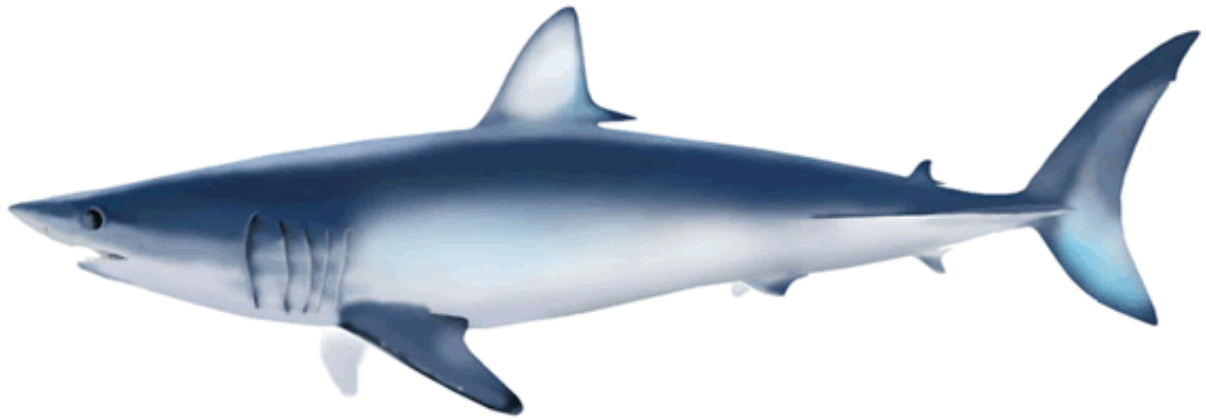
NON-DETRIMENT FINDING
FOR NORTH ATLANTIC SHORTFIN MAKO SHARKS
(*Isurus oxyrinchus*).
EUROPEAN UNION.

EU Scientific Review Group for CITES
Working Group on Makos

2022



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INTRODUCTION

The current document is an update of the Non-detriment Finding presented by the Working Group on Mako Sharks of the Scientific Review Group (SRG) at the 92nd meeting of the SRG in December 2020.

This Non-detriment Finding (NDF) report for the species *Isurus oxyrinchus* (shortfin mako shark) is based on the guidelines developed by the German Scientific Authority for CITES (Mundy-Taylor *et al*. 2014. CITES Non-detriment Findings Guidance for Shark Species - 2nd REVISED VERSION – A framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II), included in CITES document AC27 Inf.1, Non-Detriment Findings Guidance for Sharks presented at the 27th CITES Animals Committee (Veracruz, 28 April-3 May 2014).
These guidelines are organized in six steps:
1. Preliminary Considerations and Information Gathering
2. Conservation Concern and Intrinsic Biological Vulnerability
3. Pressures on the Species.
4. Existing Management Measures.
5. Non-Detriment Finding and Related Advice.
6. Further Measures.

The NDF is considered to begin properly at step 2. The continuation beyond steps 2 and 3 will depend on whether the results obtained for the parameters evaluated until that moment are considered acceptable, so if it is concluded that they are not acceptable, a NDF will not be produced. The levels and risks deduced (unknown / high / medium / low) from the evaluated parameters have been extracted from the indices presented in the document prepared by the Scientific Authority of Germany.

STEP 1. Preliminary considerations and information gathering (is an NDF necessary?)

The tasks required in this step are the responsibility of CITES Management Authorities, so only a few remarks are highlighted here for information.

This first step has two important objectives:
1.1. Confirm whether an NDF will be needed, and
1.2. Gather the required information to adopt this decision.

QUESTION 1.1 Is an NDF necessary?

The NDF should be prepared in order to plan the management of the concerned shark stock when applications for introduction from the sea (IFS) certificates, import, or export permits are foreseen. It is therefore concluded that the corresponding NDF should be developed.

The CITES Management Authorities, on their side, will verify prior to the issuance of these permits or certificates that:
- The specimens have been correctly identified.
- The specimens were legally acquired.
- The international export is not prohibited by the laws of the countries involved.

Detailed information on how to carry out these controls and summarize the information obtained can be found in the *CITES Non-detriment Findings Guidance for Shark Species* (Mundy-Taylor et al., 2014, pages 12-16).

QUESTION 1.2 Gather the required information to adopt this decision.

Table 1.

NORTHERN ATLANTIC	
Part 1. Global-level information	
Description/comments	**Sources of information**

Reported global catch:

a) Worldwide catch:

The shortfin mako shark *(Isurus oxyrinchus*) is the second-most common oceanic shark caught by high-seas longline and net fisheries, principally for its high-value fins (Sims *et al.*, 2018 and references therein; the first is the blue shark *Prionace glauca*). It accounted for 2.37% of all samples in Hong Kong and 4.16% in Guangzhou shark fin markets in 2015-2017 – the world's largest fin markets – coming fourth after blue sharks, silky sharks (*Carcharhinus falciformis*), and requiem sharks (*Carcharhinus* spp.) (Cardeñosa *et al.*, 2020).

The graph below (graph 1) shows the global catch of shortfin mako sharks in all stocks according to official data from the Fisheries Division of FAO (2021), starting in the first year with data (1981) [note that data of EU Member States exist only since 1997-1998]. The global catch peaked in 2011 with 14,515 tons, descending to an average of 12,093 tons in 2015-2019. A catch of 11,164 tons was reported in the last year with complete data (2019).

According to the IUCN/TRAFFIC (2019) analysis of the CITES listing proposal, based on FAO data, global landings of the species increased by 69% between the periods 2004-2009 (54,155 tons in total) and 2010-2016 (91,989 tons).

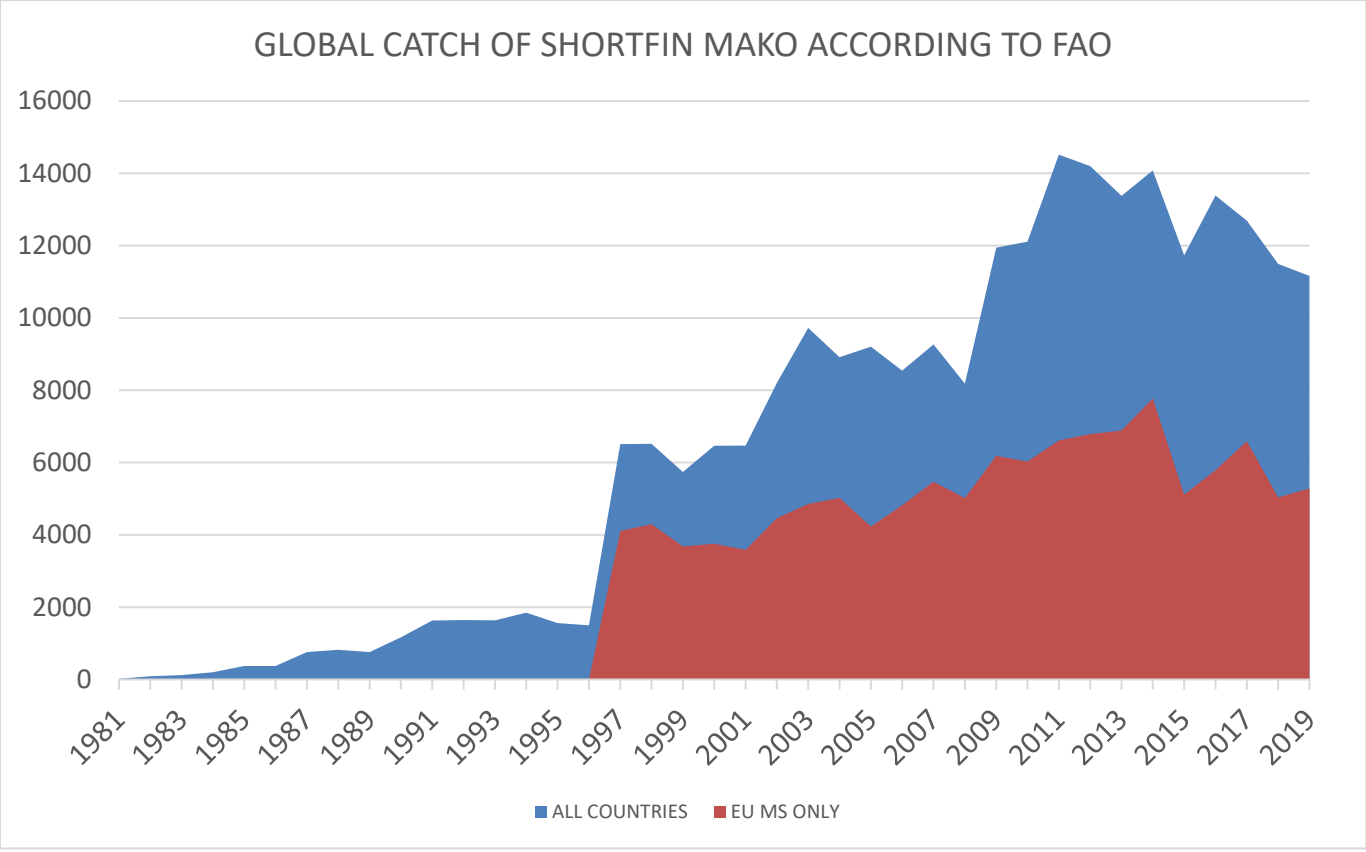


Figure 1. Global catch (in all the oceans and by all the countries) according to FAO.

In the period 2006-2016, the global catches by all countries were distributed as follows: 50% in the Atlantic, 34% in the Pacific, 15% in the Indian Ocean and less than 1% in the Mediterranean.
In 2006-2018, Spain, Taiwan (China) and Portugal were, in that order, the countries with the highest catches worldwide (see table 1.1), but in 2018 South Africa ranked third and Portugal descended to fifth (table 1.2).

Table 1.1 Worldwide catch (in tons) of shortfin mako sharks in all stocks in 2006-2018 (FAO, 2021).

Rank	Country	Total catch 2006-2018 (t)
1	Spain	58496
2	Taiwan (prov. of China)	19764
3	Portugal	18746
4	South Africa	11670
5	Namibia	7523
6	China	5240
7	Morocco	4835
8	Vanuatu	4806
9	Pakistan	4624
10	Chile	4539

Table 1.2 Worldwide catch (in tons) of shortfin mako sharks in all stocks in 2018 (FAO, 2021).

Rank	Country	Total catch 2018 (t)
1	Spain	4138
2	Taiwan (prov. of China)	1789
3	South Africa	1015
4	Namibia	980
5	Portugal	792
6	China	694
7	Chile	455
8	Pakistan	411
9	Brazil	399
10	United Kingdom	298

b) Worldwide catch of EU Member States:

One of the EU Member states, Spain, is the largest fisher of shortfin makos worldwide: it fished an annual average of 36% of the world total of *Isurus oxyrinchus* (in all stocks) between 2014 and 2018. This corresponds to about 4,800 t out of the 12,700 t of *Isurus oxrynchus* that were globally landed each year in that period. Spain has decreased its share from 48% in 2014 (when it reached its peak catch of 6,756 tons) to 35% in 2018 (with 4,138 tons). There are no global data beyond 2018 yet, but Spain has decreased further its catch in 2019 (ca. 3,800 tons) and 2020 (3,712 tons in all stocks, plus 594 tons of discarded specimens, presumably alive, of which a further 30% or 178 tons are estimated to have died after release).

The other EU MS with significant catches is Portugal, with an average share of 8% of the world total catch in 2014-18, and a decreasing trend in time, from up to 25% in 2007 (when it peaked at 2,337 tons) to 7% in 2016 (790 tons). As Spain, it has further decreased its catch in 2019 and 2020.

c) Total catch in the North Atlantic:

The catch in the North Atlantic stock in the last years is presented in Table 1.3 and figures 2 and 3 (ICCAT, 2021a).

Table 1.3 Total catch (landings, in tons) in the North Atlantic stock according to ICCAT official statistics (available at: https://www.iccat.int/en/t1.asp; data for 2019 and estimates for 2020, as reported by ICCAT 2021b)

Year	TOTAL CATCH (t)
2015	2964.14
2016	3346.70
2017	3115.74
2018	2395.54
2019	1829.00
2020	1709.00
AVERAGE 2015-2020	2561.85

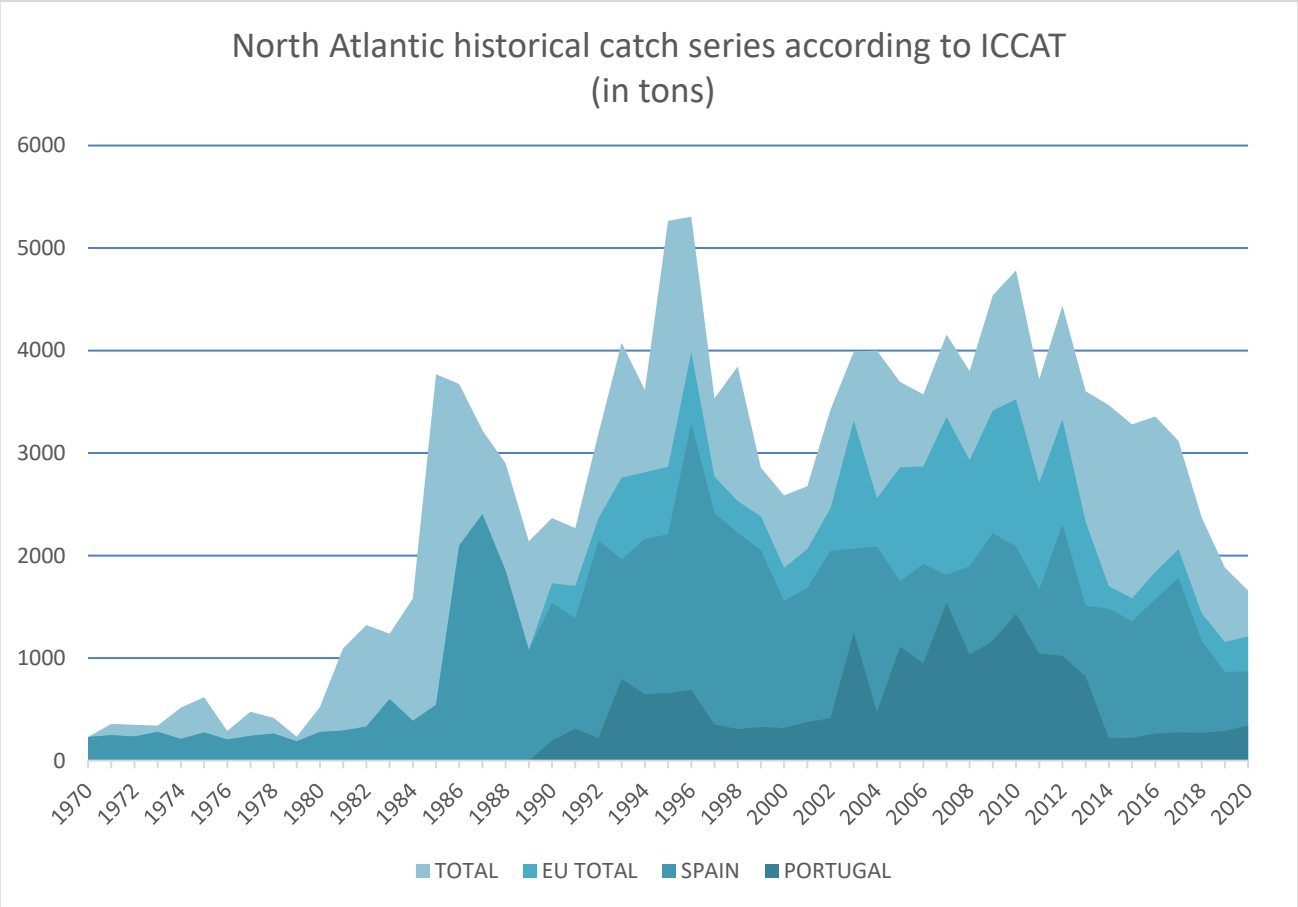
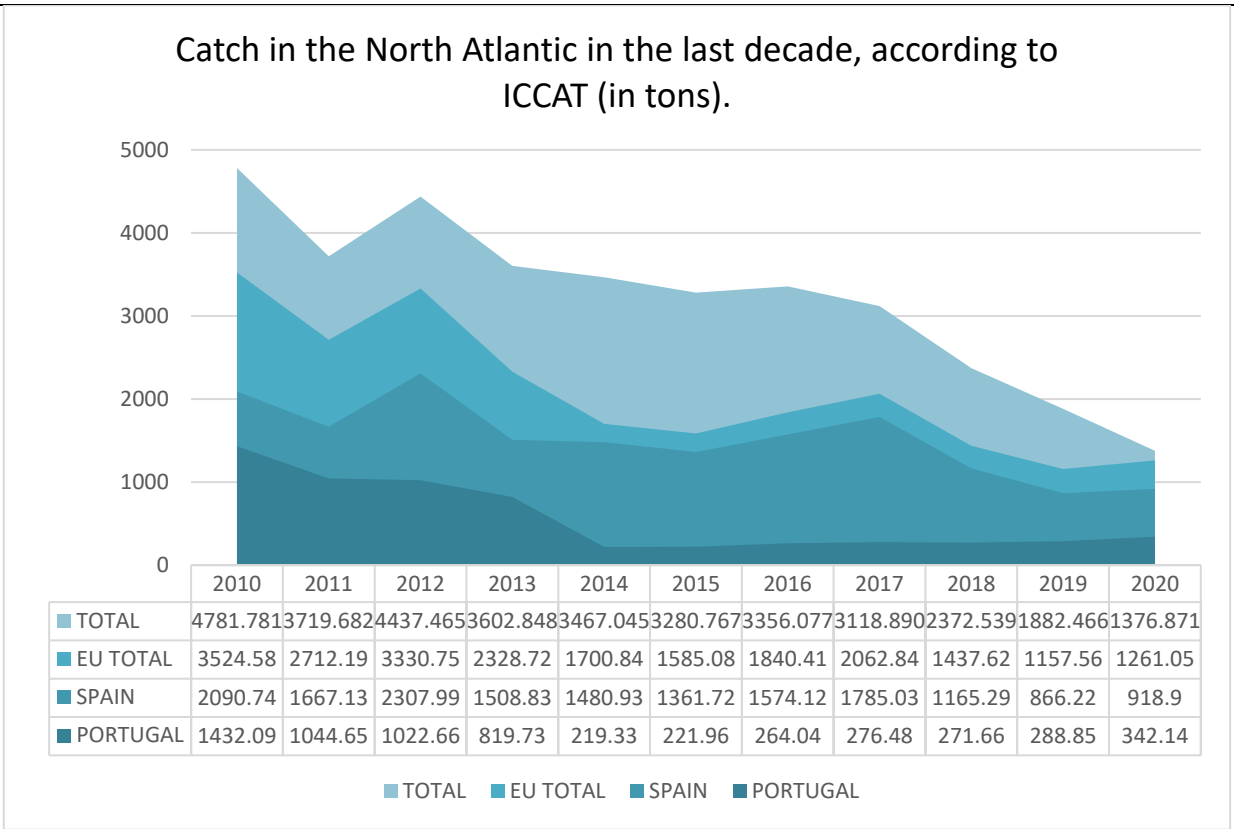


Figure 2. Global catch data in the North Atlantic stock, according to ICCAT.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
TOTAL	4781.781	3719.682	4437.465	3602.848	3467.045	3280.767	3356.077	3118.890	2372.539	1882.466	1376.871
EU TOTAL	3524.58	2712.19	3330.75	2328.72	1700.84	1585.08	1840.41	2062.84	1437.62	1157.56	1261.05
SPAIN	2090.74	1667.13	2307.99	1508.83	1480.93	1361.72	1574.12	1785.03	1165.29	866.22	918.9
PORTUGAL	1432.09	1044.65	1022.66	819.73	219.33	221.96	264.04	276.48	271.66	288.85	342.14

Figure 3. Evolution in the catch in the North Atlantic in the last decade, according to ICCAT.

Note, however, that the ICCAT SCRS (Standing Committee on Research and Statistics; ICCAT, 2019a) presented a different graph (figure 4 below) which included a rebuilt series (the dotted red line) for the stock with an accumulated higher total catch than the official ICCAT register on which figure 2 above is built.

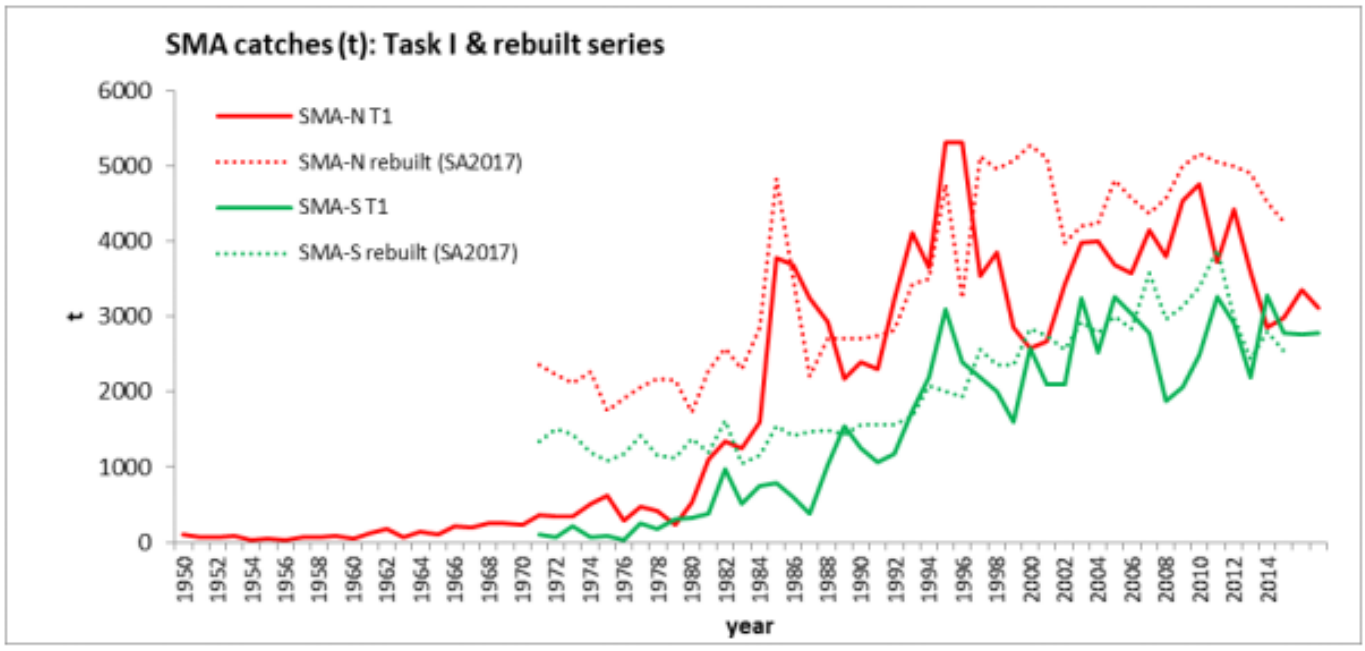


Figure 4. SMA catches (t) in Task I by stock (includes two dotted series rebuilt in the 2017 stock assessment).

Figure 4. Rebuilt series of the catch of shortfin mako sharks in the North Atlantic (the red dotted line is the rebuilt series; the solid red line is the series of official registers; ICCAT, 2019a).

d) Catch of EU-Member states in the North Atlantic: Please refer to Part 3 below.

e) Note on the representativeness of reported data:

It should be noted that all these figures (worldwide and in the North Atlantic) may be an underestimate of the actual catch. Speaking in general about sharks, Worm *et al*. (2013) stated that reported catches represent only a fraction of total shark mortality. For instance, estimates of the volume of sharks found in the fin trade in Hong Kong were more than four times the reported catch from FAO in 2000 (Clarke *et al*., 2006). There are multiple reasons for this: sharks are often not landed and discards are not reported, the weight landed may correspond to a higher weight of sharks that have been finned and whose bodies have been discarded at sea, etc. ICCAT, for instance, has not imposed a ban on finning (ICES, 2017).
Fishery-independent data are scarce, but those that are available - for instance, recent satellite telemetry studies of tagged specimens -, report very high harvest rates which also indicate that fisheries data are underestimations:

- Queiroz *et al*. (2019), in the Atlantic, reported that 19.3% of 119 tagged specimens were harvested and emphasized that that was the highest species-specific return rate for sharks that had yet been recorded in an ocean-scale.
- Vaudo *et al.* (2017): at least 7 out of 32 juveniles (22%) tagged in the western North Atlantic were harvested. This is twice the mortality reported by conventional tagging, fisheries-dependent studies.
- Byrne *et al.* (2017): 12 of 40 tagged individuals (30%) -primarily immatures- in the North Western Atlantic were harvested. They calculated in the NW Atlantic a 72% probability for a mako shark surviving a year and not being harvested by a fisher, and estimated a fishing mortality (F) = 0.19-0.56, which was 5-18 times greater than estimates of F_{MSY} (fishing mortality at maximum sustainable yield) (0.031-0.038).

Species distribution:

The shortfin mako population occurs in temperate and tropical waters in the Mediterranean Sea and in the Atlantic, Indian and Pacific Oceans, between 50º North latitude and 50º South latitude. It is present in the following FAO fishing areas: 21, 27, 31, 34, 37, 41, 47, 51, 57, 61, 67, 71, 77, 81 and 87. It is an oceanic and meso/epipelagic species. Thermal frontal systems (as the equatorial one) may act as barriers separating different stocks (see Corrigan *et al.*, 2018).
It is a highly migratory species: for instance, cumulative distances up to 24,213 km in 551 days, with an average of ca. 40 km per day, have been recorded in the Southern Hemisphere (Corrigan *et al.*, 2018). On the other hand, they may be resident in comparatively small areas for extended periods, often showing fidelity to specific areas of continental shelf and slope over several to many months (*ibid*.).

The ICCAT SCRS (ICCAT, 2019b) noted importantly that [in the North Atlantic stock] the fishery mostly catches juveniles and very few adults, especially gravid females, and that there is a lack of knowledge on where reproductive females and adults in general occur.

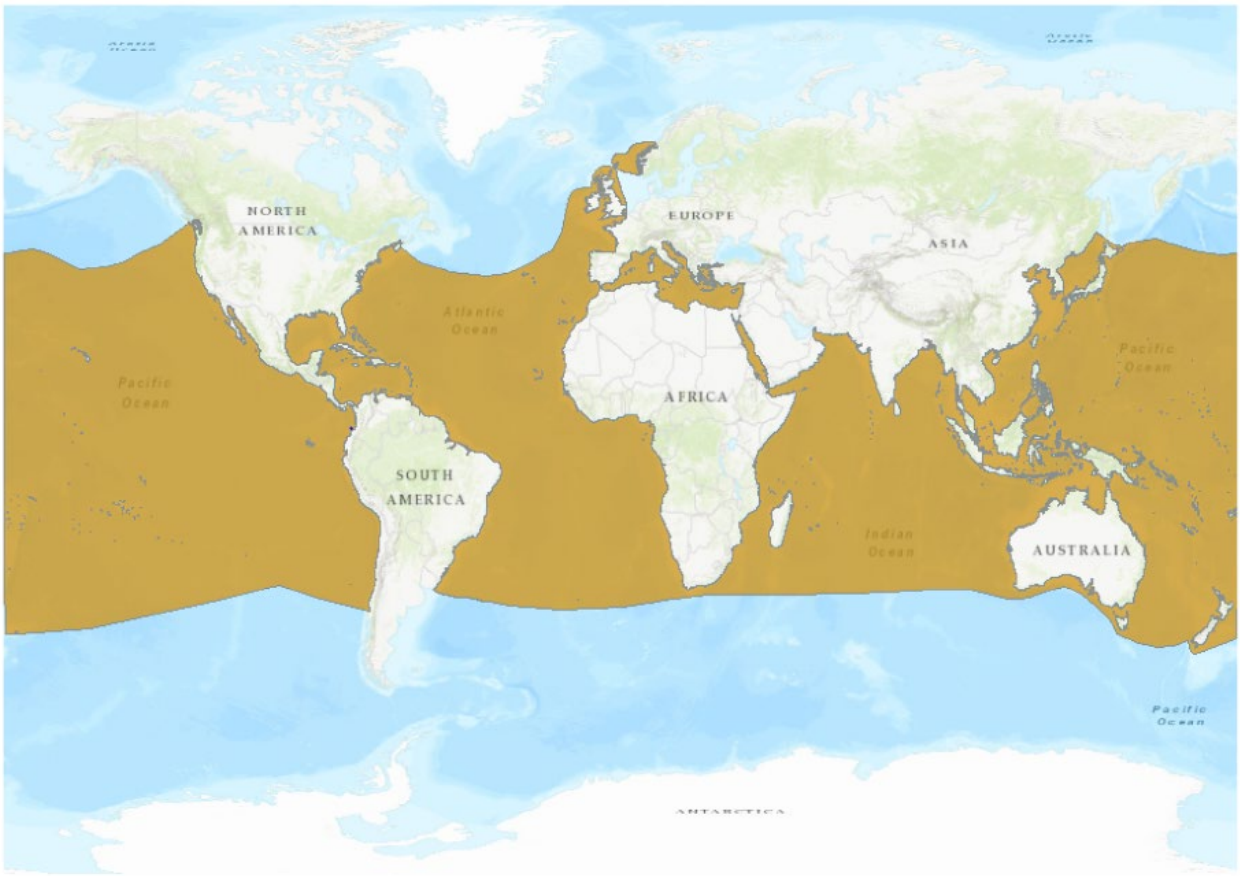


Figure 5. Distribution of *Isurus oxyrinchus* (Rigby *et al*., 2019).

Figure 6. FAO fishing areas.

Several authors have hypothesized that water temperature is the key driver of the distribution of the species, preferring a sea temperature range of 17-22ºC (see Vaudo *et al*., 2017), although these last authors found that they consistently occupied waters with temperatures of 22-31ºC, but also stayed in waters cooler than 17ºC and even a few moved into water below 10ºC. They are regional endotherms capable of maintaining 6 to 8ºC above ambient water temperatures. Thus, they may response to the availability of prey resources, rather than temperature alone.

Shortfin makos have been registered diving to a maximum of 1480 m, although most did not exceed 600 m. In these dives they can swim in waters as cold as 5.8ºC (Mucientes *et al.*, 2012). Vaudo *et al.* (2017) found out that there was little overlap between the juvenile specimens tagged off the USA (western North Atlantic) and those tagged off Mexico (Gulf of Mexico and Caribbean). The sharks showed a high fidelity to each of these areas, and those in the NWA showed pronounced seasonal movements within their range as a result of a higher degree of spatiotemporal variability in environmental conditions, such as water temperature and productivity. They also found distinct areas of consistent, concentrated use by juvenile specimens within these areas -areas characterized by heavy commercial and recreational fisheries in the USA and Canada-, and suggest that other areas of concentrated use also occur in the North Atlantic and throughout the world's oceans, as other authors have written.

Corrigan *et al.* (2018), based on telemetry and genetic data gathered in the Southern Hemisphere, thought that populations of shortfin makos may be genetically homogeneous across large geographical areas as a consequence of few reproductively active migrants, although spatial portioning exists. Makos do cross international boundaries and the high seas, such that management at the scale of Regional Fisheries Management Organizations is important. But the propensity for makos to spend extended periods within national EEZs (Exclusive Economic Zones) means that the homogenizing effect of large-scale movements likely occurs at a rate that is too slow to combat differing levels of fishing mortality across the entire genetic stock. This means that effective fisheries management of shortfin mako must occur at national as well as international levels, given that connectivity appears to occur at different scales.

There may also exist regional and seasonal sexual segregation (Mucientes *et al*. 2009), possibly explained by male-biased dispersal and producing skewed sex ratios. These authors found sexual segregation in the population of shortfin makos in the South Pacific Ocean, where males stayed predominantly west of 120ºW and females east of this longitude. They found no difference in prey availability and consumption, or temperatures, so they hypothesized that the segregation could be due to females avoiding males, which may be very aggressive during courtship. They concluded that complex structuring coupled with region-specific fishing activities may have disproportionate effects on different components of shark populations, like the existence of sex differences in potential exposure to fishing effort owing to geographical separation of the sexes, and that this, in turn, could be a major contributor to population declines.

In the North Atlantic, Queiroz *et al.* (2016) showed that 99 sharks that were satellite-tracked - including 14 mako sharks, plus blue, tiger and scalloped-headed sharks- showed a broad distribution spanning diverse habitats that are productive and generally bounded at higher altitudes by the 12ºC isotherm. The distribution of blue and mako sharks shifted seasonally, from more northerly latitudes in spring-summer to lower latitudes and more easterly longitudes in autumn-winter. Sharks (of the 4 species) aggregated in hotspots (figure 7), on or near thermal fronts in oceanic or shelf habitats, in highly productive specific regions such as the Gulf Stream and North Atlantic Current/Labrador Current convergence zone, and also in the Azores Islands, Mid-Atlantic Ridge SW of the Azores, and the Iberian Peninsula, preferring frontal boundary habitats characterized by steep sea surface temperature gradients and primary productivity. Shortfin makos preferred habitats characterized by these two factors, while blue sharks only showed preference for productive areas. They also found evidence of philopatry in the 4 species: sharks remained within relatively localized areas for extended periods of time, in addition to long-distance movements away from and return to preferred habitats. The authors concluded that the space use of pelagic sharks is predictable at the species level for a broad range of habitats.

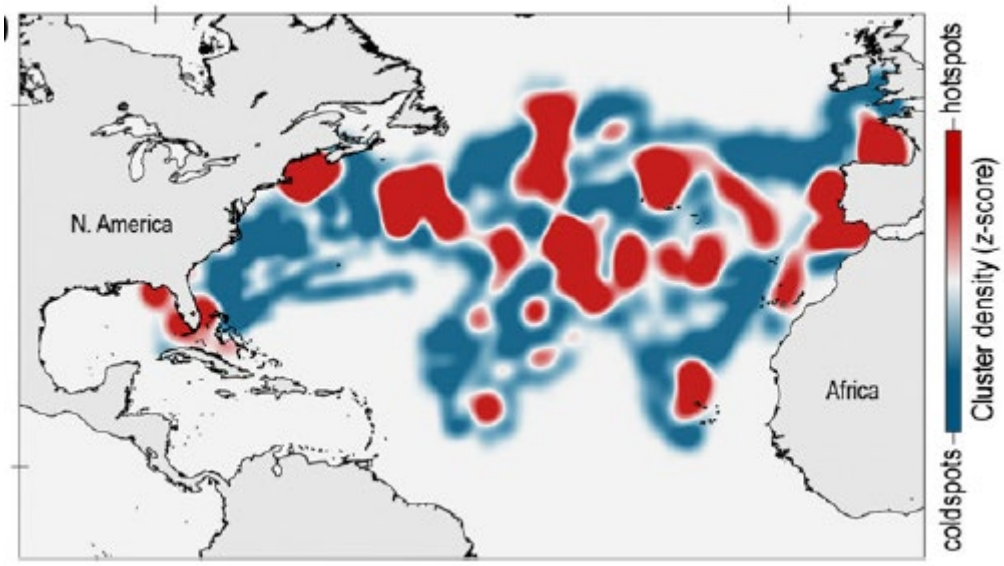


Figure 7. Hotspots (red) and coldspots (blue) of satellite-tracked pelagic mako, blue, tiger and scallop-headed sharks (taken from Queiroz *et al.*, 2016).

Known stocks/populations:
ICCAT assesses the North Atlantic population as a single stock.

Main catching countries:
See “Reported global catch” above, and “Part 3. Data and data-sharing” below.

Main gear types by which the species is taken
No global data for all stocks. 93.18% of the catches in 2018 across the Atlantic were done in surface longlines (84.49% in the North Atlantic). Other relevant gears in the Atlantic in 2018 were: purse-seine (3.12% of the catch, used mainly by Morocco) and rod & reel (2.26%; used mainly by recreational fisheries in the USA).

Global conservation status:
Endangered according to the IUCN (2019 assessment). See further details in Step 2 ahead.

Main management bodies:
In the Atlantic (all waters): International Commission for the Conservation of Atlantic Tunas (ICCAT)
In the EU: European Commission (Directorate-General for Maritime Affairs and Fisheries).
In Spain: Fisheries Secretariat, Ministry of Agriculture, Fish and Food (MAPA).

Multilateral Environmental Agreements:
The species *Isurus oxyrinchus* is included in*:*
- CITES Appendix II, as of 26 November 2019.
- Appendix III of the Bern Convention or Convention on the Conservation of European Wildlife and Natural Habitats.
- Annex I (highly migratory species) of the United Nations Convention on the Law of the Sea.
- Appendix II of the Bonn Convention or Convention on the Conservation of Migratory Species of Wild Animals.
- within the framework of the Bonn Convention there is a Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU), which includes the shortfin mako in its Annex 1. The MOU includes an Action Plan recommending conservation actions for migratory sharks.

Morocco, the second largest catcher of the species in the North Atlantic, is not a Party to this MOU.
- FAO International Action Plan for the Conservation and Management of Sharks (IPOA-Sharks).
- At the national level, the species is included in the List of Wild Species under Special Protection (only the Mediterranean population).

Part 2. Stock/context-specific information

Description/comments	**Sources of information**

Stock assessments

See Question 2.2 below.

Cooperative management arrangements:

EU agreements with protocols in force in the North Atlantic (European Union, 2021):

- Cape Verde: from 20/05/2019 to 19/05/2024.
- Ivory Coast: from 01/08/2018 to 31/07/2024.
- Gambia: until 30/07/2025.
- Guinea Bissau: from 15/ 06/ 2019 to 14/ 06/ 2024.
- Morocco: until 17/07/2023.
- Sao Tome and Principe: until 18/12/2024.
- Senegal: until 17/11/2024

[Note that the agreement with Mauritania expired on 15/11/2021.]

Northern agreements for joint management and exchange of fishing rights:

- Norway
- Faroe Islands.

Non-membership of Regional Fishery Bodies (RFBs)

ICCAT has 52 Contracting Parties, including the EU and Morocco, the main fleets catching the species. In addition, the following countries are Cooperating non-Contracting Parties of ICCAT: Bolivia, Chinese Taipei, Suriname, Guyana, and Costa Rica.

Nature of harvest:

Shortfin mako fishing by the Spanish fleet is commonly categorized as a secondary catch, the target species being blue shark (*Prionace glauca*) and swordfish (*Xiphias glaudius*).

On average in 2010-2018, blue shark accounted by weight for 78%, swordfish for 17%, and shortfin mako for 5% of the catches of the Spanish fleet in the North Atlantic, according to official ICCAT data. These percentages have varied very little with respect to the period 1997-2009, when they were 74%, 18% and 8% respectively, i.e., in the decade of 2010 the relative catch of shortfin mako sharks decreased slightly (ICCAT data).

The lucrative fin trade is a strong motivator for retaining shark fins and/or bycatch (Campana, 2016), Despite its alleged status of secondary catch, shortfin makos have a high commercial value -- higher than blue sharks -- and are actively sought for this reason by the fisheries.

The status of the shortfin mako as bycatch of the Spanish North and South Atlantic swordfish longline fishery was not recognized, for example, by the 2016 MSC (Marine Stewardship Council) assessment of this fishery (Bureau Veritas, 2016): with a 5.4% of the weight of the total catch in

2010-2014, shortfin makos were considered as a “primary main” species (both in North and South Atlantic), along with blue shark and swordfish. Other shark species caught by this fishery, besides blue shark and makos, accounted together for about 1% of the total catch weight and were considered by-catch. The Spanish swordfish longline fleet is thus, nowadays, a shark-directed fishery catching mainly blue sharks. The ICCAT SCRS recognizes that the Spanish and Portuguese swordfish longline fleets in the North Atlantic have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catches of these species previously considered as bycatch in some fleets (ICCAT, 2019c). According to Queiroz *et al*. (2016), both blue and mako sharks are targeted because of the high price of shark fins; these authors proved empirically that the spatial and temporal distribution of the catch effort of the Spanish and Portuguese swordfish longline fleets coincides to a high degree (ca. 80%) with the areas of aggregation of these two species in the Atlantic, according to the data obtained from the specimens followed by telemetric means and GPS location of the fleets. This overlap held true in two different years (2005 and 2009) and occurs mainly in the oceanic frontal regions of the Gulf Stream/North Atlantic Current/Labrador Current convergence zone (NLCZ) and near the MAR SW of the Azores. The overlap is also seasonal, as the fleets follow the sharks to the Gulf Stream/NLCZ in summer, and to the Mid-Atlantic Ridge (MAR) area in autumn.

Fishery types

The Spanish fishery catching shortfin mako is a surface longline fishery targeting mainly blue sharks and swordfish, with a fleet of about 200 vessels (in 2021) operating both in national and international waters in all Fishing Areas where the species is present throughout the year. 100 of these vessels operated in 2021 in the North Atlantic targeting swordfish.

Portugal had 37 vessels targeting swordfish in the North Atlantic in 2021.

Management units

In the North Atlantic, the catch of the species is regulated by ICCAT, covering all or part of FAO Fishing Areas 21, 27, 31 and 34. The activity of the Spanish and Portuguese fleets is also regulated by national and EU regulations.

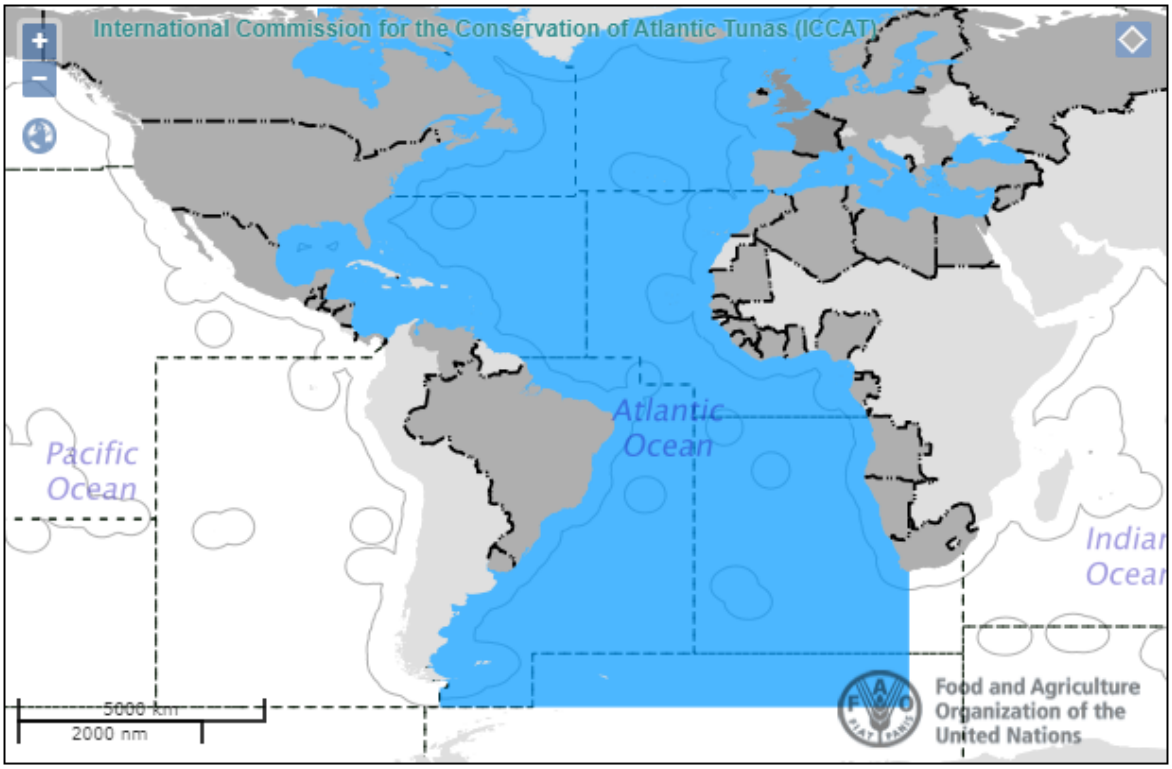


Figure 8. ICCAT limits, according to FAO.

Products in trade

The main product is the fin, but meat is also traded. Other products, such as skin and oil are of little relevance (CITES COP18 Proposal 42).

Biton-Porsmoguer *et al*. (2018) analyzed the total mercury (Hg) concentration in white muscle of blue and shortfin mako sharks of the NE Atlantic at Vigo port (Spain), finding that juveniles of both species presented lower concentrations than the maximum allowed by the European Union (1 mg kg−1 wet weight), but found concentrations above that threshold in larger blue sharks and shortfin makos. They defined *a size range of potential risk* for blue sharks of 200-250 cm TL and for shortfin makos of 150-190 cm, with highly contaminated sharks but not numerous in that size range, and a *size at risk* of >250 cm for blue sharks and >190 cm for shortfin makos, above which most individuals presented higher Hg level than the allowed EU limit.

Part 3. Data and data-sharing

Description/comments	**Sources of information**

Reported national catches / EU catches

a) Total catch and EU Member states catch in the North Atlantic:

Historically, the total catch (by all countries) in this stock soared in the middle 1980's, staying over 3,000 tons almost all years ever since, but descending to ca. 2,000 tons in 2018 and 2019, and to 1,659 in 2020 (estimate; ICCAT, 2021b). The catch in the North Atlantic stock peaked at over 5,000 tons in the middle 1990's, and again at similar levels around 2010.

Table 1.4 shows the countries with the largest catches in the North Atlantic stock. Spain and Portugal have remained first and third in the rank in historical and recent years.

Table 1.4. Rank of countries with the largest catches in the North Atlantic stock

Rank 1950-2018	Country	Total catch 1950-2020 (t)	Rank 2010-2020	Country	Total catch 2010-2020 (t)
1	Spain	71639	1	Spain	16726
2	U.S.A.	21108	2	Morocco	6295
3	Portugal	19346	3	Portugal	6204
4	Japan	9865	4	U.S.A.	2890
5	Morocco	7956	5	Canada	592
6	Canada	1730	6	Japan	584
7	Chinese Taipei	1225	7	Belize	335
8	Venezuela	480	8	Senegal	170
9	Belize	358	9	Venezuela	140
10	China PR	229	10	China PR	114

According to official ICCAT statistics (table 1.5), in 2016-2020 EU Member states together retained on average a little more than 1,550 (one thousand five hundred and fifty) tons of the species in the North Atlantic (excluding the Mediterranean, where the catch is prohibited by the General Fisheries Commission for the Mediterranean), with an increasing trend in the first two years and a very significant drop in 2018 and 2019, so that in 2019 the catch was 55% of the catch in 2016. However, in 2020 there was a slight escalation, with a catch 9% larger than in 2019. The average weight of shortfin mako sharks caught by the industry is 25 kg (Sims *et al*., 2018), so the mentioned annual average corresponds roughly to 62,000 specimens.

Spain and Portugal have accounted for almost 100% of the EU share in the total catch along the 1970-2020 series. The Spanish share in the total catch averages a little above 50%, peaking in the middle 1990's (3,300 t) and having declined slowly over the years to a minimum of 887 t in 2019 (and ca. 880 tons in 2020). Portugal accounts for 10% of the total catch on average, peaking in 2007 (1,500 t) and then having dropped very significantly, and staying in low volumes (ca. 250 t) since 2014. According to the data submitted to the European Commission the EU catch data for 2021 was 239.115 tons, a substantial decrease from previous years.

Note however that according to the Spanish Ministry for Fisheries (MAPA), the Spanish catch in 2021 in the North Atlantic was 9.38 tons, plus 924.69 tons of discarded specimens. It is not known if the discarded makos were alive or not, but until further details are known, an additional mortality of 30% of these discards (i.e. 277.41 tons) should be added to the figure provided by the EC. The total actual mortality for just the Spanish fleet in the North Atlantic should be, hence, at least 514.83 tons.

Table 1.5. Catch in the North Atlantic stock according to ICCAT

	TOTAL CATCH (t)	EU MS CATCH	% EU MS
2016	3346.70	1840.28	54.99%
2017	3115.74	2061.57	66.17%
2018	2395.54	1437.62	60.01%
2019*	1863.00	1156.00	62.05%
2020*	1659.00	1212.00	73.06%
AVERAGE	2421.37	1551.90	63.26%

*Estimate (ICCAT, 2021b).

In 2016-2020, Spain accounted on average for 80% of the catch by EU MS, followed by Portugal with 20%, while France and The Netherlands retained anecdotic quantities summing less than 0,1% of the total.

In 2020, after the listing of the species in CITES Appendix II and in Annex B of the EU CITES Regulation (338/97), Spain issued a NDF for its fleet for a maximum volume of 350 tons, aiming to reduce the total catch in this stock to 700 tons in that year (see the assessments in Question 2.2 below). Portugal acted accordingly and established a volume of 65 tons.

In Spain the 2020 limit of 350 tons -- which was explicitly set for the sum of retained catch plus discarded sharks -- was not observed, and 886 tons were landed, to which there must be added an estimated mortality of ca. 152.7 tons (a 30% of the 509 discarded tons). Thus, the total mortality of the Spanish fleet in 2020 is estimated in 1,039 tons (886+152.7).

Table 1.6

UE MS	2015	2016	2017	2018	2019	2020	% IN 2019	AVERAGE 2015-19	AVERAGE % 2015-19
SPAIN	1361.72	1574.13	1783.98	1165.29	866	886*	75%	1350.22	84%
PORTUGAL	221.96	264.03	276.48	271.66	289	342	25%	271.66	16%
FRANCE	1.40	2.12	1.11	0.67	1		0%	1.26	0%
NETHERLANDS	0.00	0.00	0.00	0.00	0		0%	0.00	0%
TOTAL UE	1585.08	1840.28	2061.57	1437.62	1156	486		1616.11	

*Only landed sharks (does not include a further estimated mortality of 153 tons of discarded sharks).

Spain fished in a combination of jurisdictional waters and the high seas, while Portugal shared its catch almost equally among its EEZ (45%) and the high seas (55%). As an example, a detailed analysis of the Spanish catch in 2018 in the North Atlantic by jurisdiction of the waters is shown below (data provided by the Spanish MAPA):

Table 1.7

Jurisdiction	*%*
International waters	80%
EEZ EU MS (ES, FR, IE, PT, UK)	4%

EEZ Non-EU (CV, LBR, MRT, STP)	16%

As for 2020, incomplete data -- from May 26 to December 31 -- show that Spain has fished 34% of the catch in international waters, 52% in EEZ of EU-MS (39% in Portugal, 11% in Spain and 1% in each Ireland and France), and 14% in EEZ of Non-EU countries (8% in Mauritania and 6% in Cape Verde).

It is also noteworthy that most of the catch of Spain was landed in another EU MS (Portugal) and even outside of the EU in 2018, for instance.

Table 1.8. Landing sites of the Spanish fleet in 2018 (North Atlantic):

Country	Tons	%
Portugal	373,94	30%
Cabo Verde	348,81	28%
Namibia	38,6	3%
Spain	378,42	30%
Unknown	104,66	8%
TOTAL	1245,97	100%

As for 2020, incomplete data -- from May 26 to December 31 -- show that Spain has landed 31% of the catch in Portugal, 32% in Spain, 17% in Cape Verde and 19% in undisclosed ports.

b) Are catch and/or trade data available from other States fishing this stock?

All ICCAT Parties report their catch data to the ICCAT Secretariat. FAO registers trade data in fish products, but very few categories are species specific and none in mako sharks, thus FAO data on trade is not analyzed here for that reason. The table below (1.9) summarizes the trade data for the species currently available at the CITES trade database:

Table 1.9 Trade in shortfin mako shark in 2019 and 2020 according to the CITES (in tons)

Term (origin) (kg)	Reported by	2019	2020
Bodies (W)	Importer		248.88
	Exporter	0.02	1003.78
Derivatives (W)	Importer		
	Exporter	0.46	
Fins (W)	Importer	0.60	75.99
	Exporter	0.60	71.64
Meat (W)	Importer		24.46
	Exporter	225.27	320.66
Skins (W)	Importer		
	Exporter		19.72
Unspecified (W)	Importer		
	Exporter		23.77
Bodies (X)	Importer		2445.72
	Exporter		138.71
Fins(X)	Importer		36.10
	Exporter		49.66

Note that some clearly inaccurate trade data have not been included in table 1.9, more specifically:

- An export of 15.8 tons of fins from Vanuatu to South Korea in 2020.
- An export of 216.26 tons of fins from Vanuatu to Taiwan in 2020 (these two exports together would correspond approximately to 3867 tons of total catch, which is impossible).
- An export of 52.96 tons of fins from Seychelles to Taiwan in 2020, which would correspond to a catch of approximately to 882 tons, which is clearly excessive in view of its record.

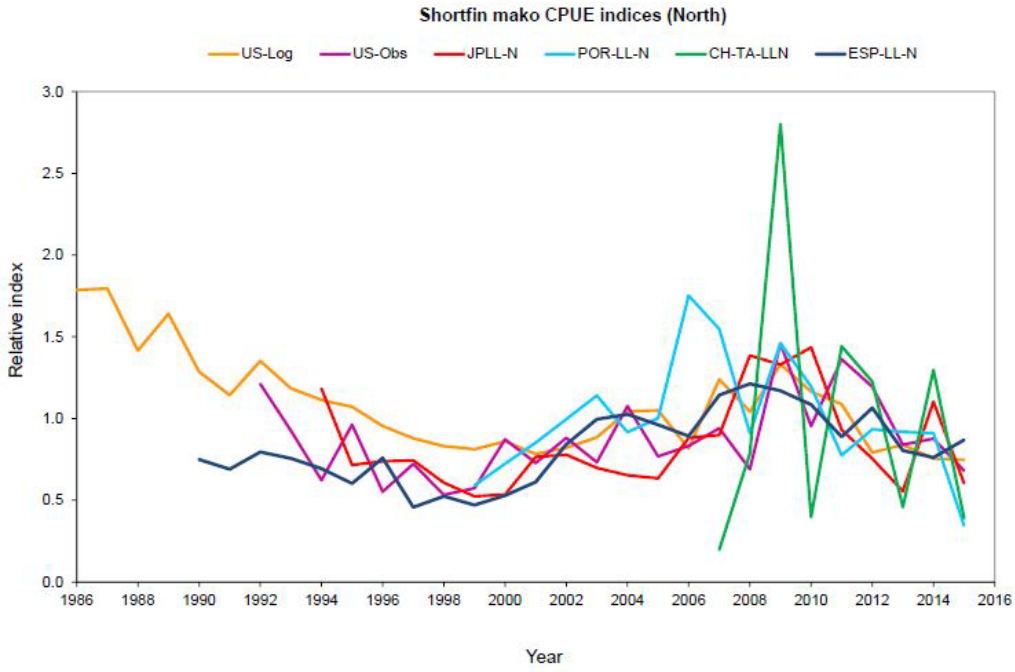
In 2019, the main traders worldwide were South Africa, with 140 tons of meat exported, followed by Japan, with 50 tons of meat exported, and Vanuatu, with 35 tons of meat exported. In 2020, the first exporter was Namibia, with 934 tons of meat and 59 tons of fins, followed by Japan, with 229 tons of meat and 4 tons of fin exported, then Spain with 188 tons of meat and 46 tons of fins exported, and Morocco, with 81 tons of meat and 5 tons of fins exported.
In Spain in 2020, the CITES Management Authority reported having (re-)exported 258 tons from this stock up to May 25. In the whole of 2020, a minimum of 668 tons from all stocks were re-exported, and 2,407 tons were imported (including introductions from the sea).

c) Reported catches by other States

Please see the information above.

d)Catch trends and values

Please see the information above. The catch by all countries in this stock has declined by 44% between 2016 and 2019 (59% in 2016-2020), but it is not known to what degree this decline corresponds to the own decline of the population or to other factors (management, changes in the fisheries and the markets, etc.). There is, however, a relevant piece of information illustrating what has been happening in the last years: ICCAT data on the evolution of CPUE (Catches per Unit Effort, ICCAT 2019b) up to 2016, show an overall decline since 2010 for the North Atlantic stock, as can be seen in the following figure (Figure 9). This figure shows that the CPUE of the Spanish fleet, in particular, started to decline even earlier, already in 2008. The CPUE of Portugal shows an even larger drop, since its peak in 2005.



SHK-Figure 4. Indices of abundance for North Atlantic shortfin mako shark used in the 2017 stock assessment.

Figure 9. Evolution of CPUE in the North Atlantic (ICCAT, 2019b).

e)Have RFBs and/or other States fishing this stock been consulted during or contributed data during this process?

Data from ICCAT and FAO's online databases have been used, but these organizations have not been consulted as such.

All EU Member states have been invited to participate in the elaboration of this NDF, for which a specific Working Group on Makos was organized within the Scientific Review Group, which is the official forum of the CITES Scientific Authorities of the EU MS. The Working Group counted as well with the regular participation as observers of staff of MAPA (Ministry of Agriculture, Fisheries and Food of Spain) and of the European Commission, with the occasional participation as observers of scientific experts and NGOs.

The European Commission also contributed comments to the Spanish NDF for 2020 for this stock, from which most of the data of the current NDF have been retrieved.

STEP 2. Intrinsic biological vulnerability and conservation concern

QUESTION 2.1 What is the level of intrinsic biological vulnerability of the species?

The biological parameters of this species in Table 2 indicate that **the level of vulnerability of the species is high**:

Table 2. Biological parameters.

Intrinsic biological factor	Indicator/metric	Level of vulnerability
1. Median age at maturity (age at which 50% of the cohort reaches maturity)	Differs according to the source: - 21 years on average (ICCAT, 2019a). - 13 years on average in the Northwest Atlantic; - 8 years for males and 18 years for females (references in Rigby *et al*., 2019). - 7 years for males and 15 years for females in the SW Indian Ocean (Groeneveld *et al*., 2014).	High (Medium) Reference values: - High >15 years -Medium: 5 to 15 years
2. Median size at maturity (size at which 50% of the cohort reaches maturity)	>200 cm total length in females. Males mature between 166 and 204 cm TL and females between 265 and 312 cm TL (Rigby *et al*., 2019).	High (>200 cm TL in females)
3. Maximum age/longevity in an unfished population	Differs according to the source: - Above 25 years (6 to 45 years), according to the CITES listing proposal (CITES COP18 PROP. 42). - 28-32 years in New Zealand, Southwest Pacific, Southwest Atlantic and Northwest Atlantic (Rigby *et al*., 2019).	High (>25 years)
4. Maximum size	According to references cited in Rigby *et al*. (2019), males reach a maximum size of 296 cm, and females of almost 400 cm.	High (>300 cm)
5. Natural mortality rate (M)	Less than 0.2 (0.072 to 0.223), according to the CITES listing proposal (CITES COP18 PROP. 42)	Medium (0,17-0,4)
6. Maximum annual pup production (per mature female)	According to ICCAT (2019a): - 12 pups on average every two or three years, - average production of only 4 pups every two years	Medium (2-15)

7. Intrinsic rate of population increase (r)	- Less than 0.14 (0.031 to 0.123) (COP 18 PROP. 42) - From 0.066 to 0.123 according to Cortés (2017).	High (<0,15)
8. Geographic distribution of stock	In each of the analyzed fishing areas, the distribution of the species is very extensive.	Low (ocean basin, unrestricted)
9. Current stock size relative to historic abundance	In the North Atlantic, the population has declined to about **50% of historical levels** (between 1950 and 2015), with a recent decline of 32% (between 2006 and 2015). In addition, the population is **at risk of falling to less than 30% of the historical level in the coming decades** if catches do not decrease (FAO, 2019).	Medium (25-50% of the baseline abundance)
10. Behavioural factors	In the ecological risk assessment (ERA) conducted by the WPEB (Working Party on Ecosystems and Bycatch) and the SC (Scientific Committee) of the IOTC in 2018 (Murua *et al*., 2018), it was the most vulnerable species to longlines as it has one of the lowest yields of the sharks analyzed, and a high sensitivity to longlining. Another ERA developed in 2015 concluded that the species is the most vulnerable to Atlantic longline fisheries and is among the most biologically vulnerable (to catch and mortality) (Cortés *et al*., 2015). Finally, the ICCAT SCRS also conducted an ERA in 2008, which determined that the species is susceptible to overfishing even at very low levels of fishing mortality, due to its low biological productivity (ICCAT RECOMMENDATION 10-06).	High (High level of risk incurred through behavioural factors)
11. Trophic level	According to references (in CITES COP18 PROPOSAL 42): it is a pelagic predator whose diet consists of squid, teleost fish, other sharks and, to a lesser extent, sea turtles and marine mammals. By occupying high trophic levels it plays an important role in marine ecosystems, including in structuring communities and controlling prey populations.	High

	Given their predatory nature, pelagic sharks compete with, and are often found in association with, the targets of pelagic longline fishing gear (Mejuto *et al.*, 2008).	

QUESTION 2.2 What is the severity and geographical extent of the conservation problems?

High severity and geographical extent of conservation problems.

Table 3. Indicators of conservation concern.

Factor	Indicator	Level of severity/extent of the problem
North Atlantic		
Conservation or stock assessment status	Several recent assessments are available: *1) IUCN global assessment (Rigby et al., 2019):* *1.1 Assessment:* IUCN has assessed the species globally as Endangered under criterion A2bd (reduction in population size based on ≥ 50% decline over three generations (72-75 years), the causes of which may not have ceased, with the current population trend being negative, based on an index of abundance and actual exploitation levels). This assessment also considered the status of the species in different regions, with the Atlantic - north and south together - also being assessed as Endangered and in decline. The IUCN projects a decline of 60% over the next 3 generations (or 72 years) for the Atlantic as a whole. *1.2 Management recommendation*: To allow the species to recover the IUCN recommends prohibiting its landing while it remains globally Endangered. Failing this, catch and discard data should be improved, regional and national limits on catches should be established based on scientific evidence and/or the precautionary principle, and safe release protocols should be promoted as a matter of urgency, as well as fully implementing the additional commitments adopted through international treaties. *2) Assessment by the Shark Group of the International Commission for the Conservation of Atlantic Tunas (ICCAT)*	High (seriously threatened; the stock is overfished and overfishing is taking place)

	2.1 Assessment: ICCAT updated the assessment of shortfin mako stocks in the Atlantic at its Shark Group meeting in May 2019, which was endorsed by its Standing Committee on Research and Statistics (SCRS) at its meeting in September 2019 (ICCAT 2019a and 2019b). The conclusion of this assessment is that the species is overfished (i.e. fishing mortality F is greater than maximum sustainable yield mortality F_{MSY} ($F > F_{MSY}$)) and experiencing overfishing (i.e. biomass B is below biomass at maximum sustainable yield B_{MSY} ($B < B_{MSY}$)) with a 90% probability in the North Atlantic. In addition, the Atlantic catches are mostly juveniles -immature fish under 10 years- and very few breeding adults (ICCAT, 2019b). It was also noted that given that the fishery mostly catches juveniles and very few adults, especially gravid females, and the lack of knowledge on where reproductive females and adults in general occur, there must still be a proportion of juveniles that reach maturity and reproduce and therefore contribute to recruitment. Also, if the decrease in mature females is related not only to the catch of immature females, but to other unknown reasons, the measures adopted by the Commission, which focus mostly on protecting the immature segment of the stock, may not suffice to recover the reproductive stock (ICCAT, 2019b). The Shark Group conducted new projections using two Stock Synthesis model scenarios that incorporated important aspects of shortfin mako biology. This was a feature that was not possible with the production model projections developed in previous assessments and therefore the Group considered the new projections to be a better representation of the stock dynamics. The Stock Synthesis projections (see Table 3.1) indicated that a TAC (Total Allowable Catch) of zero will allow the North Atlantic stock to recover without overfishing (green quadrant of the Kobe diagram) by 2045 with a 53% probability; regardless of the TAC (including a TAC of 0 t), the stock will continue to decline until 2035 before any increase in biomass occurs (since the number of fish produced each year will continue to decline until about 2035 even without fishing, because cohorts that have been depleted in the past will move to the mature stock in the coming decades); a	

TAC of 500 t, including dead discards, has only a 52% chance of recovering the stock to levels above SSF_{MSY} (the fecundity of the spawning stock at maximum sustainable yield) and below F_{MSY} (fishing mortality rate at maximum sustainable yield) in 2070 (two mean generation time); to be in the green quadrant of the Kobe diagram with at least a 60% probability by 2070, the TAC should be set at 300 t or less; lower TACs achieve recovery in shorter periods; a TAC of 700 t would stop overfishing immediately with 57% probability, however this TAC has only a 41% probability of recovering the stock by 2070 [note that all these TACs include dead discards].

Table 3.1 Projections of ICCAT SCRS (ICCAT, 2019b).

TAC (in tons)	Probability of the stock being in the green quadrant of the Kobe diagram ($F<F_{MSY}$ and $SSF>SSF_{MSY}$) in 2070 (two mean generation time) and the year when it exceeds the 50% threshold
(any TAC, including 0)	(decline until 2035 before any increase in biomass occurs)
0	81% in 2070 (53% in 2045)
100	73% in 2070 (56% in 2050)
200	66% in 2070 (54% in 2050)
300	60% in 2070 (52% in 2055)
400	55% in 2070 (52% in 2065)
500	52% in 2070
600	47% in 2070
700	41% in 2070
800	32% in 2070
900	24% in 2070
1000	17% in 2070
1100	10% in 2070

	The Committee emphasized that the Kobe II Strategy Matrix (K2SM) does not capture all the uncertainties associated with the fishery and the biology of the species. In addition, the length of the projection period (50 years) requested by the Commission implies that estimates at the end of the projection period are highly uncertain and that there is a long lag time (~20 years) between when management measures are implemented and when stock size starts to rebuild, due to the biology of the species. Therefore, the Committee advised that the results of the K2SM should be interpreted with caution. In particular, if the decrease in mature females is related not only to the catch of immature females, but to other, unknown causes, the management measures above may not lead to the recovery of the stock. *2.1 Management recommendation:* The Committee (i.e. SCRS) agreed that the projections that addressed the exceptions in Rec. 17-08 indicated that any retention of shortfin makos will not permit the recovery of the stock by year 2070. Given the vulnerable biological characteristics of this stock and the pessimistic projections, to accelerate the rate of recovery and to increase the probability of success the Committee recommends that the Commission adopt a non-retention policy without exception in the North Atlantic as it has already done with other shark species caught as bycatch in ICCAT fisheries. In the 2019 ICCAT annual meeting, the SCRS Vice chair explained that, in developing its advice, the SCRS concluded that a no retention policy was considered the best management approach to ensure that all CPCs (i.e. Parties) release shortfin mako brought to the boat alive and make every effort to avoid incidental encounters with shortfin mako, and re-confirmed later on the meeting that the SCRS advice was a non-retention police without exceptions; he also concluded that a simple no retention policy would still result in about 1,200 t of mortality and that other changes to fishing practices would be needed to reduce mortality further (ICCAT, 2020b). *3) FAO expert advisory panel assessment report on the CITES listing proposal:*	

	According to the analysis made by an FAO expert panel of the proposal to list the species in Appendix II of CITES (FAO, 2019), the stock has declined to about 50% of historic levels and catches would have to decrease by at least 65% just to stop its decline, and only a further reduction would prevent the population from declining in the next decades to below 30% of the historical level (which would lead to a move to Appendix I of CITES). 4) Queiroz *et al*., 2019: These authors -whose work has already been explained along this NDF- considered that the areas of greatest use of shortfin makos throughout their range in the North Atlantic may already be fully exploited in the habitats where they remain, increasing the potential for overexploitation and population collapse. They therefore urged the adoption of spatial conservation measures on the high seas, in addition to catch controls, to conserve this population.	
Population trend	Global negative trend in combination with abundance/assessment indicators that indicate that the stock is at a level of 40-70% of its historical baseline, and may reach 30% of the baseline in a few decades (FAO, 2019).	Medium-High
Geographic extent/scope of conservation concern	Identified threats affect the entire global population of the species.	High

STEP 3. PRESSURES ON THE SPECIES

QUESTION 3.1 WHAT IS THE SEVERITY OF TRADE PRESSURE ON THE STOCK OF THE SPECIES?

Table 4. Indicators of trade pressure

Factor	Indicator	Level of severity of trade pressure	Level of confidence in the evaluation
North Atlantic			
Magnitude of legal trade	*a) Outlook on shark fin trade:* Shark fin remains a highly valued commodity among Asian consumers both in Asia and elsewhere. The complexity and increasing dynamism of this trade makes it difficult to quantify market volumes and there is no accurate information on trends. According to TRAFFIC (Okes & Sant, 2019), the global trade in elasmobranchs peaked at almost 900,000 tonnes in 2000 and has since declined by 14% to 750,000 tonnes per year, although without catch effort data it is not possible to know whether this decline is due to overfishing or whether it is related to changes in records, fishing practices or management measures. Almost 40% of the catches occurred in the Atlantic and adjacent seas, 33% in the Pacific and 27% in the Indian Ocean. Indonesia, Spain and India are the countries that catch the most elasmobranchs, at least since 2007. Between that year and 2017, the	High (multiple uses in commercial trade; market demand increasing; high cost by unit product)	High (information available from authoritative sources with little or no extrapolation or inference required)

	Spanish average was 78,443 tons, with a 5% increase in catches between the two dates. Spain was also the world's second largest importer of elasmobranch meat between 2013 and 2017, with some 12,500 tons a year. It is also one of the world's largest exporters of shark fins. FAO (2015), in its report *State of global market for shark produ*cts, states that Spain exported 3,490 tons of shark fins annually between 2000 and 2011, worth 57.9 million US dollars. Its main destinations are in East and Southeast Asia, mainly Hong Kong SAR. More recently, WWF (2021) showed that Spain is among the top three traders of shark and ray meat by value, volume, and number of trading partners, being by far the world's largest exporter, and also a significant importer. Portugal is the second exporter, and the fourth importer, with a significant number of trading partners as well. Table 3.1 summarizes the exports and imports of shark products by Spain in Portugal, according to the latest data from FAO - Fisheries and Aquaculture Information and Statistics Branch, for 2018. Table 3. Import-export of shark products (all species), Spain and Portugal, 2018, according to FAO (online query).		

	Spain		Portugal	
	Quantity (tons)	Value (USD millions)	Quantity (tons)	Value (USD millions)
Import fins	116	1.61	23	0.18
Export fins	2,303	37.91	218	2.35
Import other*	1,809	5.31	177	0.76
Export other	1,046	2,33	2,085	4.27

*Different types of meat products

b) Trade in shortfin mako sharks:

The species is marketed in the form of a wide variety of products, including meat for human and animal consumption (pets), livers, cartilage, fins and skin (FAO, 2019).

There are numerous difficulties in obtaining data for the evaluation of utilization and trade in shortfin mako sharks, as this species is commonly aggregated into higher-level generic catch categories. Very few of the commodity categories used by FAO for chondrichthyans are taxon-specific, and none for mako sharks (there are currently 6 for *Prionace glauca*, 6 for *Lamna nasus*, plus 14 for Squalidae, 2 for catsharks and 20 for sharks in general). The use of commodity codes also varies considerably between States, further complicating product traceability by species and origin (CITES COP17 PROPOSAL 42).

The shortfin mako shark is the second-most common oceanic shark caught by high-seas longline and net fisheries, principally for its high-value fins (Sims *et al.*, 2018 and references therein; the first is the blue shark *Prionace glauca*). It accounted for 2.37% of all samples in Hong-Kong and 4.16% in Guangzhou

	shark fin markets in 2015-2017 – the world's largest fin markets-, coming fourth after blue sharks, silky sharks (*Carcharhinus falciformis*), and requiem sharks (*Carcharhinus* spp.) (Cardeñosa *et al.*, 2020). For this particular species, according to Europêche (2019), Spain marketed 3,000 t in 2017 and 2,000 t in 2016, with profits of €10 million and €8 million respectively. Data from the European Market Observatory for Fisheries and Aquaculture Products (https://www.eumofa.eu/) show that in 2020 the first sales of shortfin mako accounted for 8.7 million Euros in Spain (meat and fins) In Spain, according to the proposal for CITES listing, shortfin mako shark meat costs twice as much as blue shark (*Prionace glauca*) (14.17 USD/kg fresh, compared to 7.63 USD/kg). Spain caught an annual average of 35% of the world total between 2006 and 2016. In that period of time, global catches were distributed as follows: 50% in the Atlantic, 34% in the Pacific, 15% in the Indian Ocean and less than 1% in the Mediterranean. Most of the catch that is landed in Portugal is sent to Spain (Vigo) by land or by sea, as the CITES Authorities of Portugal inform (*in litt.*).		
Magnitude of illegal trade	In Spain, according to Europêche (2019), there is no illegal market for this product in Spain and state controls have eliminated attempts at illegal trade. Less than 1% of shipments of this species have been rejected as illegal since 2011.	Low (Good documentation of domestic and international trade; trade chain transparent)	Medium (Some reliable information but inference and extrapolation required)

QUESTION 3.2 WHAT IS THE SEVERITY OF FISHING PRESSURE ON THE STOCK OF THE SPECIES?

Table 5. Indicators of fishing pressure.

Factor	Indicator	Level of severity of fishing pressure	Level of confidence of the evaluation
North Atlantic			
Fishing mortality (retained catch)	The actual proportion of the stock removed by all fishing activities is not known, but is probably high, as the pressure has been maintained over many years and consistently throughout the year. Large pelagic sharks are subject to four different types of fishing-induced mortality: (1) landing; (2) finning; (3) unintentional capture (hooking) mortality; and (4) postrelease mortality (Campana, 2016). (1) Landing mortality: In 2015, fishing mortality on this stock was estimated to be between 1.93 and 4.38 times the mortality at maximum sustainable yield (F_{2015}/F_{MSY}=1.93-4.39; ICCAT, 2019a). However, ICCAT shark landing reports, in general, are largely believed to be underestimations (Campana, 2016; ICES, 2017), and the actual fishing mortality could be much higher. For example, this author calculated that in 2006 the actual landing volume of shortfin makos from the North Atlantic based on independent data (fin trade, Spanish and Canadian CPUE, US and Portugal	High (High proportion of the stock removed by all fishing activities)	High (information available from authoritative sources with little or no extrapolation or inference required)

	observers' CPUE) ranged between 5,349 and 12,642 t, with an overall mean of 8,698 t, which was more than double that reported to ICCAT (3564 t). There are also recent studies based on fisheries-independent data, indicating very high harvest rates: - Queiroz *et al*. (2019) reported a very high catch rate by Atlantic longliners of *Isurus oxyrinchus* that had been previously tagged with satellite transmitters (19.3% of 119 fish), concluding that at least in that Ocean the fishing mortality of that species is high. - At least 7 out of 32 juvenile *I. oxyrinchus* tagged by Vaudo *et al.* (2017) in the western North Atlantic were harvested (22%). - Byrne *et al.* (2017): 12 of 40 tagged individuals (30%) -primarily immatures- in the North Western Atlantic were harvested. They calculated in the NW Atlantic a 72% probability for a mako shark surviving a year and not being harvested by a fisher, and estimated a fishing mortality (F) = 0.19-0.56, which was 5-18 times greater than estimates of F_{MSY} (fishing mortality at maximum sustainable yield) (0.031-0.038). Other factors that must be considered in assessing the severity of the fishing pressure are its distribution in space and in time: According to Queiroz et al. (2016), the spatial and temporal distribution of the catch effort (of the Spanish and Portuguese fleets) coincides to a high degree with the areas of aggregation of *Isurus* spp. in the North Atlantic according to the data obtained from the individuals followed by telemetric means.		

	Queiroz *et al*. (2019) showed that the overlap of the fishing effort with this species (and with blue sharks in almost identical percentage) is very high (80%) in the areas of intensive use by the mako shark in the Gulf Stream, at the convergence of the latter with the Labrador Current, and in the West African upwelling. Fisheries exploitation covers the main large-scale habitats of shortfin mako throughout its range in the North Atlantic, complementing other recent analyses that indicate overfishing. This overlap held true in two different years (2005 and 2009) and in different seasons, as the fleets follow the sharks to the Gulf Stream/NLCZ in summer, and to the Mid-Atlantic Ridge (MAR) area in autumn. (2) Finning mortality: Finning is prohibited in the EU, but not by ICCAT and some Parties in the North Atlantic. There are no estimates of this type of mortality for this species or stock, but generally speaking, shark fin trade statistics from Hong Kong correspond to much higher volumes of catch than reported by RFOs, indicating that illegal finning continues to be a problematic and major source of shark mortality (Clarke, 2008 *in* Campana, 2016).		
Discard mortality	(3) Unintentional capture (hooking mortality): Hooking mortality may be an important source of unrecorded mortality if a shark dies on the hook and is subsequently discarded. In the North Atlantic, shortfin makos caught by pelagic longlines experience mean hooking rates of 26.2% (range 12-32%; Campana, 2016 and references therein). According to Sims *et*	Unknown (An unknown proportion of total catch is thrown back)	Low (Limited information available)

	al. (2018, and references therein), 60 to 80% of longline-hooked makos reach vessels alive. ICCAT data on discarded shortfin makos are very scarce, probably because many Parties have not recorded them at all. In the last years some Parties, like Spain, have improved in this sense, but the records do not differentiate between sharks discarded alive or dead. (4) Postrelease mortality: This is the mortality of sharks that are caught and released alive but die after being released, due to the injuries, stress, breathing difficulty, and other damages occurred when hooked and hauled on board, or to the manipulation to which they are submitted on board before being released (handling mortality). The proportion of the total catch that is returned to the sea and its actual survival rate is unknown. The survival of released fish has been estimated at 70% (ICCAT 2019a). Campana *et al*. (2015) reported a 30% mortality rate of healthy makos (at the time of unhooking; n=23) and a 33% of injured makos (n=3), in Canadian commercial longline fisheries, but considered these estimates as imprecise. More recently, Miller *et al.* (2020) reported a 22.9% rate of post-release mortality in a sample of 35 shortfin mako sharks tagged in the Atlantic. The following are the known data of discards of the Spanish fleet in all stocks (in tons, provided by MAPA):		

Year/Reason for discard	Prohibited species	Landing not compulsory	Other	Damaged by predators	*De minimis* exemption	Total
2020						594*
2019	6.4	295.6	9.1	0.05	0	311
2018		312.6	0	0.3	19	364
2017	¿	¿	¿	¿	¿	1863

*The sum of 509 tons in the North and 85 tons in the South Atlantic.

Therefore, in 2017-2019 (only until November 2019) there has been a downward trend in discards, but an important increase in 2020. The vast majority of discards have been attributed to "landing not compulsory". The waters and fishing areas where discards have occurred are unknown, although 94% of the catches were made in international waters in 2018, as an example (although in subsequent years the Spanish catch came increasingly from territorial waters or EEZ).

The number of sharks that were discarded alive or dead is not specified in the Spanish data, but supposedly all living specimens should have been released. However, it must be said that the lucrative fin trade is a strong motivator for retaining shark fins and/or bycatch (Campana, 2016), and the low coverage of independent observers (5-8% for instance in the Spanish fleet) and the scarcity of Electronic Observation Systems do not permit to verify independently the actual number of shortfin makos that are alive at-haul.

Spain applied in 2019 and 2020 a catch limitation for *Isurus oxyrinchus*, which consisted in limiting each vessel’s catch to its average catch in previous years

	("*De minimis* exemption"), in particular to that of 2017 (this was before the 2020 Spanish NDF was issued). Thus, it could well be that longliners retained all shortfin makos (dead or alive) until they reached that limit, and once they reached it they started discarding specimens in order not to exceed it. In 2018 the Spanish fleet could have started making efforts to release live fish from the beginning of the fishing trips as a result of the negative assessment received in the MSC (Marine Stewardship Council) certification process for swordfish and of Recommendation 17-08-BYC. This would explain the sharp decline in discards between 2017 and 2018. In 2020, the CITES SA of Spain issued an NDF for 350 tons, but the fleet retained 886 tons and registered a very high quantity of discards. Sims *et al.* (2018) illustrated with 2016 data from ICCAT that the minimum expected mortality due to the sum of the postrelease mortality of makos hauled alive (reported catch * 0.8 * 0.3) plus the mortality of retained makos (reported catch * 0.2), would total ca. 1,400 tons. If data for 2018 were used instead, this total mortality would sum 820 tons.		
Size/age/sex selectivity	There is no intended size/age/sex selectivity, but in practice, nearly all specimens caught are immature. In the Atlantic, some sources (ICCAT 2019a) indicate that most of the fish caught are juveniles under 10 years of age, and the Spanish fleet rarely catches pregnant females. It is possible that fleets concentrate their effort in areas favored by juveniles, but there are also other alternative explanations such as the possibility of very few reproducing adults remaining, among others. In the SW Indian Ocean (Groeneveld *et al*., 2014), pelagic longline fisheries also harvested immature specimens in 2005-2010. The effect of catching mostly immature specimens has a particularly detrimental impact in the conservation status of the stock Juvenile survival rather than	Unknown (possibly high, because in practice fisheries are highly selective for immatures, although it is not known if this has a negative	Medium (some information available but inference and extrapolation required)

	fecundity is a crucial factor contributing to population growth rate, especially in longer-lived sharks given their life-history traits (Bonanomi *et al.,* 2017). Detailed data on frequencies of lengths, ages and sexes of catches have been registered both in Spain and Portugal but have not been available for this NDF.	impact on sustainability)	
Magnitude of illegal, unreported and unregulated (IUU) fishing	According to Europêche (2019), there is no illegal market for this product in Spain and state controls have eliminated attempts at illegal trade. Less than 1% of shipments of this species have been rejected as illegal since 2011. Catches are well documented, and the trade chain is transparent, with no reason to believe that there is a divergence between the volume of extraction and the volume of legal trade. There are no data on illegal trade in other countries.	Low (Good documentation of catches; trade chain transparent)	Medium (some information available but inference and extrapolation required)

STEP 4. EXISTING MANAGEMENT MEASURES

QUESTION 4.1(a). ARE EXISTING MANAGEMENT MEASURES APPROPRIATELY DESIGNED AND IMPLEMENTED TO MITIGATE THE PRESSURES AFFECTING THE STOCK/POPULATION OF THE SPECIES?

Table 6. Existing management measures.

SUMMARY OF MAIN EXISTING MANAGEMENT MEASURES
Management measures established by RFOs (in force)
International Commission for the Conservation of Atlantic Tuna (ICCAT): – Recommendation 04-10-BYC, to make full use of retained shark catches, release all live sharks (provided they are not used for food or subsistence) and do not carry onboard more than 5% of the weight of fins of sharks caught. – Recommendation 07-06, for Parties to report estimates of dead discards and size frequencies of makos. – Recommendations 14-06-BYC, 10-06-BYC, for Parties to report information on actions taken domestically to monitor catches, conservation and management of makos. – Recommendation 2011-10 BYC, on information collection and harmonization of data on by-catch and discards. – Resolution C-04-05 (REV 2) calls for the release of all sharks resulting from bycatch. – Resolution C-05-03, sharks may not be retained on board, transshipped, landed, transferred, stored, sold, displayed or offered for sale. Each Party shall implement its IPOA-Sharks, submit annual reports of shark catches, utilize the total catch, and keep on board no more fins than 5% of the total weight of sharks. Non-directed fisheries for sharks shall release live specimens (provided they are not used for food or subsistence), develop research in more selective fishing gear and on shark nursery areas. – [Recommendation 17-08-BYC, requiring that captured North Atlantic *Isurus oxyrinchus* be promptly released (if caught alive) to stop overfishing, with certain exceptions. This measure was in effect until December 31, 2019.] – Recommendation 2018-06, to enhance the review of compliance with shark conservation and management measures. - Recommendation 19-06 BYC, maintained the measures included in 17-08-BYC and, furthermore, urged Parties to take additional measures to stop overfishing and to rebuild the stock, required that discard data for live specimens be provided from 2020 onwards

(already requested before), and also announced that a new recommendation will be adopted to establish a rebuilding plan for this stock. In addition, ICCAT, at its 2019 annual meeting, extended its mandate to the management of oceanic species of sharks and rays, amending the text of the International Convention for the Conservation of Atlantic Tunas.

- In November 2021, ICCAT adopted a new recommendation (Rec. N.º 21-09; Annex 3) which establishes a recovery programme, starting in 2022, with the aim of stopping overfishing immediately and securing levels of biomass which permit a maximum sustainable yield by 2070, with a probability between 60 and 70%. The programme sets a moratorium for 2022 and 2023, when retention, transhipment and landing of shortfin makos from the North Atlantic is forbidden. Once the moratorium is over, and until further assessments by the SCRS are published, the total mortality (including discards) must not exceed 250 tons. In case any retention is permitted in the future if mortality is driven below the objectives set by the plan, the same conditions as in Recommendation 19-06 BYC will apply (obligation of having an observer on board or an Electronic Observation System in operation, in order to retain makos which are already dead at haul), and only 1 shortfin mako per fishing trip would be allowed for vessels of 12 meters or less. Furthermore, the recommendation includes a full set of safe handling practices, and states that Parties will have to report their catch, retained and discarded volumes on a monthly basis, among other measures. The EU has been applying this recommendation since January 2022.

Management measures established by the European Union

- The CITES Scientific Review Group (SRG), in its meeting of December 3, 2020 (SRG92), adopted four opinions concerning the North Atlantic stock of shortfin makos, in force since January 1, 2021:
  1) A negative opinion for the import of specimens taken in the marine environment not under the jurisdiction of any State (code X) (i.e. commonly known as “introduction from the sea”, applies to vessels registered in the EU).
  2) A negative opinion for imports (code W; applies to all vessels).
  3) A negative opinion for imports of shortfin makos fished by vessels registered in the Republic of Senegal.
  4) A negative opinion for imports of shortfin makos fished by vessels registered in the Republic of Panama.
- [Note that in addition to these opinions, the SRG will decide early in 2022 whether to set 0 quotas for exports and re-exports of shortfin mako sharks from the North Atlantic stock. If such quotas are approved, exports and re-exports from the EU will not be permitted of makos fished in territorial, EEZ or international waters, whether caught by EU or non-EU fishing vessels.]

- COUNCIL REGULATION (EU) 2022/109 of 27 January 2022 fixing for 2022 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in Union waters and for Union fishing vessels in certain non-Union waters does not include any total allowable catch limit for shortfin makos of the North Atlantic stock on account of the prohibition on retaining on board, transhipping and landing, whole or in part, North Atlantic shortfin mako caught in association with ICCAT fisheries as set out in ICCAT Rec 21-09 which the EU is applying as of January 2022.
- REGULATION (EU) 2019/1241 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 on the conservation of fisheries resources and the protection of marine ecosystems through technical measures. Art. 14.1 provides the possibility of Member States conducting pilot projects with the aim of exploring methods for the avoidance, minimization and elimination of unwanted catches. Art. 14.2 states that where the results of these pilot studies or other scientific advice indicate that unwanted catches are significant, the relevant Member States shall endeavor to establish technical measures to reduce such unwanted catches in accordance with Article 19 of Regulation (EU) No 1380/2013 (note: this makes reference to waters of the Union).
- REGULATION (EU) No 1380/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 on the Common Fisheries Policy (CFP), stating among others the following objectives (Article 2):
  - 1. The CFP shall ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and of contributing to the availability of food supplies.
  - 2. The CFP shall apply the precautionary approach to fisheries management, and shall aim to ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels which can produce the maximum sustainable yield (…).
  - 3. The CFP shall implement the ecosystem-based approach to fisheries management so as to ensure that negative impacts of fishing activities on the marine ecosystem are minimised, and shall endeavour to ensure that aquaculture and fisheries activities avoid the degradation of the marine environment.
- REGULATION (EC) No 1077/2008 on the implementation of electronic recording and reporting of fishing activity and on means of remote sensing: makes the use of an electronic logbook (ELO) compulsory on most fishing vessels, through which the catch data of each vessel are communicated to the control centers. Vessels longer than 15 meters have to use so-called blue boxes or VMS, which monitor the movement of the vessel every two hours, indicating its exact position and the nature of its activity (fishing, sailing, etc.).

- COUNCIL REGULATION (EC) No 520/2007 of 7 May 2007 laying down technical measures for the conservation of certain stocks of highly migratory species and repealing Regulation (EC) No 973/2001: provides that Member States shall encourage the release of live sharks caught accidentally, in particular juveniles, and the reduction of sharks discards by improving the selectivity of fishing gears. It lists all Lamnidae as highly migratory species.
- Council Regulation (EC) No 1185/2003 on the removal of fins of sharks on board vessels, as amended by Regulation (EU) No 605/2013.
- Council Regulation (EC) No 1224/2009 of 20 November 2009, as well as Implementing Regulation (EU) No 404/2011, provides for the satellite-based Fishing Vessel Monitoring System at EU level.
- COUNCIL REGULATION (EC) No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein (*Isurus oxyrinchus* is included in its Annex B).
- European Union Action Plan for the Conservation and Management of Sharks.

Management measures established by Spain

FISHING:

- Law 3/2001, of 26 March, on State marine fishing: establishes the legal parameters for fishing, in line with European regulations.
- Order APM/1057/2017, of 30 October, and Order AAA/658/2014: restricts the capture of the species to vessels registered in the Unified Census of Longline Vessels that use surface longlines, and defines capture areas.
- Order APA 3660/2013 of 22 December and its modification by ORDER ARM 3238/2008 of 5 November, regulate the Satellite Fishing Vessel Location System in Spain.
- Up to 2019, Spain applied the catch limitation for *Isurus oxyrinchus* consisting of not allowing each vessel to exceed its maximum catch in 2017, according to information provided by MAPA.
- In 2021, the Ministry of Fisheries of Spain instructed the fleet to retain a maximum of 2 shortfin makos per fishing trip in ICCAT waters.

An extensive description of the swordfish fishery management system, and that of by-catches, can be found in the 2016 Bureau Veritas assessment report on North and South Atlantic swordfish fisheries (Bureau Veritas, 2016). The fisheries were evaluated to certify with the

MSC label swordfish caught by the Longliners Associations of La Guardia (OPAGU) - together with the Spanish Fishing Confederation (CEPESCA) -, but did not achieve the required score in the evaluation.

COMMERCE:
- Royal Decree 418/2015 of 29 May, regulating the first sale of fishery products and the traceability of the fishing products from third countries at the time of entry into the national territory.

CITES:
In 2020, Spain issued a positive NDF for a volume of 350 tons for its fleet in the North Atlantic stock, while Portugal limited its catch to a volume of 69 tons, as initial steps for further reductions in the catch (the actual catch was much larger than those limits in both countries).
In 2021, Spain issued no NDF for the North Atlantic stock for its own fleet, nor authorized introductions from the sea, imports, exports or re-exports of this stock, in application of the SRG decisions mentioned earlier.

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Table 7. Assessment of the appropriateness of existing management measures.

ASSSESSMENT OF THE APPROPRIATENESS OF EXISTING MANAGEMENT MEASURES				
A. HARVEST-RELATED MANAGEMENT MEASURES				
TYPE OF MEASURE	AIM(S)	PRESSURE ADDRESSED	ARE THERE APPRO-PRIATE MEASURES TO ACHIEVE THE AIMS?	MEASURES
1)Limited entry	To limit fishing mortality by restricting access to the fishery to a specific group or number of operators (as the first step in controlling fishing effort).	Fishing mortality	Yes	In Spain, there is a solid system of permits, regulated by Order APM/1057/2017 of 30 October: it restricts the catch of the species to vessels registered in the Unified Census of Longline Vessels using surface longlines, and defines the catch areas.
2)Fishing time restrictions	i. To limit fishing effort by restricting number of days that fishers can operate	Fishing mortality	No	In Spain, there are no seasonal time restrictions (closures), nor are there daily time limits on catches.
	ii. To increase selectivity of fishing operations to minimize take of	Size/sex/age selectivity	No	

	certain segments of target stock, or of non-target species			
3) Fishing gear restrictions	i. To limit fishing effort by controlling quantity of gear that can be deployed or type of gear that can be used	Fishing mortality	Yes	In Spain: - Only surface longlines are permitted to catch the species. - The characteristics of the longline must follow the rules of each RFB. - There are no measures to increase the selectivity -specified or size/sex- of the gears and decrease the bycatch. - There are no measures to limit the immersion time of longlines.
	ii. To improve selectivity of the gear so as to avoid catching particular size/life stages of target species or non-target species	Size/sex/age selectivity	No	
	iii. To improve post-release survivorship	Discard mortality	No	
4) Permanent area closures	To protect certain segment of the target species population (e.g. nursery area)	Fishing mortality	No	Non-existing in the North Atlantic in international waters (see next row).
5) No-take marine protected areas	To minimize fishing mortality of one or more species or to protect certain habitat/ecosystem types	Fishing mortality	No	There are 7 Marine Protected Areas in international waters of the North Atlantic, under the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), covering 464,940 km2 or 8% of the Convention's area, as shown in the following figure (10) and table.

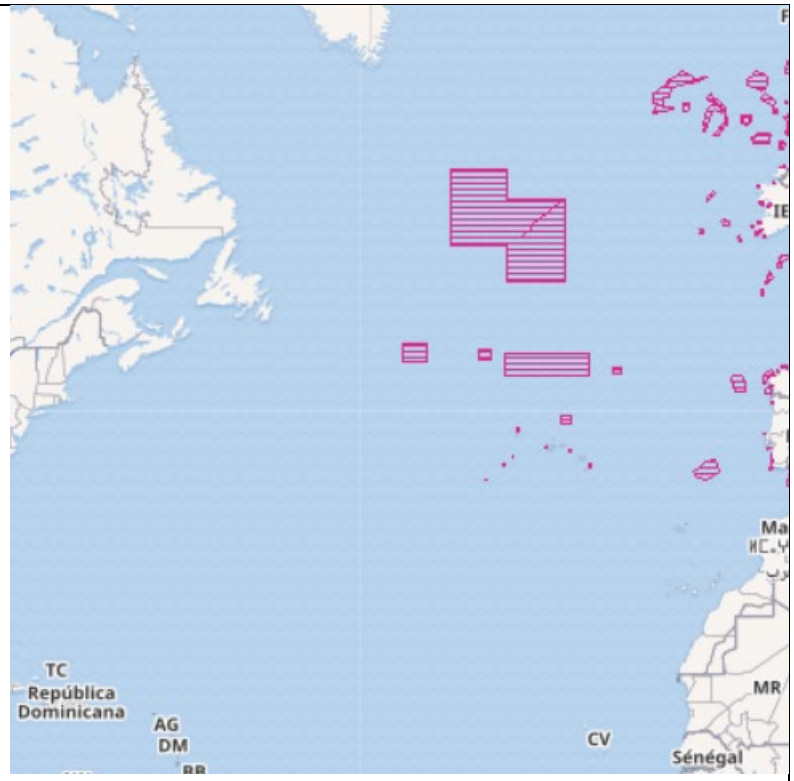

Figure 10. OSPAR Marine Protected Areas in the North Atlantic.

NAME	SURFACE
ALTAIR SEAMOUNT HIGH SEAS MPA	4 384.23 km²
ANTIALTAIR SEAMOUNT HIGH SEAS MPA	2 807.51 km²
CHARLIE-GIBBS NORTH HIGH SEAS MPA	177 764.04 km²

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<tr><td>CHARLIE-GIBBS SOUTH HIGH SEAS MPA</td><td>145 835.40 km²</td></tr>
<tr><td>JOSEPHINE SEAMOUNT HIGH SEAS MPA</td><td>19 401.50 km²</td></tr>
<tr><td>MAR NORTH OF THE AZORES HIGH SEAS MPA</td><td>93 595.51 km²</td></tr>
<tr><td>MILNE SEAMOUNT COMPLEX MPA</td><td>20 915.41 km²</td></tr>
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None of these areas have been specifically designated to protect this species. These areas do not have legal status and some fishing activities such as surface longlines are theoretically regulated in them, but not prohibited.

In addition to these international areas, there are numerous MPAs in the territorial waters of different countries.
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<td>6) Total Allowable Catch (TAC)</td>
<td>To limit fishing mortality on a species or a group of species</td>
<td>Fishing mortality</td>
<td>No</td>
<td>There are no formal TACs for the species, though the following restrictions have been adopted:
The CITES Scientific Authority of Spain established a catch limit of 350 tons for 2020.The EU established a total allowable catch of 288.43 tons for 2021 and conditions for the retention (see above).
– For 2022, and until further notice, there will be no catch permitted in the EU Regulation on fishing</td>
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				opportunities, in line with the ICCAT moratorium of retention and landing for 2022-2023. From January 1, 2021, the following negative opinions of the CITES Scientific Review Group are in force in this stock: – import of code X specimens (introduction from the sea). – import of code W specimens. – Spain issued no NDF for this stock in 2021, and did not authorize introductions from the sea, imports, exports or re-exports.
7) Individual quota (IQ)	To provide individual fishers or community groups with security of access to a specific portion of the TAC	Fishing mortality	No	Although there is no TAC, Spain set a catch limit per vessel based on its maximum catch in 2017, until 2019; in 2021, it set a limit of 2 retained shortfin makos per fishing trip in ICCAT waters (information provided by MAPA).
8) Fishing trip limits	To control mortality of target or non-target species	Fishing mortality	No	No action has been taken in this regard.
9) Prohibited retention	To minimize fishing mortality of a certain species	Fishing mortality	No	- The above-mentioned ICCAT recommendations, without prohibition. - The limitations imposed in the EU for this stock by the COUNCIL REGULATION fixing the Fishing Opportunities (EU) 2021/92 of 28 January 2021: 1) Only fish already dead when brought alongside the vessel can be retained on-board under this catch limit.

				2) Only vessels with either an observer or a functioning electronic monitoring system on board, which can identify whether the fish is dead or alive, can retain on-board shortfin mako.
10) Fish size limits	(i) To ensure each fish can reproduce at least once prior to capture and that fish are not removed before reaching a size at which maximum growth and productivity would be obtained from the stock	Size/sex/age selectivity	No	There are no limitations on this.
	(ii) To maximize contribution of individuals to the stock	Size/sex/age selectivity	No	
11) Protection of breeding females	To protect breeding females in order to minimize the impact of fishing on recruitment to the stock	Size/sex/age selectivity	No	No action has been taken in this regard.

12) Product-form restrictions	To reduce fishing mortality on a species	Fishing mortality	(Yes)	Finning is prohibited in the EU (Council Regulation (EC) No 1185/2003 on the removal of fins of sharks on board vessels, as amended by Regulation (EU) No 605/2013).
13) Move-on provisions	To minimize fishing mortality of a certain species, usually a non-target species	Fishing mortality	No	No action has been taken in this regard.
14) Bycath Reduction Devices (BRD)	To reduce fishing impacts on a non-target species	Fishing mortality	No	No measures are applied in this regard.
B. TRADE-RELATED MANAGEMENT MEASURES				
1) Documentation schemes	To assist in validating catch data and/or minimizing opportunities for product taken by IUU fishing to reach markets	Magnitude of legal trade; Magnitude of illegal trade	Yes	Catch data are documented and validated and trade documentation programs are in place.
2) Export quotas	To limit export volumes in the expectation that this will limit catches and hence fishing mortality	Magnitude of legal trade	No	They do not exist in Spain, Portugal or in the EU. [Note that the following trade restrictions are in force in the EU from January 1, 2021: negative opinions of the CITES Scientific Review Group for the: - import of code X specimens (introduction from the sea). - import of code W specimens.]

The analysis in table 7 (above) shows that the measures currently in place in the EU are appropriate in that they limit the access to the resource (permits), limit fishing effort by restraining the types of gear allowed to fish the species, reduce fishing mortality (most notoriously, by the negative opinion adopted by the CITES Scientific Review Group for imports of code X -introduction from the sea- and of code W specimens), and minimize the opportunities for IUU fishing to reach the market.

The data and rationale that were presented in the first version of this (negative) NDF are still valid at the time of elaborating the current update of the NDF (December 2021), and the new catch data for 2020 and 2021 do not justify any change to its conclusions or to the standing SRG opinions (adopted in December 2020 when the first version of the NDF was presented). Moreover:

1) In practice in 2021 shortfin makos could still be legally fished by EU vessels in territorial waters and the EEZ of EU Member States and landed in the Union,-- within the limits of the catch limit (288.54 tons) established by Council Regulation (EU) 2021/92--, whereas these particular landings were not regulated by CITES. Hence, these specimens could subsequently be legally traded within the EU, or
2) exported, in theory, out of the EU following the prescriptions in the EU CITES Regulation (a CITES export permit and the corresponding NDF would be required).

This is so because the SRG has not imposed so far any restrictions to exports and re-exports of shortfin makos from the North Atlantic stock. Note, however, that although exports of specimens fished in territorial waters or in the EEZ (point 2 above) of the EU MS are theoretically possible, in practice no NDF can be issued for them. Such an NDF would necessarily be based on the same data, and follow the same rationale, as the analysis performed for introduction from the sea and imports, which resulted in the impossibility of issuing an NDF for those other cases. The Scientific Authority of Spain applied this argument in 2021 and issued no NDF for exports at all, nor was it consulted regarding re-exports (in application of article 5.3 of Regulation 338/97).

In conclusion, the existing battery of management measures is not completely appropriate to combat the problems associated with the catch of this stock, given that shortfin mako sharks fished in territorial waters or the EEZ of the EU MS can still be landed and traded within the EU, and are also eligible for export in theory. As the true aim of the SRG in adopting the standing negative opinions for IFS and imports in this stock was to halt completely the trade in the species in the EU, it is necessary for the SRG to decide as well on whether to introduce 0 quotas for the export and re-export of shortfin mako sharks from the North Atlantic, wherever they were sourced (prior to the moratorium that ICCAT has established for 2022 and 2023).

As regards the control of the application of the existing measures, it seems to be good in Spain and Portugal, and in the whole of the EU, as there are multiple measures to control fishing activity such as inspections of vessels and fishing permits in ports and at sea, control of the movements of the vessels and where and when the catches and landings occur

(Logbook on board, blue boxes or VMS, Fisheries Monitoring Center, etc.), on-board observer programmes (from the RFO, Spain and Portugal) reaching 8% of the vessels in this area (in Spain, according to information provided by MAPA), prohibition of transhipments, detailed control of the whole chain of trade, etc.

Note that ICCAT approved a new Recommendation (21-09; Annex 3) in December 2021 that introduces a rebuilding programme for the stock starting in 2022 to end overfishing immediately and gradually achieve biomass levels sufficient to support maximum sustainable yield (MSY) by 2070 with a probability of a range of between 60 and 70% at least. The programme includes a a prohibition on retaining on board, transhipping and landing, whole or in part, North Atlantic shortfin mako caught in association with ICCAT fisheries in 2022 and 2023 as a first step in rebuilding the stock. The effects of Recommendation 21-09 will be duly analysed by the SRG in due time in future updates of the current document.

QUESTION 4.1.B Are existing management measures effective (or likely to be effective) in mitigating the pressures affecting the stock/population of the species?

The North Atlantic stock of shortfin mako was assessed as overfished and still subject to overfishing by ICCAT already in 2017, after which it approved Recommendation 17-08 -- in 2017 -- which required the release of live specimens caught on longlines, with a few exceptions under which Spain and Portugal continued retaining a significant catch, though smaller than in preceding years. Due to this measure and probably also because of the rarefaction of the species, the Spanish catch in particular was reduced by about 50% from 2017 to 2019 (but note that it increased by 6% from 2019 to 2020). The catch of Portugal, on the contrary, increased by 24% from 2017 to 2020.

In 2019, ICCAT's SCRS updated its assessment of the stock, providing in addition worrying projections for the future. The SCRS concluded that ICCAT should adopt a no-retention policy accompanied by further measures to reduce the incidental catches, such as the reduction of the setting time, temporary closures of some areas, and adopting the best practices for the safe management and release of specimens. It is noteworthy that even under a complete no-retention policy, the stock would continue to decline until 2035, and with the level of fishing effort experienced until 2018 the mortality under a retention ban could still be as high as 1,000 tons. The SCRS considered the measures in force at that time to be insufficient to rebuild the stock within two generations time.

The 26th Regular Meeting of ICCAT did not follow the SCRS advice and approved instead the renewal of Recommendation 17-08 (renamed as 19-06).

In the spring of 2019, the IUCN published its own assessment, depicting a globally Endangered and declining species, and a North Atlantic stock in the same status.

In the summer of 2019, the 18th CITES CoP approved the inclusion of the shortfin mako shark in Appendix II, with the support of the EU. The inclusion in Annex B of Regulation 338/97 entered into force in the EU on December 14 of the same year.

In light of these assessments and developments, the management measures in force in the autumn of 2019 had not proved to be effective for the conservation of the stock, in the sense of Mundy-Taylor *et al.* (2014) (i.e. positive results had not been demonstrated through robust monitoring).

In 2020, Spain issued a positive NDF for a volume of 350 tons for its fleet in the North Atlantic stock, while Portugal limited its catch to a volume of 69 tons, as initial steps for further reductions in the catch (the actual catch was much larger than those limits in both countries).

In November 2020, the European Union tabled a proposition at the annual meeting of the ICCAT Commission for a maximum catch volume of 500 tons in this stock, with accompanying measures aiming to build a recovery plan for the stock, as well as tight

conditions for the retention and landing of specimens. Neither the EU proposition, nor others with different measures proposed by other Parties (including a proposition by Senegal for no retention) were adopted by ICCAT, and the only decisions concerning this stock were the renewal of recommendation 19-06 for 2021, and the announcement of a specific meeting in 2021. This result was a repetition of what had happened in the previous year.

Aware of the news from ICCAT, the EU CITES Scientific Review Group (SRG) examined on December 3, 2020, an EU-wide NDF for the introduction from the sea of shortfin mako sharks of the North Atlantic stock caught by vessels registered in the EU (applicable to all EU MS). Consequently, the SRG issued negative opinions for imports of specimens with source code X (i.e. introduction from the sea – IFS) and with source code W. In practice, since January 1, 2021, EU vessels are not allowed to land shortfin mako sharks of the North Atlantic stock fished in international waters, as no CITES import/IFS permits are issued for these landings. Imports of shortfin mako sharks with code W from this stock are also precluded as no CITES import permits are issued for them (be it fish caught by non-EU vessels or by EU-vessels and landed in non-EU countries for which import permits are required).

After the SRG established those opinions, the EU set for its vessels -- through COUNCIL REGULATION (EU) 2021/92 of 28 January 2021 -- a catch limit of 288.54 tons of shortfin makos of this stock. The volume corresponds to 57,7% (which is the average share of the EU in the total catch in the North Atlantic stock in recent years) of 500 tons (the maximum catch volume that with a 52% probability would let the stock to recover in 2070, according to ICCAT's SCRS). Note that this limit was not a regular TAC, which is a concept that does not apply to a supposedly bycatch species as this one.

In summary, the situation in 2021 was that EU vessels could legally introduce into the Union up to 288.54 tons of shortfin mako sharks of the North Atlantic stock fished in the territorial waters and EEZ of EU Member States, without CITES permits, as CITES regulations are not applicable in these cases. EU vessels can do the same in territorial and EEZ waters of countries holding bilateral fishing agreements with the EU (such as Mauritania and Cape Verde). These goods can subsequently be legally traded within the EU.

Note as well that goods originating from introduction from the sea and that are to be sent out of the Union, are in fact re-exports and not exports, because the goods had been previously introduced in the Union from the high seas with its respective IFS permit (which is equivalent to an import permit). As introduction from the sea is not authorized in the EU by CITES authorities, there is no possibility of re-exporting these goods either.

There are also mako sharks fished by EU vessels in territorial or EEZ waters of non-EU countries with no fishing agreements. In practice, these goods cannot be consequently imported into the EU as they should be assigned code of origin "W" and are subject to the negative opinion of the SRG.

Finally, if an EU vessel fished in the high seas and wished to land the catch in a non-EU country, it would require an export permit and NDF by the EU MS, which is highly unlikely to be issued on account of the negative SRG opinions.

At its 2021 General meeting in November, ICCAT approved a new recommendation, presented in detail above, developing a new recovery programme for the North Atlantic stock which includes, among other measures, a *de facto* moratorium for the retention, transhipments and landings of these specimens. On account of this moratorium, the new Council Regulation fixing the fishing opportunities in 2022 in the EU does not permit the retention of the species in this stock and, unlike in 2021, will not include a catch limit for it.

The current SRG negative opinions for the introduction of the sea and imports of specimens of the North Atlantic stock remain valid. Furthermore, in early 2022 the SRG will decide whether to complement those opinions with 0 quotas for exports and re-exports of shortfin mako sharks of this stock. The SRG will also examine any new data and measures that might be taken in the future and decide accordingly on eventual changes to its own measures.

STEP 5. NON-DETRIMENT FINDING AND RELATED ADVICE

QUESTION 5.1 BASED ON THE OUTCOMES OF THE PREVIOUS STEPS, IS IT POSSIBLE TO MAKE A POSITIVE NDF (WITH OR WITHOUT ASSOCIATED CONDITIONS) OR IS A NEGATIVE NDF REQUIRED?

Step 2: Intrinsic biological vulnerability and conservation concern			
Intrinsic biological vulnerability (Question 2.1) **Conservation concern (Question 2.2)**			**High** Medium Low Unknown **High** Medium Low Unknown
Step 3: Pressures on species			**Step 4: Existing management measures**
Pressure	**Level of severity (Questions 3.1 and 3.2)**	**Level of confidence (Questions 3.1 and 3.2)**	**Are the management measures effective at addressing the concerns/pressures/impacts identified? (Question 4.1(b))**
Trade pressures			
(a) Magnitude of legal trade	**High** Medium Low Unknown	**High** Medium Low Unknown	Yes **Partially** No Insufficient information Not applicable
(b) Magnitude of illegal trade	High Medium **Low** Unknown	High **Medium** Low Unknown	**Yes** Partially No Insufficient information Not applicable
Fishing pressures			
(a) Fishing mortality (retained catch)	**High** Medium Low Unknown	**High** Medium Low Unknown	Yes Partially **No** Insufficient information Not applicable
(b) Discard mortality	High Medium Low **Unknown**	High Medium **Low** Unknown	Yes Partially **No** Insufficient information Not applicable
(c) Size/age/sex selectivity of fishing	High Medium Low **Unknown**	High **Medium** Low Unknown	Yes Partially **No** Insufficient information

(d) Magnitude of IUU fishing	High Medium **Low** Unknown	High **Medium** Low Unknown	**Yes** Partially No Insufficient information Not applicable

A) Can a positive NDF be made?	YES - *go to B*	**NO** - *go to Step 6 and list recommendations for measures to improve monitoring/management under Reasoning/comments below*
B) Are there any mandatory conditions to the positive NDF?	YES - *list under Reasoning/comments below and go to C*	**N/A**
C) Are there any other further recommendations? *(e.g. for improvements to monitoring/management)*	YES - *go to Step 6 and list recommendations for measures to improve monitoring/management under Reasoning/comments below*	**N/A**

Reasoning/comments *(include justification for decision made and information on mandatory conditions and/or further recommendations):*

The current document has shown that the shortfin mako shark, an important component of marine ecosystems as an apex predator, is an endangered, highly migratory, and highly vulnerable species whose North Atlantic stock is subject to constant and enduring high fishing and trade pressures, with tens of thousands of – mainly immature -- specimens harvested each year. This work has also compiled relevant evidence suggesting that this resource is in fact targeted by some fisheries -- due to the high demand for this product and the high prices that it attains –, seriously questioning the commonly assumed categorization of this harvest as by-catch or incidental catch.

The severe decline of this stock, illustrated by data such as the recent assessment of ICCAT as overfished and still experiencing overfishing, **proves that the management of the North Atlantic stock of shortfin makos (*Isurus oxyrinchus*) has not been effective**.

The two CITES Scientific Authorities of the EU Member states that exploit this stock – Spain and Portugal – already limited the export in 2020 to a volume consistent with putting a stop to overfishing (which could be attained with a TAC of 700 tons according to the SCRS of ICCAT). Nevertheless, the catch of the Spanish fleet in 2020 was even larger than that of 2019, when no NDF existed. Portugal has an increasing catch record in the last years. The measures adopted in 2020 were insufficient in the medium and long-term and, from 2021 on,

the SRG adopted negative opinions for introduction from the sea and imports of specimens of this species in the whole of the EU. Despite this, Spain and Portugal still landed –at least- 237.4 tons under the provisions of Council Regulation (EU) 2021/92 of 28 January 2021 fixing the fishing opportunities for 2021[1]

,

Therefore, the CITES Scientific Authorities of the Member states of the European Union, in application of Article 4 paragraph 2(b) of the *COUNCIL REGULATION (EC) No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein*, stating that before import permits are issued the CITES Scientific Authorities shall give their opinion on whether the introduction into the EU would not have a harmful effect on the conservation status of the species or on the extent of the territory occupied by the relevant population of the species, taking account of the current or anticipated level of trade:

1. **Having reexamined the effects of the trade in specimens of the North Atlantic stock in December 2021, cannot issue a Non Detriment Finding for the introduction from the sea (source code X) and imports (code W) of shortfin mako sharks (*Isurus oxyrinchus*) of this stock (as defined by ICCAT) captured from 1 January 2021.**
2. **Consequently, the negative opinions for introduction from the sea (source code X) and imports (code W) of shortfin mako sharks of the North Atlantic stock, remain valid.**
3. **The SRG will decide in early 2022 whether to adopt 0 quotas for export and re-exports from the EU of specimens of the North Atlantic stock.** If adopted, these quotas shall be reviewed by the SRG every year in accordance with CITES Res. Conf. 14.3 (Rev. CoP15).
4. The SRG acknowledges ICCAT rebuilding programme as an important step forward, and will duly analyse new scientific data of its effects when they are available (especially new stocks assessments by ICCAT SCRS), as well as any other relevant scientific information eventually provided by other sources.

[1] Note that Council Regulation (EU) 2022/109 of 27 January 2022 fixing for 2022 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in Union waters and for Union fishing vessels in certain non-Union waters, in line with ICCAT Rec 21-09, estates in its article 25.6 the following:
It shall be prohibited to retain on board, tranship or land any part or whole carcass of North Atlantic shortfin mako (Isurus oxyrinchus) caught in fisheries in the ICCAT Convention Area

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ANNEX

1. SUMMARY TABLES OF THE NORTH ATLANTIC STOCK ASSESSMENT (ICCAT)

2019 SCRS REPORT

NORTH ATLANTIC SHORTFIN MAKO SUMMARY

Current Yield (2018)		2,388 t[1]
Yield (2015)		3,227 t[2]
Relative Biomass	B_{2015}/B_{MSY}	0.57-0.95[3]
	B_{2015}/B_0	0.34-0.57[4]
Relative Fishing Mortality	F_{MSY}	0.015-0.056[5]
	F_{2015}/F_{MSY}	1.93-4.38[6]
Stock Status (2015)	Overfished	Yes
	Overfishing	Yes
Management Measures in Effect:		Rec. 17-08, Rec. 04-10, Rec. 07-06 Rec. 10-06, Rec. 14-06

[1] Task I catch.
[2] Task I catch used in the stock assessment.
[3] Range obtained from 8 Bayesian production and 1 SS3 model runs. Value from SS3 is SSF/SSF_{MSY}. Low value is lowest value from 4 production model (JABBA) runs and high value is from the SS3 base run.
[4] Range obtained from 8 Bayesian production and 1 SS3 model runs. Value from SS3 is SSF/SSF_0. Low value is lowest value from 4 production model (JABBA) runs and high value is highest value from 4 production model (BSP2JAGS) model runs.
[5] Range obtained from 8 Bayesian production and 1 SS3 model runs. Value from SS3 is SSF_{MSY}. Low value is lowest value from 4 production model (JABBA and BSP2JAGS) runs and high value is from the SS3 base run.
[6] Range obtained from 8 Bayesian production and 1 SS3 model runs. Values from the production models are H (harvest rates). Low value is lowest value from 4 production model (BSP2JAGS) runs and high value is from the SS3 base run and highest value from 4 production model (JABBA) runs.

2. THE FIP BLUES PROJECT (SPAIN)

NOTE: This relevant project of the Spanish swordfish longline fishery could have important positive effects on the shortfin mako shark stock of the North Atlantic and on other stocks. However, the Project has not yet produced tangible results or brought changes to the management of the fisheries, so is not considered in the analysis of existing management measures or elsewhere in the current NDF, and the following information is included here only for information purposes.

As a result of not having achieved in 2016 the necessary score to obtain the MSC label for swordfish caught (in the North and South Atlantic) by the Longliners Associations of La Guardia (OPAGU) - together with the Spanish Fishing Confederation (CEPESCA) -, this organization has undertaken at the end of 2019 a FIP (Fishing Improvement Project) called FIP Blues (Blue Shark Swordfish EU Surface Longliners) with the aim of obtaining the MSC certification for swordfish and blue shark in the Atlantic in 2024. The rest of the Galician swordfish longliners also participate in FIP Blues through organizations of fishing producers (OPROMAR OPP-08, OPP-07 LUGO and OPPC-3), 160 vessels and 12 companies that make up the National Association of Companies of Traders and Transformers of Highly Migratory Species (ANECTEAM). The project has the cooperation of WWF and renowned scientists. FIP Blues covers the fisheries of the North and South Atlantic, the Western and Central Pacific, and the Indian Ocean, although its work will begin in the Atlantic to gradually extend to the rest of the aforementioned fishing areas.

The FIP Blues Action Plan contains specific tasks concerning shortfin mako and sharks in general, in addition to other general measures that would also help mitigate the impact on makos (http://fipblues.com/objetivos#pll_switcher; https://fisheryprogress.org/fip-profile/atlantic-ocean-blue-shark-and-swordfish-surface-longline):

Action Name	Tasks
1. Harvest and Management strategy – FIP tasks and Interaction with ICCAT (SCRS and scientists)	1.1 To evaluate information-data needed and develop proposals from the industry to improve the harvest strategy and control rules for Atlantic Swordfish and Blue shark to deliver in support of ICCAT tasks.
	1.2 To collaborate with ICCAT to achieve clear Management objectives
	1.3. To lead the fishing effort on mako shark to sustainable levels, which had already been substantially reduced with respect to previous years.
	1.4 To promote the extension of the EU obligation for sharks fin attached norm (finning) to all fleets operating in the ICCAT area.
	1.5 Provide all kind of support (scientific-technical, operative) to ICCAT in order to design and adopt a possible plan to rebuild overfished stocks

	1.6 To support ICCAT to regularly evaluate the performance of the Management Strategy (MSE) by increasing data supply and improving data quality.
2. To address information-data gaps for fishery related species (mako and ETPs	2.1 To keep constant improvement of the reporting procedures
	2.2 To analyze data sets and critical revision of the available MAPA annual reports, studies, measures, taken domestically, etc, directly linked to CPCs commitment to manage shortfin mako and make it accessible to ICCAT.
	2.3. To review and report data of all catches of ETP species, interactions and captures of marine turtles, marine birds and protected sharks, by the fleet.
	2.4 To keep the constant improvement of the performance of the FAO's Guidelines to Reduce Sea Turtle Mortality in Fishing Operations by the fleet.
	2.5 Development of Good Practices Guide for all ETPs related with the fishery and organization of workshops for the whole fleet of FIP-Blues.
3. To increase and maintain On Board Observers coverage and improvement of the current reporting scheme	3.1 To increase on Board Observers coverage (Electronic Observers included)
	3.2 the coverage of observers will be increased progressively, exceeding the 5%, what will be complemented with other systems like the electronic observers.
	3.3: To increase and maintain On Board Observers coverage and improvement of the current reporting scheme
4: To develop and trial "Mitigation Techniques" and implementation of good practices on board.	4.1 To review research projects-actions related with mitigation techniques. Scientific-technical surveillance on the subject. Update of FIP-Blues own actions.
	4.2 To determine which technique suits better for a given species. Also select the principal species to deal with by the fleet.
	4.3 Depending on the results, the FIP-Blues will consider to perform pilot-experimental actions to test feasible measures-techniques designed to cope with no target species. Task to be defined in year 2.
	4.4 To develop a comprehensive Good Practices guide to teach/train fishers to release alive individuals accidentally captured. Extend these practices to all the FIP Blues fleet (primary and ETPs species).

3. ICCAT Recommendation 21-09

21-09 **BYC**

RECOMMENDATION BY ICCAT ON THE CONSERVATION OF THE NORTH ATLANTIC STOCK OF SHORTFIN MAKO CAUGHT IN ASSOCIATION WITH ICCAT FISHERIES

RECOGNIZING that North Atlantic shortfin mako sharks are primarily caught in association with ICCAT fisheries and that the Commission has adopted management measures for shark species considered vulnerable to overfishing in ICCAT fisheries;

NOTING that the 2017 and 2019 SCRS assessments concluded that there is a 90% probability of the North Atlantic shortfin mako stock being overfished and experiencing overfishing;

RECALLING that according to its Convention, the stated objective of ICCAT is to maintain the stocks at levels which will permit the maximum sustainable catch;

RECALLING measures adopted by the Commission to improve the status of North Atlantic shortfin mako sharks, including the *Recommendation by ICCAT on the Conservation of North Atlantic Stock of Shortfin Mako Caught in Association with ICCAT Fisheries* (Rec. 17-08 and 19-06), which implemented measures aimed at ending overfishing of the North Atlantic shortfin mako stock with a high probability, as the first step in the development of a rebuilding program;

CONSIDERING that the *Recommendation by ICCAT on the Principles of Decision Making for ICCAT Conservation and Management Measures* (Rec. 11-13) calls for the Commission to immediately adopt management measures designed to result in a high probability of ending overfishing in as short a period as possible and adopt a plan to rebuild the stock taking into account, *inter alia*, the biology of the stock and SCRS advice;

RECALLING the ecological risk assessments carried out by the SCRS in 2008 and 2012 which indicate that shortfin mako ranks third in the vulnerability table;

FURTHER NOTING that the updated projections conducted by the SCRS in 2019 outline several scenarios, including the scenario where a certain degree of mortality would still allow the recovery of the stock by 2070 with a probability that is within an appropriate range for elasmobranchs;

FURTHER RECALLING the SCRS advice that regardless of the TAC (including a TAC of 0 t), the spawning stock biomass will continue to decline until 2035 before any increase can occur, owing to the time it takes juveniles to reach maturity and that even a zero TAC will only allow the stock to be rebuilt and without overfishing (in the green quadrant of the Kobe plot) by 2045 and that consequently due to the biology of the stock the recovery period will in any event be long;

AWARE that the SCRS has emphasized that reporting all sources of mortality is an essential element to decrease the uncertainty in stock assessment results, and particularly the reporting of estimated dead discards for all fisheries;

ALSO RECOGNIZING SCRS advice on the need for Contracting Parties and Cooperating non-Contracting Parties, Entities, or Fishing Entities (hereinafter referred to as CPCs) to strengthen their monitoring and data collection efforts in support of future stock assessments, including but not limited to total estimated dead discards and, live releases and the estimation of CPUE using observer data;

FURTHER RESPONDING to the need for additional research on methods to reduce shortfin mako interactions in ICCAT fisheries, including identifying areas with high interactions;

THE INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNA (ICCAT) RECOMMENDS THAT:

Rebuilding programme objectives

1. The Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities (hereinafter referred to as "CPCs"), shall implement a rebuilding programme for North Atlantic shortfin mako shark starting in 2022 to end overfishing immediately and gradually achieve biomass levels sufficient to support maximum sustainable yield (MSY) by 2070 with a probability of a range of between 60 and 70% at least.

2. Toward that end, the rules set out in this Recommendation shall be applied by CPCs with the aim to reduce total fishing mortality (the sum of any retention, dead discards, and post-release mortality of live discards), to maintain mortality at sustainable levels to rebuild the stock, and to establish a process to determine whether in any given year there is a possibility for retention.

First step in rebuilding the stock and process to determine future permissible retention

3. CPCs shall implement a prohibition on retaining on board, transhipping and landing, whole or in part, North Atlantic shortfin mako caught in association with ICCAT fisheries in 2022 and 2023 as a first step in rebuilding the stock.

4. The total fishing mortality tonnage associated with the probability level established in paragraph 1 shall be based on the most recent Kobe II strategy matrix provided by the SCRS for North Atlantic shortfin mako (the probability of both $F < F_{MSY}$ and $SSF^{1} > SSF_{MSY}$). Following every stock assessment, the SCRS shall update the Kobe II strategy matrix consistent with the objectives established by paragraph 1 for endorsement by the Commission.

   a) Consistent with the objectives established under paragraph 1 and the 2019 SCRS Kobe II strategy matrix the total fishing mortality for North Atlantic shortfin mako shall be no more than 250 tonnes until new SCRS advice is provided to the Commission.

5. Future permissible retention shall be pursuant to the following process:

   a) During 2022 and 2023 the SCRS and Panel 4 shall work together to test and confirm the appropriateness of the approach in **Annex 1**, or alternative approaches, for determining the amount of permissible retention of North Atlantic shortfin mako in the future. Any alternative approaches shall take into consideration, among other factors, the relative contributions made by CPCs to conserve, manage, and rebuild the stock (including a CPC's performance in reducing its mortality in line with the objectives of previous ICCAT Recommendations 17-08 and 19-06) and other criteria as set out in Resolution 15-13, as well as the need to continue to incentivize individual CPC accountability to achieve fishing mortality reductions in line with the objectives of this rebuilding program. To assist with this work, the SCRS shall, as appropriate, provide to the Commission estimates of post release mortality and, where needed, estimates of dead discards, taking into account data submitted by CPCs and other relevant information and analyses.

   b) Notwithstanding paragraph 3, in 2022, the SCRS will use **Annex 1** to calculate possible retention allowed in 2023 and provide the results to the Commission, which shall then validate the amount of any permissible retention in 2023.

   c) Starting in 2023 and annually thereafter, the SCRS will use **Annex 1**, unless an alternative approach to calculating future permissible retention is agreed (as per paragraph 5(a)), to calculate a possible level of retention, including eligible CPCs' individual retention allowances, allowed in the subsequent year, and provide the results to the Commission.

[1] SSF is Spawning stock fecundity, which is used for Kobe II risk matrix for North Atlantic shortfin mako.

d) Starting in 2023 and annually thereafter, the Commission shall validate the amount of permissible retention in the subsequent year, based on advice from the SCRS in accordance with paragraph 5(c).

6. CPCs whose fishing vessels retain North Atlantic shortfin mako shall prohibit transshipping, whole or in part, North Atlantic shortfin mako caught in association with ICCAT fisheries.

7. Any retention permissible in accordance with paragraph 5 shall be allowed only when the fish is dead on haulback and the vessel has an observer or a functioning electronic monitoring system (EMS) on board to verify the condition of the sharks.

a) For vessels of 12 meters or less, no more than one specimen of North Atlantic shortfin mako shall be retained by a vessel for any fishing trip.

b) For the purposes of this paragraph, a fishing trip is defined as the time period that begins when a fishing vessel departs from a dock, berth, beach, seawall, ramp, or port to carry out fishing operations and that terminates with a return to a dock, berth, beach, seawall, ramp, or port.

8. Paragraphs 3 to 7 shall not apply to Iceland and Norway whose domestic law requires that any dead fish be landed, provided that:

a) The fish is dead on haulback;

b) Directed fishing for shortfin mako sharks is prohibited;

c) The amount of landed North Atlantic shortfin mako is reported in the CPC's Shark Implementation Check Sheet, as required by Recommendation 18-06 and any future successor or revision thereto;

d) North Atlantic shortfin mako be landed with their fins naturally attached; and

e) Fishermen are prohibited from drawing any commercial value from such fish.

Safe handling and release

9. Upon entry into force of this Recommendation, CPCs shall require vessels flying their flag to implement, while giving due consideration to the safety of the crew, the minimum standards for safe handling and release procedures of North Atlantic shortfin mako shark, as provided under **Annex 2** of this Recommendation, in order to promptly release unharmed, to the extent practicable, and to improve survivability of live North Atlantic shortfin mako shark when brought alongside the vessel. Revisions to **Annex 2** may be considered by the Commission as new information from the SCRS becomes available.

Requirements for reporting on implementation

10. In accordance with Rec. 18-06, CPCs shall submit a Shark Implementation Check Sheet to provide information on how this Recommendation is being implemented. If the Compliance Committee determines that any CPC fails to report as required by Rec. 18-06, that CPC shall immediately require its fishing vessels to refrain from retaining or landing North Atlantic shortfin mako sharks until the required reporting is made to ICCAT.

11. CPCs shall report to the ICCAT Secretariat, in accordance with ICCAT data reporting requirements, total catches, including any landings, dead discards and live releases, of North Atlantic shortfin mako. The frequency of reporting shall be monthly for any permissible landings in order to closely monitor the uptake of the retention allowance, and annually for dead discards, live releases and total catches. The Secretariat shall notify all CPCs when a CPC has reached its limit in retention based on monthly reported landings.

12. Any retention by a CPC in excess of its retention allowance calculated in paragraph 5 will result in a reduction of that CPC's allowance the following year by an amount equal to the excess. Retention by that CPC shall be prohibited until any overages are repaid in full.

13. No later than 31 July 2022, CPCs that reported annual average catches (landings and dead discards) of North Atlantic shortfin mako over 1 t between 2018-2020 shall present to the SCRS the statistical methodology used to estimate dead discards and live releases. CPCs with artisanal and small-scale fisheries shall also provide information about their data collection programs. The SCRS shall review and approve the methods and, if it determines that the methods are not scientifically sound, the SCRS shall provide relevant feedback to the CPCs in question to improve them.

14. As part of their annual Task 1 and 2 data submissions, CPCs shall provide all relevant data for North Atlantic shortfin mako, including estimates of dead discards and live releases using the methods approved by the SCRS in paragraph 13. If the Compliance Committee determines that CPCs that authorize their vessels to retain on board and land North Atlantic shortfin mako pursuant to paragraph 5 fail to report their catch data, including dead discards and live releases, the CPCs concerned shall require their fishing vessels to refrain from retaining any quantity of North Atlantic shortfin mako until such data have been reported.

15. The SCRS shall evaluate the completeness of Task 1 and 2 data submissions, including estimates of total dead discards and live releases. If, after conducting this evaluation, the SCRS determines that significant gaps in data reporting exist, or, following the review in paragraph 13, that the methodology used by one or more CPCs to estimate dead discards and live releases is not scientifically sound, the SCRS shall inform the Commission that the data for those CPCs are inappropriate for inclusion in the calculation of the retention allowance. In this case, the SCRS shall estimate dead discards and live releases for those CPCs for use in the retention allowance calculation.

Biological sampling and observer coverage

16. CPCs shall endeavor to gradually increase the observer coverage, including EMS, of all longline fishing vessels in ICCAT fisheries that may have potential interaction with North Atlantic shortfin mako sharks to 10%. This increase in the coverage should be implemented in accordance with provisions of Recommendation 16-14 either by means of the deployment of human observers on board vessels or through the use of EMS, taking into account minimum standards to be agreed by ICCAT, based on advice from SCRS and PWG.

17. Collection of biological samples during commercial fishing operations shall comply with the *Recommendation by ICCAT on biological sampling of prohibited shark species by scientific observers* (Rec. 13-10). CPCs should encourage the collection of biological data and biological samples of North Atlantic shortfin mako that are dead at haulback, such as muscle, vertebrae and reproductive tissues, consistent with the terms of this Recommendation and according to the recommendations of SCRS.

18. Notwithstanding paragraph 7, in the context of this Recommendation and only for vessels less than 15 meters, where an extraordinary safety concern exists that precludes deployment of an onboard observer, a CPC may exceptionally apply an alternative approach as set out in Recommendation 16-14. This derogation from paragraph 7, shall be without prejudice to the overall commitment of all CPCs as outlined in this measure to immediately end overfishing and to reduce mortality levels. Any CPC wishing to avail itself of this alternative approach must: 1) present the details of the approach to the SCRS based on the advice of the SCRS for evaluation and 2) obtain approval from the Commission (as stipulated in Recommendation 16-14).

Scientific and research activities

19. The SCRS shall continue to prioritize research into: identifying mating, pupping and nursery grounds, and other high concentration areas of North Atlantic shortfin mako; options for spatial-temporal measures; mitigation measures (*inter alia*, gear configuration and modification, deployment options), together with the benefits and disadvantages for the objectives of the rebuilding programme, aimed at further improving stock status; and other areas the SCRS deems helpful both to improving stock assessments and reducing shortfin mako mortality. In addition, CPCs are encouraged to investigate at-vessel and post-release mortality of shortfin mako including, but not exclusively through, the incorporation of hook-timers and of satellite tagging programs.

20. Taking into account that hotspots of incidental catches may occur in areas and periods with specific oceanographic conditions, the SCRS shall launch a pilot project to explore the benefits of installing mini data loggers on the mainline and on the branchlines of longline fishing vessels which participate in the project on a voluntary basis targeting ICCAT species that have potential interactions with shortfin mako sharks. The SCRS shall provide guidance on the basic characteristics, minimum number and positions to install the mini data loggers with a view to have a better understanding of the effects of the soaking time, fishing depths and environmental characteristics underpinning higher incidental catches of shortfin mako.

21.

a) The SCRS shall provide to the Commission by 2023, and whenever new information becomes available, updated advice on mitigation measures aimed at further reducing shortfin mako mortality. For that purpose, by 30 April 2023, CPCs shall submit to the SCRS information by fishery on the technical and other management measures they have implemented for reducing total fishing mortality of North Atlantic shortfin mako sharks, except the CPCs that have already provided this information to the Secretariat. The SCRS shall review this information and advise the Commission on which tools and approaches have been most effective at reducing fishing mortality with a view to recommending specific measures that should be considered for adoption by the Commission.

b) Taking into account the information on the technical and other management measures submitted by CPCs in subparagraph a) above, the SCRS shall assess the potential benefits of both minimum and maximum size limits for live retention (applied separately or in combination), in particular sex specific sizes at maturity based on the best available science, particularly when considered in combination with other management measures, to meet required mortality reductions. The SCRS shall advise the Commission by 2024 whether size restrictions are effective tools, especially when used in combination with other measures, to meet required mortality reductions.

22. The SCRS shall review the reported landings and discards of longfin mako shark to identify any unexpected inconsistencies that could be the result of misidentification between the two mako species, for the purpose of formulating management advice.

Next stock assessments and review of measures effectiveness

23. The SCRS shall conduct a benchmark stock assessment, including producing a Kobe II strategy matrix that reflects the time frame for rebuilding up to 2070, of North Atlantic shortfin mako by 2024. Further assessments shall be carried out by 2029 and 2034, with a view to evaluate the stock status and trajectory as well as the effectiveness of actions taken pursuant to this Recommendation and subsequent amendments to achieve the objectives of the rebuilding programme.

Implementation

24. Notwithstanding the provisions of Article VIII, paragraph 2 of the Convention, CPCs are strongly encouraged to implement, in accordance with their regulatory procedures, this Recommendation as soon as possible and before the date of its entry into force.

25. In 2023, an intersessional meeting of Panel 4 shall take place to promote the sharing among CPCs of best practices, to reduce encounters with, and catches and fishing mortality of shortfin mako sharks. Panel 4 shall seek input from fishing operators, other relevant stakeholders, and scientists and shall encourage their participation in this meeting. Any recommendations from this meeting for effective technical measures that have the potential to reduce fishing mortality for shortfin mako sharks shall be referred to the SCRS for its review and consideration. Based on that review, in 2024 the SCRS shall advise the Commission on the most effective technical measures that should be implemented to reduce fishing mortality for shortfin mako while also providing information and advice on the trade-off for the catches of the target species by fishery.

Review and repeal

26. This Recommendation replaces and repeals the *Recommendation by ICCAT on the Conservation of North Atlantic Stock of Shortfin Mako Caught in Association with ICCAT Fisheries* (Rec. 19-06).

27. At its 2024 annual meeting, the Commission shall review this measure against the objectives of the rebuilding programme, taking into account advice received from the SCRS, including advice relating to paragraphs 21 (a) and (b), as well as discussions at Panel 4.

28. The Commission shall review this measure no later than the annual meeting 2024 to consider additional measures to reduce total fishing mortality.

Annex 1

Process to determine possible retention

1. In order to determine whether any retention is permissible, the following rules shall apply when making management decisions in year Y:

   a) All sources of fishing mortality for the previous year (Y-1) shall be estimated by the SCRS based on the data submitted by CPCs as well as updated scientific evidence. In the event that not all CPCs report all required data and full data sets for Y-1 (i.e., dead discards, live releases and where allowed, retentions) or if the SCRS determines that the data provided by a CPC are not scientifically sound, the SCRS shall provide estimates as appropriate to fill any known data gaps.

   b) The total fishing mortality from all sources for year Y-1 as calculated in **Annex 1**, paragraph 1a) is subtracted from the figure established by paragraph 4. The resulting amount shall be referred to as the dead bycatch retention allowance (hereinafter "retention allowance") for the following year Y+1.

   c) If the retention allowance established by **Annex 1**, paragraph 1b) is equal to or less than zero, CPCs shall prohibit retaining onboard, transshipping and landing, whole or in part, North Atlantic shortfin mako caught in association with ICCAT fisheries in year Y+1.

   d) If the retention allowance established by **Annex 1**, paragraph 1b) is greater than zero, CPCs may be eligible to retain up to the amount resulting from **Annex 1**, paragraph 2 below.

CPC retention allowance

2. If, pursuant to **Annex 1**, paragraph 1d), retention is permissible, the retention allowance for each CPC will be calculated using the following formula:

$$\textit{Individual CPC retention allowance (t)} = \frac{\text{(CPC average annual catches from 2013-2016) x (Retention Allowance)}}{\text{Average total ICCAT catches from 2013-2016}}$$

Where: "CPC average annual catches from 2013-2016" is the average annual catches (reported landings + dead discards, as verified by the SCRS pursuant to the data submitted and analysis undertaken pursuant to paragraphs 13 and 15) for an individual CPC for the four years covering 2013-2016; "Retention Allowance" is defined in **Annex 1**, paragraph 1; and, "Average total ICCAT catches from 2013-2016" is the average annual catches (reported landings + dead discards, as verified by the SCRS pursuant to the data submitted and analysis undertaken pursuant to paragraphs 13 and 15) across all CPCs 2013-2016.

3. CPCs must meet all the requirements within this measure in order to access any possible retention allowance.

4. Once the total amount retained by a CPC in a given year reaches that CPC's retention allowance, that CPC must immediately prohibit retention, transshipment, and landing for the remainder of that fishing year, and the CPC shall notify immediately the Secretariat that it has reached its retention allowance and has implemented the required prohibitions.

Annex 2

Minimum standards for safe handling and live release procedures

The following provides minimum standards for safe handling practices of North Atlantic shortfin mako sharks (nSMA) and provides specific recommendations for both longline and purse seine fisheries.

These minimum standards are appropriate for live shortfin mako sharks when released whether under no-retention policies, or when released voluntarily. These basic guidelines do not replace any stricter safety rules that may have been established by the National Authorities of individual CPCs.

Safety First: These minimum standards should be considered in light of safety and practicability for crew. Crew safety should always come first. At a minimum, crew should wear suitable gloves and avoid working around the mouths of sharks.

Training: The Secretariat and SCRS should develop materials to support the training of fishing operators to implement this safe handling protocol. These materials should be made available to CPCs in the three ICCAT official languages.

To the greatest extent practicable, all sharks being released should remain in the water at all times unless it is necessary to lift sharks for species identification. This includes cutting the line to free the shark while it is still in the water, using bolt cutters or dehooking devices to remove the hook if possible, or cutting the line as close to the hook as possible (and so leaving as little trailing line as possible).

Be prepared: Tools should be prepared in advance (e.g., canvas or net slings, stretchers for carrying or lifting, large mesh net or grid to cover hatches/hoppers in purse seine fisheries, long handled cutters and de-hookers in longline fisheries, etc., listed at the end of this document).

General recommendations for all fisheries:

- If operationally safe to do so, stop the vessel or substantially reduce its speed.
- When entangled (in netting, fishing line, etc.), if safe to do so, carefully cut the net/line free from the animal and release to the sea as quickly as possible with no entanglements attached.
- Where feasible, and while keeping the shark in the water, try to measure the length of the shark.
- To prevent bites, place an object, such as a fish or big stick/wooden pole, in the jaw.
- If, for whatever reason, a shark must be brought on the deck then minimise the time it takes to return it to the water to increase survival and reduce risks to the crew.

Longline fisheries specific safe-handling practices:

- Bring the shark as close to the vessel as possible without putting too much tension on the branchline to avoid that a released hook or branchline break could shoot hook, weights and other parts toward the vessels and crew at high speed.
- Secure the far side of the longline mainline to the boat to avoid that any remaining gear in the water pulls on the line and the animal.
- If hooked, and the hook is visible in the body or mouth, use a dehooking device or long-handled bolt cutter to remove the hook barb, and then remove the hook.
- If it is not possible to remove the hook or the hook cannot be seen, cut the line of the trace (or snood, leader) as close to the hook as possible (ideally leaving as little line and/or leader material as possible and no weights attached to the animal).

Purse seine fisheries specific safe-handling practices:

- If in purse seine net: Scan the net as far ahead as possible to spot the sharks early to react quickly. Avoid lifting them up in the net towards the power block. Reduce vessel speed to slacken the tension of the net and allow the entangled animal to be removed from the net. If necessary, use clippers to cut the net.

- If in brail or on deck: Use a purpose-built large-mesh cargo net or canvas sling or similar device. If the vessel layout allows, these sharks could also be released by emptying the brail directly on a hopper and release ramp held up at an angle that connects to an opening on the top deck railing, without need to be lifted or handled by the crew.

DO NOT (all fisheries):

- To the greatest extent practicable, do not lift sharks from the water using the branchline, especially if hooked unless it is necessary to lift sharks for species identification.
- Lift sharks using thin wires or cables, or by the tail alone.
- Strike a shark against any surface to remove the animal from the line.
- Attempt to dislodge a hook that is deeply ingested and not visible.
- Try to remove a hook by pulling sharply on the branchline.
- Cut the tail or any other body part.
- Cut or punch holes through the shark.
- Gaff or kick a shark, or insert hands into the gill slits.
- Expose the shark to the sun for extended periods.
- Wrap your fingers, hands or arms in the line when bringing a shark or ray to the boat (may result in serious injury).

Useful tools for safe handling and release:

- Gloves (shark skin is rough; ensures safe handling of shark and protects crew's hands from bites)
- Towel or cloth (a towel or cloth soaked in seawater can be placed on the eyes of the shark; used to calm sharks down)
- Dehooking devices (e.g., pig tail dehooker, bolt or plier cutters)
- Shark harness or stretcher (if needed)
- Tail rope (to secure a hooked shark if it needs to be removed from the water)
- Saltwater hose (If anticipated that it may require more than 5 minutes to release a shark, then place a hose into its mouth so seawater is moderately flowing into it. Make sure deck pump has been running several minutes before placing it in a sharks mouth)
- Measuring device (e.g., mark a pole, leader and float, or a measuring tape)
- Data sheet for recording all catch
- Tagging gear (if applicable)