extent practicable [...] Fishers shall be encouraged to develop and use techniques and equipment which, following consultation of STECF, serve to facilitate the rapid and safe release of the species". It is too early to judge how effective this measure will be. It will certainly need to be widely publicised to the fishing industry and recreational anglers if it is to be implemented effectively, and these stakeholders should also be encouraged to report released by-catch.

S. squatina is also covered by EC Regulation No. 1185/2003 on the removal of shark fins on board fishing vessels. This prohibits the removal and retention of fins and the discard of shark carcasses at sea. This may have encouraged the live discard of Angel shark by-catch if there was no market for the carcasses, but is now superseded by the requirement to release by-catch in 2009 (see above). In 2008, *S. squatina* was added to Schedule 5 (strictly protected animals) of the UK Wildlife and Countryside Act (1981). The protection afforded by this Act currently extends from 0–6 miles in England and Wales, although proposals to extend this to the 12 mile limit of territorial waters are undergoing consultation and may be adopted during 2010. Elsewhere in Great Britain, strict protection is also likely to be provided through the Northern Ireland Wildlife Order in early 2010, and is under consideration in Scottish waters. *Squatina squatina* was taken off the Irish Specimen Fish List in 2005 (a voluntary measure, to reduce recreational angling mortality). Some anglers implement voluntary tag and release programmes for elasmobranchs that provide valuable data for managers. Some Angel sharks may be incidentally protected in marine nature reserves or static gear reserves.

6. Conclusion on overall status

Squatina squatina is “Critically Endangered” due to steep declines in abundance and extirpation from significant portions of its former North-East Atlantic and global range, caused by fisheries bycatch (and possibly some historic target fisheries). The addition of this species to the OSPAR List of threatened and/or declining species and habitats and the adoption of some management measures in 2009, including the mandatory release of by-catch in EU fisheries, are too recent to have had any impact upon its overall status.

7. Action to be taken by OSPAR

The conservation objectives for this species must be to protect all remaining animals and populations in order to allow these populations to rebuild, and to enable the species to recolonise its former range. This requires the location and protection of remaining populations and their habitat and the minimisation of target and bycatch mortality throughout the OSPAR Area.

Action/measures that OSPAR could take, subject to OSPAR agreement

As set out in Article 4 of Annex V of the Convention, OSPAR has agreed that no programme or measure concerning a question relating to the management of fisheries shall be adopted under this Annex. However where the Commission considers that action is desirable in relation to such a question, it shall draw that question to the attention of the authority or international body competent for that question. Where action within the competence of the Commission is desirable to complement or support action by those authorities or bodies, the Commission shall endeavour to cooperate with them.

It is proposed that OSPAR should recommend that relevant Contracting Parties (those within the historic range of *Squatina squatina* and those whose flag vessels pursue fisheries within this range) take into account the “Critically Endangered” status of Angel sharks when reviewing, updating, developing and/or adopting the following:

1. national, European and international protected species legislation (including the Bern Convention on the Conservation of European Wildlife and Natural Habitats, the Bonn Convention on the Conservation of Migratory Species of Wild Animals, and Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora);
2. national and regional fisheries conservation and management measures, including prohibitions on fishing, retention, landing and sale;
3. marine protected areas; and
4. marine species, habitat and fisheries research.

It is proposed that OSPAR should draw to the attention of all Contracting Parties the conservation measures for this species adopted by the UK and the European Community, and recommend that CPs disseminate this information to their commercial and recreational fishers, encourage fishers to release by-catch and to report details (including date and location) of this by-catch, and use the information submitted in their reports to OSPAR.

It is proposed that OSPAR urges Parties and the European Commission to consider carefully how zero quotas, mandatory release and protected species legislation may be adopted that does not prevent sports anglers from engaging in the voluntary tag and release programmes that have provided some important scientific data on this species.

To complement the above, the OSPAR Commission should:

1. communicate to the European Commission the Critically Endangered status of *S. squatina* and its Annex V status, and encourage urgent consideration of the species as a candidate for listing on European and international biodiversity conventions and for special attention under the Community Plan of Action for Sharks; and
2. communicate to ICES and other relevant scientific funding bodies the need for more research on the life history, distribution and habitat requirements of *S. squatina*, with a view to obtaining management advice and identifying critical areas for protection.

Brief Summary of proposed monitoring system (see annex 2)

Relevant Contracting Parties should be encouraged to report to OSPAR on:

- Historic records (location, dates and abundance)
- Current location, dates and number of bycatch (returned to the sea) and sea angling records (including tag and release)
- Individuals in captivity (with a view to facilitating life history and genetic studies)

Table 3: Summary of key priority actions and measures which could be taken for *S.squatina*. Where relevant, the OSPAR Commission should draw the need for action in relation to questions of fisheries management to the attention of the competent authorities. Where action within the competence of the Commission is desirable to complement or support action by those authorities or bodies, the Commission shall endeavour to cooperate with them.

Key threats	Fisheries mortality: - Bycatch in commercial fisheries - Target fishing (primarily sport angling and possibly obtaining specimens for aquaria) Habitat deterioration and loss of prey species (secondary threats)
Other responsible authorities	- EC and Council of Fisheries Ministers (Common Fisheries Policy, TACs) - OSPAR Contracting Parties - ICES (e.g. provision of advice on trends, assessment criteria and triggers) and other RFOs - Council of Europe?
Already protected? Measures adequate?	EU: Zero TAC and mandatory release (2009) - Too recent to be able to assess impact. Must be extended into future years. Should not prohibit the participation of anglers in genuine tag and release research programmes. EC Regulation No. 1185/2003 on the removal of shark fins on board fishing vessels - Impact unknown, but now superseded by the introduction of a zero TAC and mandatory release. Schedule 5 WCA(1981) protection in Great Britain (2008) - Too recent to be able to assess impact. Similar measures needed in other range States to complement the EU zero TAC. Licensing needed for angling tag and release programmes. Exclusion from Irish Specimen Fish List - Voluntary measure that discourages killing catches. Should be extended to other countries where sport angling is popular.

<p>Recommended Actions and Measures</p>	<p>OSPAR Commission</p> <ul style="list-style-type: none"> - Communicate to the Commission the status of <i>S. squatina</i> and its need for conservation under biodiversity instruments and the Community Plan of Action for Sharks; - Communicate to ICES and other scientific bodies the need for research and advice on distribution and habitat requirements <p>Contracting Parties</p> <ul style="list-style-type: none"> - Consider how national and regional fisheries conservation and management measures, marine protected areas, and species protection legislation may be used to improve the status of <i>S. squatina</i> and take action to apply these, as appropriate; - Disseminate to commercial and sports fishers information on the threatened status of <i>S. squatina</i> and the legal and voluntary measures that protect it. <p>Research needs</p> <ul style="list-style-type: none"> - Life history information - Location of surviving populations and critical habitats
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Annex 1: Overview of data and information provided by Contracting Parties

Contracting Party	Feature occurs in CPs Maritime Area	Contribution made to the assessment (e.g. data or information provided)	National reports References or web links
Belgium	Y	N	
Denmark	Y	Y- Review of Draft	
France	Y	Y –Review of Draft	
Germany	Y	Y – Review of Draft	Fricke, R., M. Bilecenoglu & H. M. Sari (2007) Annotated checklist of fish and lamprey species (Gnathostomata and Petromyzontomorphi) of Turkey, including a Red List of threatened and declining species. <i>Stuttgarter Beiträge zur Naturkunde</i> , (A) 706: 1-169, figs 1-3, tabs 1-8. Wirtz, P., R. Fricke & M. J. Biscoito (2008) The coastal fishes of Madeira Island – new records and an annotated checklist. <i>Zootaxa</i> , 1715: 1-26, figs 1-8.
Iceland	N	Y- Review of Draft	The species has never been reported in Icelandic waters (pers. comm. Karl Gunnarsson, November 2009)
Ireland	Y	N	
Netherlands	Y	N	
Norway	N	Y- Review of Draft	No records of this species in Norwegian Arctic waters (pers. comm. Erlend Standal, November 2009)
Portugal	Y	N	
Spain	Y	Y – Review of Draft	
Sweden	Y	Y – Review of Draft	
United Kingdom	Y	Y – Review of Draft	

Summaries of country-specific information provided

Spain: *Squatina squatina* (Angel shark) in the Cantabrian Sea

The historical series of bottom trawl surveys carried out from 1983 in the continental shelf of Galicia and Cantabrian Sea do not show the presence of this species in the area. Likewise no information on catches is recorded.

Annex 2: Detailed description of the proposed monitoring and assessment strategy

Rationale for the proposed monitoring

Very little information exists on this species, its life history, distribution and habitat. These recommendations aim to provide the data needed to develop appropriate conservation and management measures for surviving populations of *S. squatina* and their habitat.

Use of existing monitoring programmes

Several regular fishery independent surveys are undertaken by research vessels and chartered vessels in the OSPAR area. These report all records of *S. squatina*. Commercial catch and landings data should also (under EU Regulation and FAO guidelines) record Angel sharks at species level, but compliance is poor in parts of the OSPAR Area and could be improved by Contracting Parties (particularly since Angel sharks are easy to identify). Voluntary tag and release programmes and records of catches by anglers have produced some important data on distribution, migration and abundance trends at low/no cost to researchers and managers. Genuine, well-conducted tagging programmes should be permitted under license within zero TACs and other species conservation measures. The ICES Working Group on Elasmobranch Fishes has used all of these sources and historic records in the literature to describe the decline of this species in the OSPAR Area.

Synergies with monitoring of other species or habitats

Monitoring of other coastal species of sharks, skates and rays on the OSPAR list require very similar strategies.

Assessment criteria

It is not possible to develop assessment criteria or triggers for additional monitoring at present. ICES advice should be sought on this.

Techniques/approaches

ICES advice should be sought on appropriate, desirable and economically feasible approaches for monitoring and assessment, in addition to those outlined in section 2 above, in order to provide information on current baseline (distribution, population/extent, condition, threat/impact), changes to that baseline, and management effectiveness. The use of pop-up satellite tags may be an effective way to monitor use of habitat, home ranges and migration patterns.

Selection of monitoring locations

Such activities are likely to be focused on known relict populations within the coastal waters of Contracting Parties.

Timing and Frequency of monitoring.

Existing fishery-independent research surveys (which are already undertaken according to timetable) and voluntary tag and release efforts by anglers are likely to form the basis for monitoring across the entire OSPAR Area and within known population centres, respectively. It is difficult to control the timing and frequency of the latter, but it is essential to ensure that effort and seasonality are quantified and recorded accurately if these activities are to be valuable (and justify licenses).

Data collection and reporting

Already well structured for fishery-independent research surveys. Licensing of anglers undertaking tag and release programmes should be accompanied by clear requirements for data collection and reporting, possibly under guidance from ICES.

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