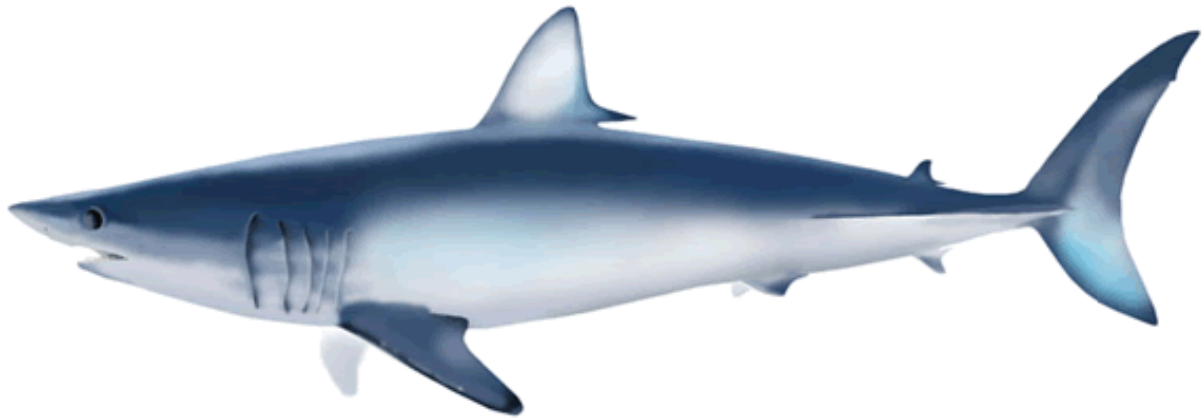
NON-DETRIMENT FINDING
FOR SOUTH ATLANTIC SHORTFIN MAKO SHARKS
(*Isurus oxyrinchus*).
EUROPEAN UNION.

EU Scientific Review Group for CITES
Working Group on Sharks

2022



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INTRODUCTION

This Non-detriment Finding (NDF) report for the species *Isurus oxyrinchus* Rafinesque, 1810 (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 used in Step 5. are deduced (unknown / high / medium / low) from the evaluated parameters and have been extracted from the indices presented in the document prepared by the Scientific Authority of Germany.

An NDF is the tool with which to apply the legal obligation of Council Regulation 338/97 to judge whether the introduction into the Union would not have a harmful effect on the extent of the territory occupied by the relevant population of the species. It can result in a negative conclusion or in a positive conclusion (with or without specific conditions). If it is positive with conditions, it must establish what are the objectives of such conditions. If it is negative, it is self-explanatory, means that the exploitation of the species (in the scale and volume that is considered in each case) is harmful and its continuity should not be accepted.

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.

SOUTH 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*). Shortfin mako shark 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 (2022), 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 10,104 tons was reported in the last year with complete data (2020).

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).

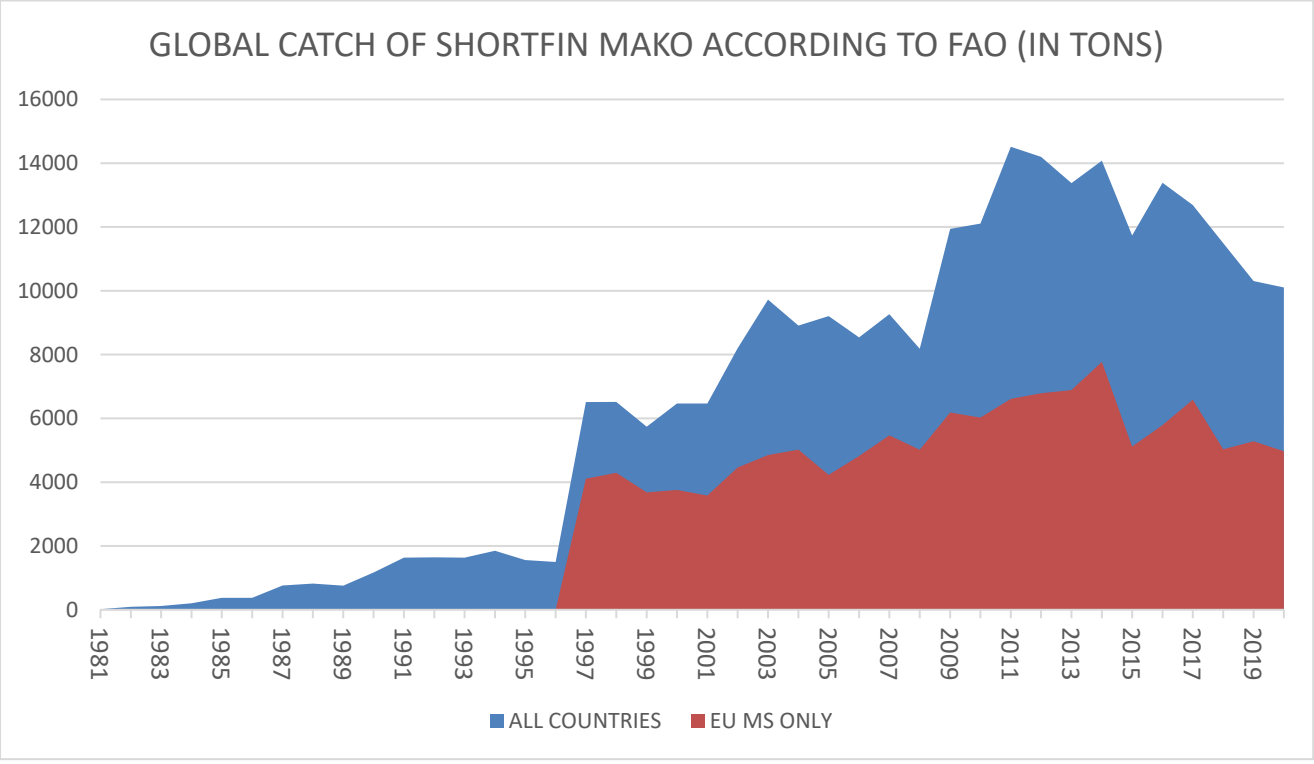


Figure 1. Global catch (in all the oceans and by all the countries) according to FAO.

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 2006-2019, Spain, Taiwan (China) and Portugal were, in that order, the countries with the highest catches worldwide (see table 1.1), but in 2019 Brazil ranked third, and Portugal fifth (table 1.2).

Table 1.1 Worldwide catch (in tons) of shortfin mako sharks in all stocks in 2006-2019 (FAO, 2022).

Rank	Country	Total catch 2006-2019 (t)
1	Spain	58496
2	Taiwan (prov. of China)	22022
3	Portugal	19389
4	South Africa	11801
5	Namibia	7523
6	China	5919
7	Morocco	4835
8	Pakistan	4835
9	Vanuatu	4806
10	Chile	4744

Table 1.2 Worldwide catch (in tons) of shortfin mako sharks in all stocks in 2019 (FAO, 2022).

Rank	Country	Total catch 2019 (t)
1	Spain	4570
2	Taiwan (prov. of China)	2259
3	Brazil	739
4	China	679
5	Portugal	643
6	Peru	602
7	Pakistan	211
8	Chile	205
9	Fiji	200
10	Seychelles	188

b) Worldwide catch of EU Member States:

One of the EU Member states, Spain, was 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 decreased its share from 48% in 2014 (when it reached its peak catch of 6,756 tons) to 41% in 2019 (with 4,570 tons), and has furthered reduced its catch in 2020 (40% and 4,061 tons) and 2021 (2,827 tons). And since 2022 has been complying with retention ban on North Atlantic shortfin mako. It should be noted that in 2019 the Spanish fishing fleet, due to government aid, decreased both in number of vessels and in fishing effort (MAPA 2020). There are no global data beyond 2020.

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 and since 2022 is complying with retention ban on North Atlantic shortfin mako.

c) Total catch in the South Atlantic:

The catch in the South Atlantic stock in the last years is presented in Table 1.3 and figures 2 and 3. Historically, the total catch (by all countries) in this stock soared in the middle 1990's, over 3,000 annual tons, and has ever since stayed between 2,000 and 3,000 tons, in an upward trend which peaked in 2014 with 3,274 tons and 2018 with 3,158 tons.

Table 1.3 Total catch (landings, in tons) in the South 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	2774
2016	2765
2017	2786
2018	3158
2019	2309
2020	2855
AVERAGE 2015-2020	2774

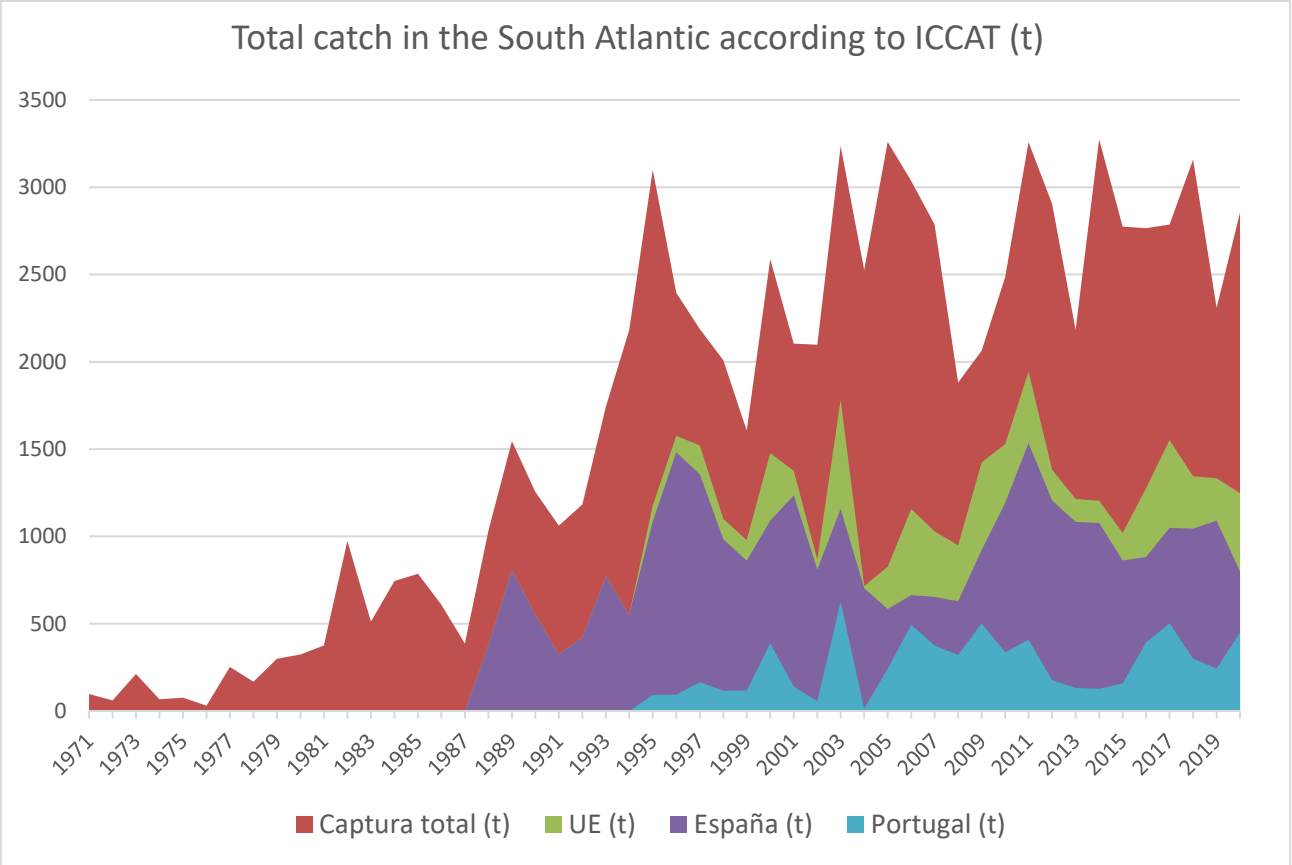


Figure 2. Global catch data in the South Atlantic stock, according to ICCAT.

Note, however, that the ICCAT SCRS (Standing Committee on Research and Statistics; ICCAT, 2019a) presented a different graph (figure 3 below) which included a rebuilt series (the dotted

green line) for the stock with an accumulated higher total catch than the official ICCAT register on which figure 2 above is built.

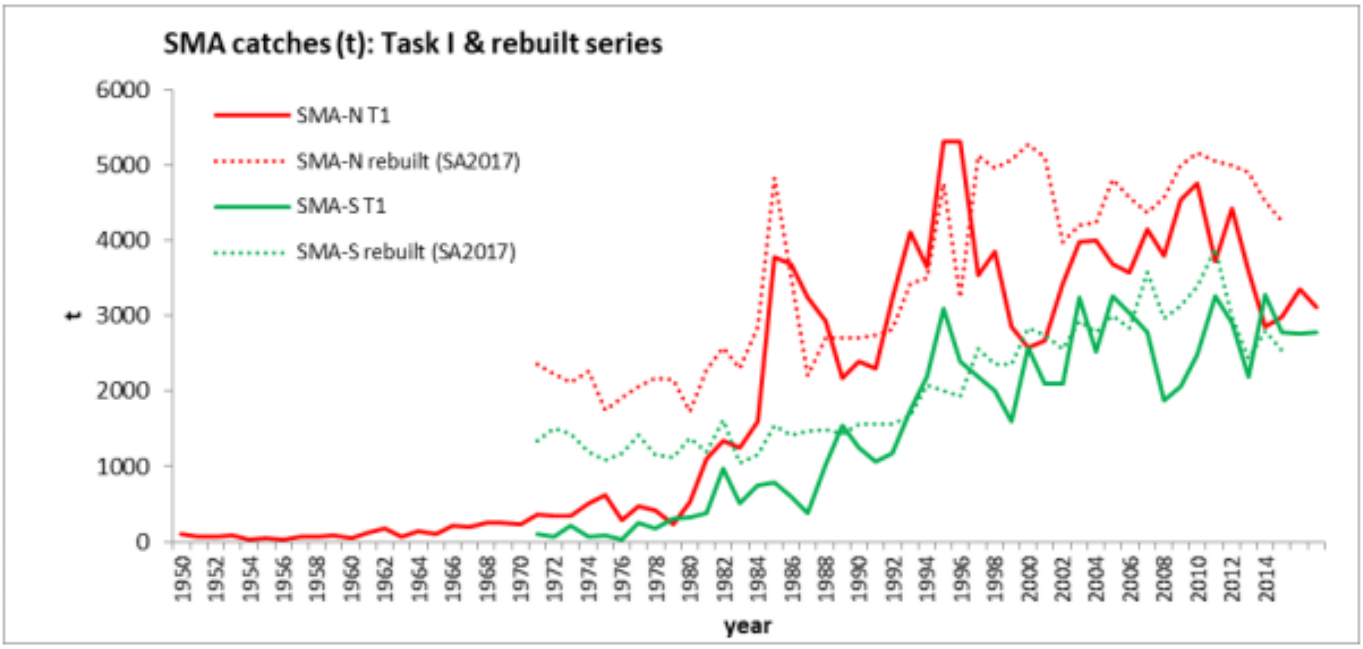


Figure 3. Rebuilt series of the catch of shortfin mako sharks in the South Atlantic (the green dotted line is the rebuilt series; the solid green line is the series of official registers; red lines are the equivalent for the North Atlantic stock; ICCAT, 2019a).

The following table (1.4) shows the countries with the highest cumulative catches in the historical series 1971-2018.

Table 1.4. Countries with the largest cumulative catch of shortfin mako sharks in the South Atlantic in 1971-2020, according to ICCAT.

	Country	Catch 1971-2020 (t)
1	Spain	29852
2	Japan	14159
3	Namibia	11129
4	Brazil	6434
5	Portugal	6966
6	South Africa	4517
7	Taipei (Taiwan)	4267
8	Uruguay	1993
9	China	1530
10	Ivory Coast	558

Table 1.5 shows the countries with the largest catches in the South Atlantic stock in recent years.

Table 1.5. Rank of countries with the largest catches in the South Atlantic stock

Rank 2010-2020	Country	Total catch 2010-2020 (t)
1	Spain	11820
2	Namibia	6295

3	Brazil	6204
4	Portugal	2890
5	South Africa	592
6	Taipei (China)	584
7	Japan	335
8	Belize	170
9	Ivory Coast	140
10	Senegal	114

The table below (1.6) summarizes the catch in the latest year with data.

Table 1.6. Countries with the largest catches of shortfin mako sharks in the South Atlantic in 2020, according to ICCAT (longline).

Country	Total catch (t) in 2020	% of global catch in the South Atl.	% of the EU catch
Namibia	945	33.10%	
Spain	799	28.00%	67.81%
Brazil	542	19.00%	
Portugal	449	15.72%	32.19%
Total South Atlantic	2855		

d) *Catch of EU-Member states in the South 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 South 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).
However, it should be notated that in the EU, the EU Shark Finning Regulation adopted in 2003 and amended in 2013 prohibits the practice of shark finning on-board of vessels as well as the retention on board, transhipment or landing of shark fins separated from the corresponding carcasses. It applies to all EU vessels, whether they operate in EU waters or in international waters. The regulation is part of the comprehensive EU strategy for the conservation and management of sharks, both within and outside the EU.

The shark fins naturally attached policy (FNAP) continues to apply on-board of EU fishing vessels and only upon landing of commercially exploited shark species fins can be separated from the corresponding carcasses and further marketed/traded.

The EU promotes the FNAP at regional level (e.g. RFMOs, including ICCAT).

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.

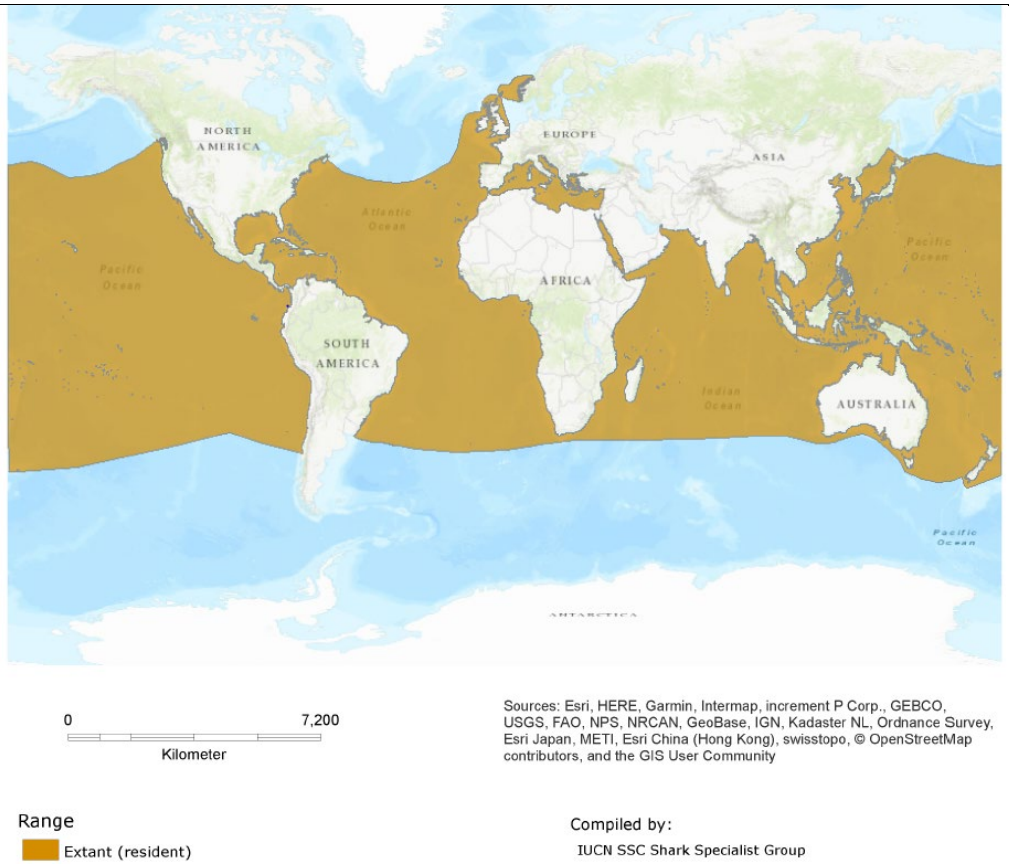


Figure 4. Distribution of *Isurus oxyrinchus* (Rigby *et al*., 2019).

18: Arctic Sea	57: Indian Ocean, Eastern
21: Atlantic, Northwest	58: Indian Ocean, Antarctic and Southern
27: Atlantic, Northeast	61: Pacific, Northwest
31: Atlantic, Western Central	67: Pacific, Northeast
34: Atlantic, Eastern Central	71: Pacific, Western Central
37: Mediterranean and Black Sea	77: Pacific, Eastern Central
41: Atlantic, Southwest	81: Pacific, Southwest
47: Atlantic, Southeast	87: Pacific, Southest
48: Atlantic, Antarctic	88: Pacific, Antarctic
51: Indian Ocean, Western	

Figure 5. 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 6), 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.

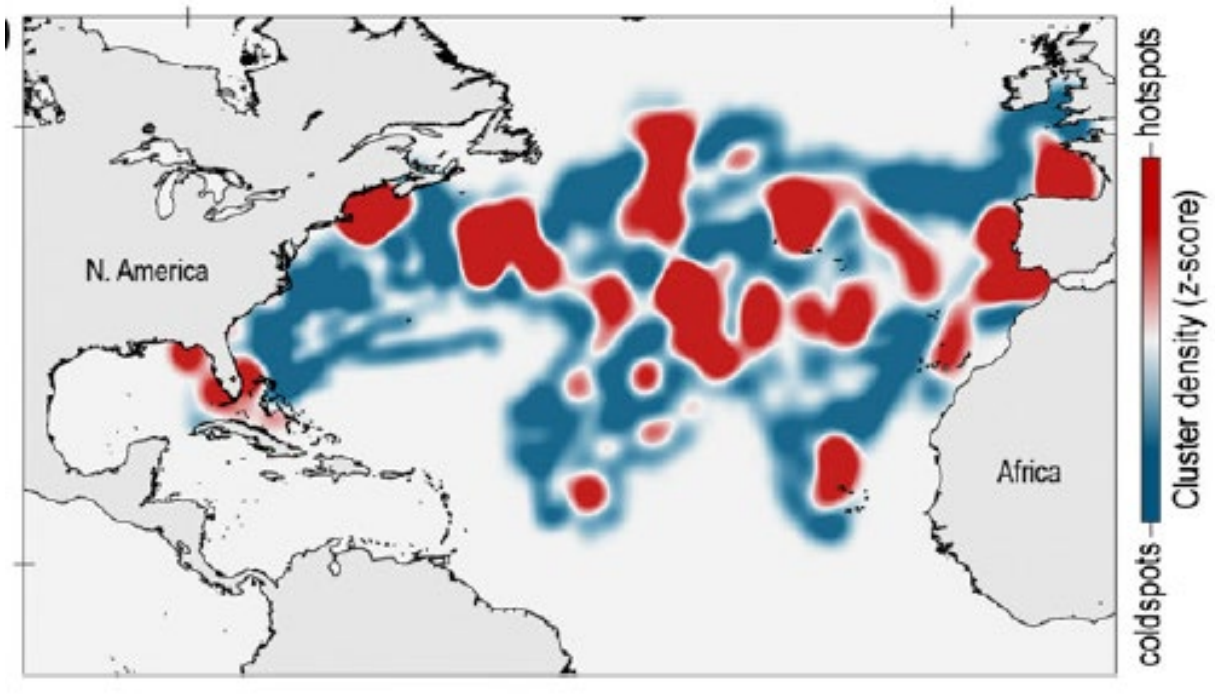


Figure 7. Hotspots (red) and coldspots (blue) of satellite-tracked pelagic mako, blue, tiger and scallop-headed sharks (taken from Queiroz *et al.*, 2016).

Known stocks/populations:

ICCAT assesses the South 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 in surface longlines. 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). 100% of the Spanish and Portuguese catch in the Atlantic by surface longlines.

Global conservation status:

Endangered according to the IUCN (2018 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).
- Of lesser relevance to this case are:
  - In the southeast Atlantic (international waters): South East Atlantic Fisheries Organization (SEAFO) (excludes the family Lamnidae from its scope).
  - In the Atlantic (EEZ waters only): Ministerial Conference on Fishing Cooperation between African States bordering the Atlantic Ocean (COMHAFAT-ATLAFCO).
  - SADC (Southern African Development Community): has a Protocol on Fisheries (mandatory) and a number of programmes and action plans.
- In the EU: European Commission (Directorate-General for Maritime Affairs and Fisheries).
- In Spain: Fisheries Secretariat, Ministry of Agriculture, Fish and Food (MAPA).
- In Portugal: Fisheries Secretariat, Ministry of Agriculture and Food (MAA).

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).
- Spain: 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 Not all sections can be filled in in detail for the South Atlantic stock	**Sources of information**
Stock assessments See Question 2.2 below.	
Cooperative management arrangements: There are currently no protocols in force between the EU and third countries in the South Atlantic area.	
Non-membership of Regional Fishery Bodies (RFBs) – ICCAT has 52 Contracting Parties, including the EU, and all 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. – SEAFO has 7 contracting Parties: Angola, EU, Japan, South Korea, Namibia, Norway and South Africa.	
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 68%, swordfish for 26%, and shortfin mako for 6% of the catches of the Spanish fleet in the South Atlantic, according to official 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), a conclusion which can be extended to the South Atlantic.	

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.

See section 1.c) for information on catch data on shortfin mako in the South Atlantic.

Fishery types

The Spanish fishery catching shortfin mako is a surface longline fishery targeting mainly blue sharks and swordfish, with a fleet of 91 vessels (in 2022) operating both in national and international waters in all Fishing Areas where the species is present throughout the year. 33 of these vessels operated in 2022 in the South Atlantic targeting blue shark and swordfish.
Spain and Namibia have about ten *joint-ventures* with vessels operating under the Namibian flag. Currently (2022) there are 7 Spanish vessels under such freight arrangements with Namibia; they fish in international waters and land in Namibia.

Management units

In the South Atlantic, the catch of the species is regulated by ICCAT, covering all or part of FAO Fishing Areas 41, 47 and 48. ICCAT assesses the South Atlantic population as a single stock. SEAFO has competence only in international waters in FAO Fishing Area 47 and a small part in the south of 41, where it overlaps with ICCAT. Note that SEAFO excludes from its competence species listed in Annex I (highly migratory species) of the United Nations Convention on the Law of the Sea, including the family Lamnidae to which the genus *Isurus* belongs. The activity of the Spanish and Portuguese fleets is also regulated by national and EU regulations.

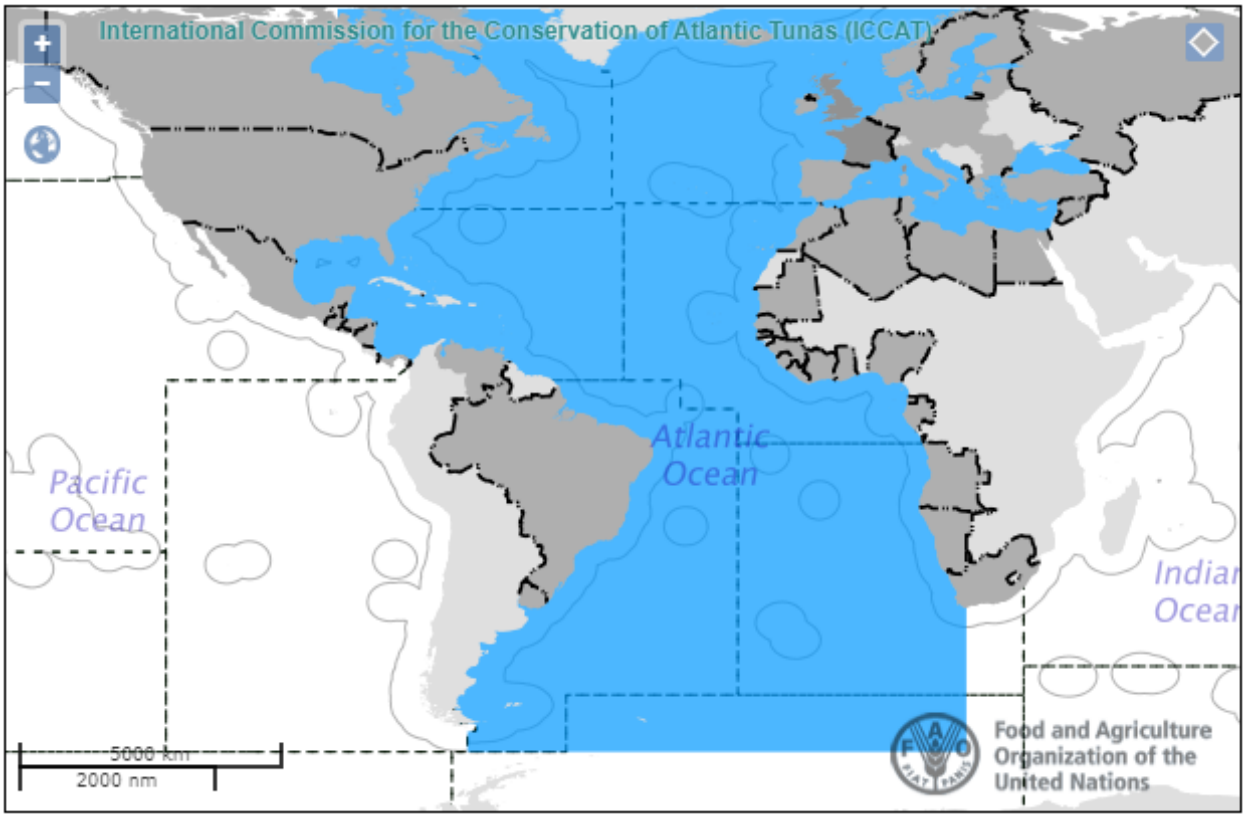


Figure 8. ICCAT limits, according to FAO.

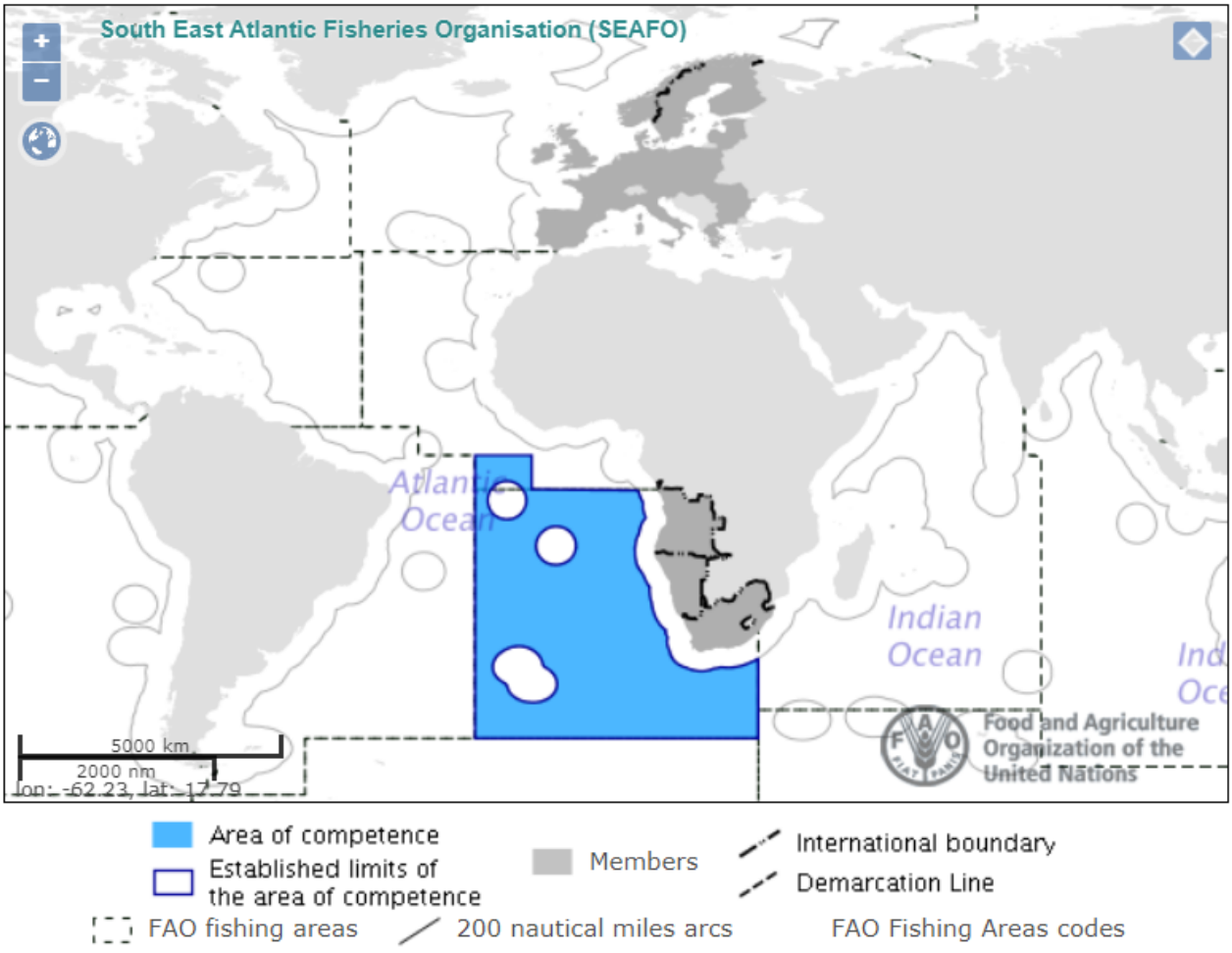


Figure 9. SEAFO limits, according to FAO (it excludes the Parties' Exclusive Economic Zones).

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) analysed 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) EU Member states catch in the South Atlantic:

According to official ICCAT statistics (table 1.7), in 2015-2020 EU Member states together retained on average almost 1,300 (one thousand three hundred) tons of the species in the South Atlantic, with an increasing trend in the first three years and decreasing after that. 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 40,000 specimens.

Spain and Portugal have accounted for almost 100% of the EU share in the total catch along the 1971-2020 series. The Spanish share in the total catch averages a little above 37%, peaking in the middle 1990's (1,482 t) and again in 2011 (1,535 t), and reaching its minimum in 2005-2008 (584 t). The Spanish catch does not show a clear trend, in conclusion. Portugal accounts for 10% of the total catch on average, peaking in 2003 (625 t) and again in 2017 (503 t), without a clear trend as in the former case.

Table 1.7. Catch in the South Atlantic stock according to ICCAT

	TOTAL CATCH (t)	EU MS CATCH	% EU MS
2016	2765	1276	46%
2017	2786	1552	56%
2018	3158	1345	43%
2019	2309	1333	58%
2020	2855	1248	44%
AVERAGE	2775	1351	49%

In 2016-2020, Spain accounted on average for 84% of the catch by EU MS, followed by Portugal with 16%, while France and the United Kingdom (while still in the EU) 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 862 tons, thus applying the ICCAT SCRS recommendation for this stock not to exceed the minimum catch in the previous 5 years (in this case, those with complete data at that time: 2014-2018; see stock assessments in Question 2.2. below). According to ICCAT data, the catch in 2020 on this stock was 799 tons (with an estimated additional 25.5 tons estimated to die after live discard, according to data provided by MAPA).

In 2021 Spain issued a new NDF for its fleet with the same limit of 862 tons, recording a total catch of 811 tons (with an additional estimated 35 tons of mortality after discarding 118 tons of live specimens).

In 2022 Spain issued a new annual NDF for its fleet with a limit of 809.67 tons.

Table 1.8 EU MS catch in the South Atlantic in 2015-2020

EU MS	2015	2016	2017	2018	2019	2020	% IN 2020	AVERAGE 2015-20	AVERAGE % 2015-20
SPAIN	862	882	1049	1044	1090	799	64%	954	74%
PORTUGAL	158	393	503	300	243	449	36%	341	26%
FRANCE	0,4	0,5	0,1	0,8	0	0		0,3	0%
UK (STA. HELENA)	0,01	0,08	0,12	0,17	0	0		0,06	0%
TOTAL EU	1020	1276	1552	1345	1333	1248		1295	

In 2021 Spain fished mainly in the high seas in this stock (data provided by MAPA), as shown in table 1.9 below.

Table 1.9 Landing by jurisdictions of the Spanish fleet in 2021

Jurisdiction	*%*
International waters	85
EEZ Non-EU (CV, LBR, MRT, STP)	15

Between 1 January and 28 October 2020 almost one third of Spain's catch was landed in non-EU countries (mainly Namibia) (table 1.10). In 2021 the Spanish South Atlantic catch was mostly landed in Namibia, Cape Verde and Uruguay.

Table 1.10. Landing ports of the Spanish fleet in the South Atlantic in 2021 (data from MAPA).

Country	T	%
Namibia	465	57
Cabo Verde	171	21
Uruguay	108	13
Spain	34	4
Portugal	18	2
(Void)	12	1
TOTAL	811	100

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 analysed here for that reason. The table below (1.11) summarizes the trade data for the species currently available at the CITES trade database:

Table 1.11 Trade in shortfin mako shark in 2019 and 2020 according to the CITES (in tons)

Term (origin) (kg)	Reported by	2019	2020	2021
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	3.27
Meat (W)	Importer		24.46	1.15
	Exporter	225.27	320.66	
Skins (W)	Importer			
	Exporter		19.72	2.5
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 1.11, 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.

The 2021 data are surely incomplete.
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 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). In 2021, 2,431 tons from all stocks were imported (including IFS), and 50 tons of meat plus 132 tons of fins were (re-)exported.

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 14% between 2005 (3,259 tons) and 2020 (2,855 tons). According to ICCAT, the CPUE (Catch per Unit Effort, ICCAT 2019b) for this stock has been on an increasing trend since at least 2008 (see figure 11). The conflict between catch and CPUE trends was noted by the ICCAT SCRS as a factor preventing future projections of the stock. However, Barreto *et al*., (2016), after analysing standardised catch rates in the South Atlantic, concluded that there have been sharp declines over 95% in mean CPUE between 1979-1997 and 1998-2007 and their results indicate that most shark populations affected by longlines in the South Atlantic are currently depleted, but these populations may recover if fishing effort is reduced accordingly (Barreto *et al*., 2016). Bornatowski et al. (2017), on their side, recorded a landing biomass reduction of approximately 30% in this stock in the Southeastern and Southern of Brazil.

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 (currently, WG on Sharks) 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 DG-Mare, with the occasional participation as observers of scientific experts from the Member States.

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 South Atlantic, the population has declined to an unknown extent between 1950 and 2015. The FAO Panel of Experts (2019) considers that there is no evidence that this stock has declined to less than 30% of the historical level.	Unknown
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. Given their predatory nature, pelagic sharks compete with, and are often found in	High

	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
South Atlantic		
Conservation or stock assessment status	Two recent key evaluations 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 (Rigby et al., 2019) 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	Unknown (uncertain assessments; risk of worsening)

	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) 2.1 Assessment: ICCAT updated the stock 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 that year (ICCAT 2019a and 2019b). Their conclusion for the South Atlantic stock was that it may be overfished (with a 32% probability; i.e. of fishing mortality F being higher than the mortality at maximum sustainable yield FMSY) and experiencing overfishing (with a 42% probability; i.e. of biomass B being below the biomass at maximum sustainable yield BMSY), but the ICCAT Standing Committee considered that the results of the assessment of this stock are highly uncertain because the catch and CPUE data are contradictory. For this reason no projections could be made for the future (but note that a new assessment is scheduled for 2024). The estimates of unsustainable harvest rates appear to be fairly robust whereas the biomass depletion estimates must be treated with caution. In recent years the number of females has been lower than expected at maximum sustainable yield (MSY) and fishing mortality was already higher than expected at MSY. There is evidence of historical declines. The SCRS produced the following graph (Figure 10) which shows that the South Atlantic stock has a 38% probability of being in the green quadrant of the Kobe diagram (not overfished and not overfished), a 34% probability of being in the yellow quadrant (either	

overfished or suffering from overfishing), and a 28% probability of being in the red quadrant (overfished and suffering from overfishing) in 2015.

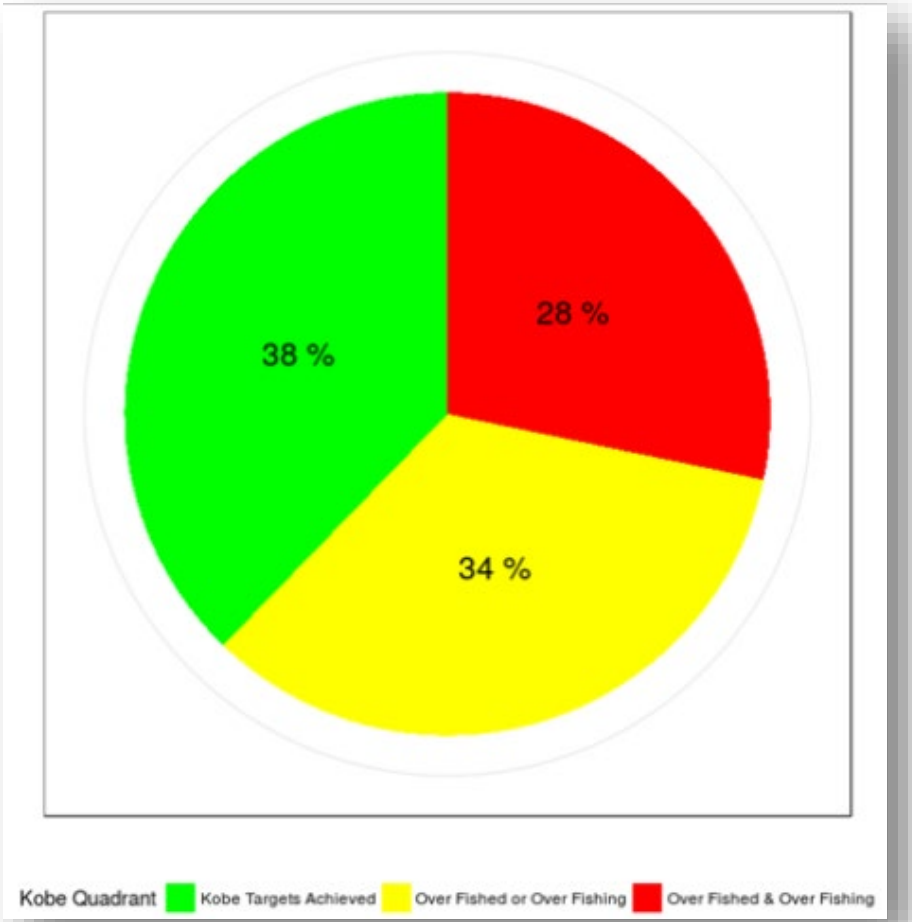
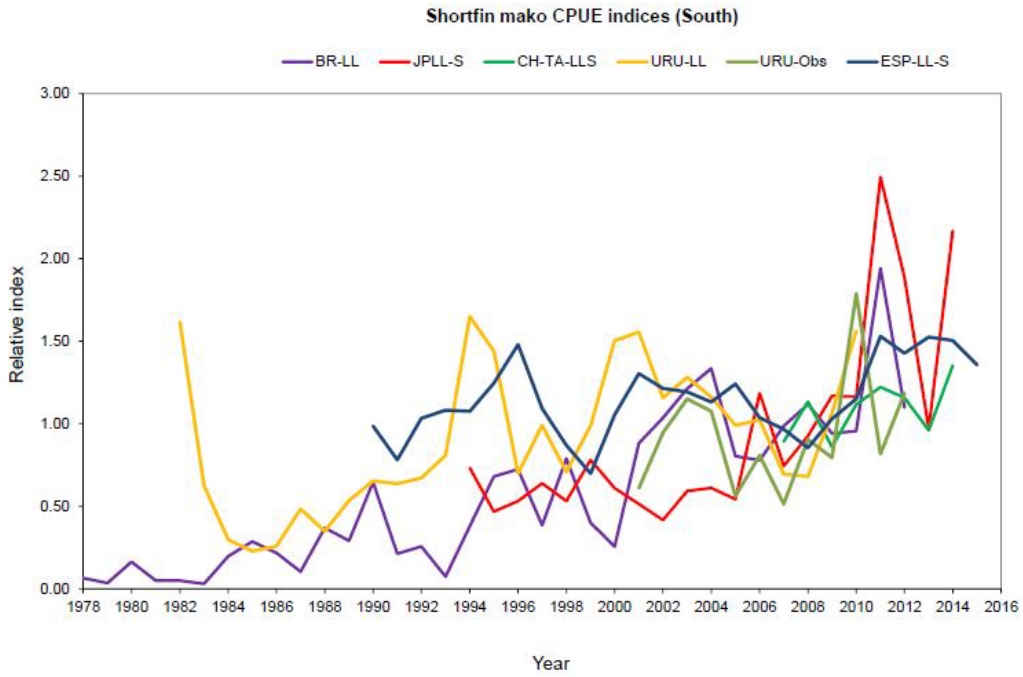


Figure 10. Kobe pie chart of the South Atlantic shortfin mako shark stock (ICCAT, 2019b).

In the Atlantic, the majority of the catches are juveniles -immature fish under 10 years- and very few breeding adults (ICCAT, 2019b).



SHK-Figure 5. Indices of abundance for South Atlantic shortfin mako shark used in the 2017 stock assessment.

Figure 11. Evolution of CPUE in the South Atlantic (ICCAT).

Since 2015 the stock status has been reported as possibly overfished and that overfishing is possibly occurring due to the fact that the 'Committee considers that the results have a high degree of uncertainty' – see Annex 1.

2.1 Management recommendation:

	These are the detailed conclusions of the Shark Working Group (May 2019, ICCAT 2019a): "Given that the development of the fishery in the South is very likely to follow the development of the fishery in the North, and also given that the biological characteristics of the stock are similar, there is a significant risk that this stock will suffer a similar evolution to that of the northern stock. If the stock declines it will, like the northern stock, require a long time to recover, even after major reductions in catch. To avoid this situation and considering the uncertainty in the status of the stock, the Group recommends that, as a minimum, catch levels should not exceed the minimum catch in the last five years of the assessment (2011-2015; 2001 t with catch scenario C1)" (ICCAT, 2019d). In 2022 ICCAT has addressed the concerns about the population status and for the first time country-specific retention allowances have been agreed which, taken together, are 35% below the recommended catch limit of 2001 t proposed in 2019. According to ICCAT this is to ensure that the total fishing mortality (the sum of any retention, dead discards, and post-release mortality of live discards) for South Atlantic shortfin mako shall be no more than the minimum reported annual catch in the last five years of the assessment (i.e., 2,001 t) as set out in the 2019 SCRS Report. The objective is to: implement a fishery management plan for South Atlantic shortfin mako shark starting in 2023 to counteract overfishing immediately and gradually achieve biomass levels sufficient to support maximum sustainable yield (MSY). To this end a retention allowance of 503 T was agreed for the EU in 2023 and 2024, pending a new assessment in 2024. 3) Other studies IUCN (2018) draw attention to ICCAT information and the study by Barreto *et al*., (2016) who, after analysing standardised catch rates in the South Atlantic, concluded that there	

	have been sharp declines over 95% in mean CPUE between 1979-1997 and 1998-2007. However, Barreto *et al.* (2016) indicate that these populations may recover if fishing effort is reduced accordingly, Bornatowski *et al*. (2017) recorded a landing biomass reduction of approximately 30% in a determined area of this stock . Charvet *et al*. (2016) stated that the South Atlantic Shortfin Mako is unlikely to be in a better condition than in the North.	
Population trend	Negative, although the FAO Panel of Experts (2019) considered that there is no evidence that this stock has declined to a level below a 30% of the historical baseline. According to IUCN (Rigby *et al*., 2019) the magnitude of the decline appears to be less than in the North Atlantic and the stock size appears to be above maximum sustainable yield (MSY), although only one model could be applied to the available data and the results of the assessments were more uncertain than for the North Atlantic.	Medium
Geographic extent/scope of conservation concern	Identified threats affect the whole stock and 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
South Atlantic			
Magnitude of legal trade	A) Trade in sharks Shark fin is still a very appreciated merchandise by Asian consumers, in Asia and in the rest of the world. The complexity and increasing dynamism of this trade make it difficult to quantify market volumes and accurate trend information is lacking, 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. From that year to 2017, the Spanish annual average was 78,443 tons, with a 5% increase in catches between the two dates. Spain is also the world's second largest	High (multiple uses in commercial trade; market demand increasing)	High (information available from authoritative sources with little or no extrapolation or inference required)

importer of elasmobranch meat between 2013 and 2017, with around 12,500 tons per 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 products*, states that Spain exported 3,490 tonnes of shark fins annually between 2000 and 2011, worth 57.9 million US dollars, mainly to 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 a major importer as well. Portugal is the second largest exporter and the fourth largest importer, with a significant number of trading partners as well.

Table 4.1 summarizes exports and imports of shark products from Spain to Portugal, according to the latest data from FAO - Fisheries and Aquaculture Information and Statistics Branch, for 2019 (not including skates and rays).

	Spain		Portugal	
	Quantity (tons)	Value (million USD)	Quantity (tons)	Value (million USD)
Import fins	105	1.5	27	0.15
Export fins	2656	48.42	234	2.61
Import other	12968	26.24	8954	16.67
Export other	13627	30.2	13804	29.54

B) Trade in shortfin makos

	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). 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. There are numerous difficulties in obtaining data to assess utilisation and trade in shortfin makos, as this species is often grouped into generic, higher-level catch categories. Very few of the product categories used by FAO for chondrichthyans are taxon-specific, and none for shortfin mako sharks (currently there are 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 among States, further complicating the traceability of products 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, primarily for high-value fins (Sims ***et al***., 2018 and references cited therein); the first is the blue shark (*Prionace glauca*), It accounted for 2.37% of all samples in the Hong-Kong and 4.16% in the Guangzhou shark fin markets in 2015-2017 - the largest shark fin markets in the world - ranking fourth after blue sharks, silky sharks (*Carcharhinus falciformis*) and other sharks *Carcharhinus* spp, (Cardeñosa et al, 2020). According to the IUCN/TRAFFIC (2019) analysis of the CITES listing proposal, based on FAO data, global trade in the species increased by 69% between the periods 2004-2009 (54,155 total tonnes) and 2010-2016 (91,989 tonnes), Regarding this species in particular, according to Europêche (2019), Spain traded 3,000 tonnes of *Isurus oxyrinchus* in 2017 and 2,000 tonnes in 2016, with profits of €10 million and €8 million respectively.		

	Data from the European Market Observatory for Fishery and Aquaculture Products (https://www.eumofa.eu/) show that in 2020 the first sales of shortfin mako accounted for €8.7 million in Spain (meat and fins). In Spain, according to the CITES listing proposal, shortfin mako shark meat costs twice as much as that of blue shark (14.17 USD/kg fresh, compared to 7.63 USD/kg). Most of the catches landed in Portugal are shipped to Spain (Vigo) by land or sea, as reported by the Portuguese CITES authorities (in litt,),		
Magnitude of illegal trade	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, In October 2022 the CITES Singaporean authorities seized an illegal export of fins without any export permit, mixed with other species' fins. These fins were separated from sharks landed in Uruguay before the transport of the carcasses to Portugal under a legal IFS certificate. There are no data on illegal trade in other countries. However, as the species has only been listed since 2019, this will need to be updated in the future.	Unknown	Low (Little information available)

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
South Atlantic			
Fishing mortality (retained catch)	The actual proportion of the stock removed by all fishing activities is not known, but is probably high, the pressure being maintained over many years and consistently throughout the year. Large pelagic sharks are subject to four different types of fishery-induced mortality: (1) landing (retained catch); (2) finning; (3) catch mortality (hooking); and (4) post-release mortality (Campana, 2016): 1) Landing (retained catch) mortality: In 2015, fishing mortality on this stock was estimated to be between 0.86 and 3.67 times the mortality at maximum sustainable yield (F_{2015}/F_{MSY}=0.86-3.67; ICCAT, 2019a). However, ICCAT shark landings reports are generally believed to be underestimates (Campana, 2016). For example, this author estimated that in 2006 the actual volume of North Atlantic shortfin mako landings based on other data (fin trade, Spanish and Canadian CPUE, US and Portuguese observer CPUE) ranged from 5,349 to 12,642 t, with an overall average of 8,698 t, which was more than double that reported to ICCAT (3,564 t), There are also recent studies based on fishery-independent data, which indicate very high catch rates:	High	High (Data available from reliable sources, with little or none need to make extrapolations or inferences)

	- 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 of the 32 juvenile *I. oxyrinchus* tagged by Vaudo et al, (2017) in the western North Atlantic were fished (22%). - Byrne *et al.* (2017): 12 of 40 tagged individuals (30%) - mostly immature - in the Northwest Atlantic were fished. They calculated in the Northwest Atlantic a 72% probability of a shortfin mako surviving a year without being caught, and estimated fishing mortality as (F) = 0.19-0.56, 5-18 times higher than F_{RMS} (fishing mortality at maximum sustainable yield) estimates (0.031-0.038), Other factors to consider in assessing the severity of fishing pressure are its distribution in space and time: Queiroz *et al*., (2019) concluded that more data are needed in areas such as the South Atlantic, Central and Western Pacific and Indian Ocean, to analyze the overlap of fishing effort with the areas most frequented by *Isurus oxyrinchus*. 2) Finning mortality: Finning is banned in the EU, but not by ICCAT and some of its Parties. There are no estimates of this type of mortality for this species or stock, but in general, Hong Kong shark fin trade statistics correspond to much higher catch volumes than those reported by RFMOs, indicating that illegal finning remains a problematic and important source of shark mortality (Clarke, 2008 in Campana, 2016).		

Discard mortality	3) Catch mortality (hooking, handling) 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 with pelagic longlines experience average hooking rates of 26.2% (range 12-32%; Campana, 2016 and references cited therein), According to Sims *et al*. (2018, and references cited therein), 60-80% of shortfin makos hooked with longlines arrive alive on board. An additional factor to be taken into account is the instrument with which the catches are hoisted on board: with a lasso the mortality is much lower than with a hook. (4) Post-release 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 2019). 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. ICCAT data on discarded shortfin makos are very scarce, probably because many Parties have not recorded them at all. In recent years some Parties, such as Spain (see below) have improved in this regard, but records do not differentiate between sharks discarded dead or alive.	Unknown (an unknown part of the catch is thrown to the sea)	Low (limited available data)

	The Spanish fleet reports discards for each stock, but not whether the specimens are alive or dead at the time of release. In the South Atlantic, according to data from MAPA, 108 tons were discarded in 2021 (it is assumed that 30% or 32 tonnes would die afterwards), while 85 tons were discarded in 2020. The vast majority of discards have been attributed to "non-compulsory landing"; the waters and fishing grounds where discards have occurred are unknown. The lucrative fin trade is a strong driver of shark fin retention and/or bycatch (Campana, 2016), and the low independent observer coverage (5-8%, for example, in the Spanish Atlantic fleet) and the almost total absence of Electronic Observer Systems do not allow independent verification of the actual number of mako sharks alive at-haul (when the longline is pulled on board).		
Size/age/sex selectivity	Apparently, there is not any size/age/sex selectivity. In the Atlantic, some sources (ICCAT 2019a) indicate that most of the fish caught are juveniles under 10 years of age. 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. Detailed data on frequencies of lengths, ages and sexes of catches are not available, but have been recorded for years by the Spanish Institute of Oceanography (IEO) (as well as by the Portuguese authorities),	Unknown	Medium: Some reliable data available but it is necessary make inferences and extrapolations
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. In October 2022 the CITES Singaporean authorities seized an illegal export of fins without any export permit, mixed with other species' fins. These fins were	Low (good documentation of catches;	Medium: Some reliable data available but it is

	separated from sharks landed in Uruguay before the transport of the carcasses to Portugal under a legal IFS certificate. There are no data on illegal trade in other countries. However, as this species has only been listed on CITES Appendix II since 2019, this information should be updated in the future.	transparent trade chain)	necessary make inferences and extrapolations

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 RFMOs (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 2018-06, to enhance the review of compliance with shark conservation and management measures. – Draft Recommendation PA4_804B/2022 for "..a fishery management plan for South Atlantic shortfin mako shark starting in 2023 to counteract overfishing immediately and gradually achieve biomass levels sufficient to support maximum sustainable yield (MSY)." The objective of the plan is to ensure that the stock is in the green zone of the Kobe II strategy matrix (not overfished and

not experiencing overfishing) with a probability of between 60 and 70% by 2070. (using catch increments of 100 tonnes and time increments of 5 years). In the plan, specific country quota have been recommended to ensure that in 2023 and 2024 “

- Toward that end and pending the results of the 2024 assessment (including the Kobe II strategy matrix), the total fishing mortality (the sum of any retention, dead discards, and post-release mortality of live discards) for South Atlantic shortfin mako shall be no more than the minimum reported annual catch in the last five years of the assessment (i.e., 2,001 t) as set out in the 2019 SCRS Report.
- . the total fishing mortality (the sum of any retention, dead discards, and post-release mortality of live discards) for South Atlantic shortfin mako shall be no more than the minimum reported annual catch in the last five years of the assessment (i.e., 2,001 t) as set out in the 2019 SCRS Report.” The retention allowance for 2023 and 2024 (until the 2024 new assessment is published) is 1295 T and for the EU an annual retention allowance of 503 T has been recommended. Once the new assessment is published, the retention allowances will be reviewed. The measure also prohibits transhipping, whole or in part, South Atlantic shortfin mako and states that, from 2025 on, retention will be limited to fish which are already dead at haulback, when there is an observer or an electronic monitoring system (EMS) on board to verify the condition of the sharks. With those requirements, vessels smaller than 12 m will retain only 1 specimen per trip. The plan includes several other provisions regarding safe handling practices, reporting requirements, research activities, etc.

<u>South East Atlantic Fisheries Organisation (SEAFO)</u>

This organization has no competence over Exclusive Economic Zones, and furthermore **excludes from its competence** (Article 1(l)) **species listed in Annex I (highly migratory species)** of the United Nations Convention on the Law of the Sea, **including the family Lamnidae to which the genus *Isurus* belongs**. Therefore, although SEAFO has enabled the following measure for sharks to be applied in international waters under its purview, **it is of no relevance here**:

- Measure 04/06 on the conservation of sharks caught in association with fisheries managed by SEAFO: Obligation to report catches annually, to retain whole fish until landing (finning is not allowed, 5% of total weight rule applies); if sharks are not a target species, release should be encouraged if alive, especially of juveniles unless used for food/subsistence; Research to make gear more selective (p.Research to make gear more selective (e.g., on the effect of not using steel lines); identify nursery areas.) Only applies to sharks caught in association with SEAFO target species.

Management measures established by the European Union
- According to 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, no TAC has been set for this species in the South Atlantic. - 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.
- The EU will likely adopted a quotum of 503 T for 2023 for the South Atlantic mako shark during the 2022 December Council

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.

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 NDF for its fleet for a maximum volume of 862 tons, thus applying the ICCAT SCRS recommendation for this stock not to exceed the minimum catch in the previous 5 years (in this case, those with complete data at that time: 2014-2018). In 2021, Spain issued a new NDF for the same quantity, and in 2022 the NDF set a maximum of 809.67 tons.
Management measures established by other countries
Brazil has announced in late 2022 that it has issued a negative NDF for this stock. The UK did the same in 2021.

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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 South 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	Non-existing in the South Atlantic in international waters (see next row).

6) Total Allowable Catch (TAC)	To limit fishing mortality on a species or a group of species	Fishing mortality	(Yes)	In 2022 a total retention allowance of 1295 T for 2023 and 2024 was recommended, which would likely keep the total mortality under that recommended by SCRS in 2019. A proportion of his retention allowance has been allocated to each of the Contracting Parties. See SCRS Draft Recommendation PA4_804B/202
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	No action has been taken in this regard.
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.
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	Magnitude of legal trade; Magnitude of illegal trade	(Yes)	Catch data are documented and validated and trade documentation programs are in place. However, there have been records of illegal trade

	product taken by IUU fishing to reach markets			
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 for this stock.

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 (in two ways: banning finning and, in Spain, setting a maximum volume which can be introduced), and minimize the opportunities for IUU fishing to reach the market. However, in October 2022 the CITES Singaporean authorities seized an illegal export of fins without any export permit, mixed with other species' fins. These fins were separated from sharks landed in Uruguay before the transport of the carcasses to Portugal under a legal IFS certificate

[In 2020, the Spanish CITES Scientific Authority imposed an annual introduction limit of 862 tonnes for the Spanish fleet on this stock, in application of the scientific recommendations of the ICCAT SCRS, keeping the same volume for 2021 and reducing it to 809.62 tons in 2022; Spain has also applied this principle to non-EU third country imports from the South Atlantic stock. There is no evidence that other ICCAT Parties fishing on the South Atlantic stock have adopted similar measures on their own, except for the mentioned negative NDFs of the UK and Brazil].

ICCAT approved a new measure in late 2022, that will limit the total mortality in the stock in 2023 and 2024 (until a new stock assessment is published in late 2024) to 1295 tons, with an allowance for the EU to retain 503 tons.

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 Centre, etc.), on-board observer programmes (from the RFMO, 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.

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?

This NDF compiles comprehensive data on the exploitation of the stock and on its conservation status, showing that it is suffering a decline of unknown magnitude and is at high risk of depletion. Given the uncertain conservation status of the stock, and the risk of a similar evolution to that of the northern stock, the ICCAT Shark Species Group recommended in 2019 (ICCAT, 2019b) that, as a minimum, catch levels should not exceed the minimum catch in the last five years of the assessment (2011-2015; 2001 t with catch scenario C1).

This scientific recommendation was taken into account by the CITES Scientific Authority of Spain from 2020 on, so that the Spanish NDF for this stock in 2020 limited the volume of catches by the Spanish fleet in this stock that could be introduced in the country to 862 tons (the minimum catch recorded in 5 years). The same limitation was set in 2021, and 809.62 in 2022. These limits have been respected.

The SRG of the EU adopted in September 2022 a negative opinion for the introduction from the sea and import of South Atlantic shortfin mako that shall enter into force in January 1, 2023, as it concluded that the measures that were in place at that point were insufficient to guarantee that the current level of exploitation is not detrimental to the population.

Later on, in November 2022, the EU and the UK prepared a joint proposal for the ICCAT annual meeting with a management plan which included a retention ban for 2023 and 2024, until a new stock assessment is published (scheduled for late 2024). After negotiating with some Parties that opposed such measure, the EU and the UK finally tabled a modified proposal that included a limit of retention of 1295 tons for 2023 and 2024, which was approved.

At the 2022 ICCAT contracting parties adopted a landmark measure on the conservation of South Atlantic shortfin mako sharks[1], addressing the concerns about the population status and for the first-time specific retention allowances have been agreed which, taken together, are 35% below the recommended catch limit of 2001 t proposed in 2019 (PA4_804B/2022). According to ICCAT this is to ensure that the total fishing mortality (the sum of any retention, dead discards, and post-release mortality of live discards) for South Atlantic shortfin mako shall be no more than the minimum reported annual catch in the last five years of the assessment (i.e., 2,001 t) as set out in the 2019 SCRS Report.

The objective is to: implement a fishery management and conservation plan for South Atlantic shortfin mako shark starting in 2023 to counteract overfishing immediately and gradually achieve biomass levels sufficient to support maximum sustainable yield

[1] https://www.iccat.int/Documents/Recs/compendiopdf-e/2022-11-e.pdf

(MSY). To this end a retention allowance of 503 T was agreed for the EU in 2023 and 2024, pending a new assessment in 2024. We acknowledge the actions taken by ICCAT as an important step towards better managing the fishery on the species.

However, despite the positive action taken by ICCAT, there are concerns about the current status of the stock of South Atlantic shortfin mako. Prior to the 2019 assessment update it was concluded by the ICCAT Shark WG in 2017 that ´... the stock status results for the South Atlantic to be highly uncertain. Despite this uncertainty, it is not possible to discount that in recent years the stock may have been at, or already below, B_{MSY} and that fishing mortality is already exceeding F_{MSY}."

In their 2017 article Winker *et al.*[2] stated "Taking into consideration results from the modelling approaches used in the assessment, the associated uncertainty, and the relatively low productivity of SMA, the Working Group recommended that the fishing mortality of shortfin mako should not be increased until more reliable stock assessment results are available for both the Northern and Southern Atlantic stocks. The high uncertainty in past catch estimates and deficiency of some important biological parameters, particularly for the southern stock, still represent obstacles for obtaining reliable estimates of current status of the stocks."

The two models used for the stock assessment have shown some inconsistencies (Winker *et al*., 2017) and the ICCAT Standing Committee considered that the results of the assessment of this stock are highly uncertain because the catch and CPUE (catch-per-unit-effort) data are contradictory. Winker *et al.* (2017) state that ".. the CMSY (catch resilient method) results suggest that the South Atlantic stock status is as pessimistic as that of the North Atlantic. The strong discrepancy between the fitted models (based on CPUE) and CMSY, which is independent of CPUE, further highlights that the CPUE-driven stock status estimates for the South Atlantic should be treated with caution." The article further explains that ".. estimates of unsustainable harvest rates in the South Atlantic appear to be fairly robust, whereas the biomass depletion and *B/BMSY* estimates are highly uncertain."

Following this, ICCAT updated the recommendations for shortfin mako stocks in the Atlantic at its Shark Group meeting in May 2019 and a 2001 T retention allowance was agreed for the southern population, lower than the 2900 T previously agreed on.

[2] https://www.researchgate.net/profile/Henning-Winker/publication/322520284_Initial_results_for_North_and_South_Atlantic_shortfin_mako_Isurus_Oxyrinchus_stock_assessment_using_the_Bayesian_surplus_production_model_JABBA_and_the_catch-resilience_Method_CMSY/links/5a5ddee0a6fdcc68fa981750/Initial-results-for-North-and-South-Atlantic-shortfin-mako-Isurus-Oxyrinchus-stock-assessment-using-the-Bayesian-surplus-production-model-JABBA-and-the-catch-resilience-Method-CMSY.pdf

The conclusion of the 2019 assessment was: "Given that fishery development in the South predictably follows that in the North and that the biological characteristics of the stock are similar, there is a significant risk that this stock could follow a similar history to that of the North stock. If the stock declines it will, like the North Atlantic stock, require a long time for rebuilding even after significant catch reductions. To avoid this situation and considering the uncertainty in the stock status, the Group recommends that, at a minimum catch levels should not exceed the minimum catch in the last five years of the assessment (2011-2015; 2,001 t with catch scenario C1)."

Looking at the catch statistics, it is clear that the recommended catch quota has been exceeded in a number of years, especially 2018 onwards. It is unclear what effect this has had on the population status.

The current catch composition is primarily juveniles, although it is unclear if this is due to fleet dynamics or an actual depletion of larger individuals. The NDF also mentions that the 2019 assessment update noted that ".. the number of females in recent years had been lower than expected at maximum sustainable yield (MSY), that fishing mortality was already higher than expected at MSY, and finally, that there was evidence of historical declines."

In 2019 the SCRS concluded that the combined probability of the stock being overfished was 32.5% and that of experiencing overfishing was 41.9%. The past years has seen an overshoot of agreed catch limits, which means that it is uncertain that the stock is in the same state as it was when last assessed in 2017. Although the retention allowance agreed in 2022 addresses the issue of overfishing immediately, it is unknown if there would be any rebuilding of the population in the short-term.

In 2018, IUCN assessed the species as globally Endangered due to a ≥ 50% decline over three generations (72-75 years), and the entire Atlantic population as Endangered and in decline, with a further projected decline of 60% over the next three generations[3]. IUCN recommended prohibiting landing of the species while it remains globally Endangered, and failing this, setting regional and national limits on catches based on scientific evidence and/or the precautionary principle, among other measures. These recommendations are based in 2017 ICCAT report. New ICCAT reports (2019, 2022) and some measurements, as full retention ban in North Atlantic or new analyses on the capturability in South Atlantic stock, have been proposed.

The 2019 ICCAT assessment (with data up to 2015) was highly uncertain, but it definitively pointed to the stock being already in a seriously unfavorable conservation status (2019a). It stated, for instance, that there was only a 38% percent probability that the stock was both not overfished and not being overfished, it said that the number of females in recent years had been lower than expected at maximum sustainable yield

[3] https://www.iucnredlist.org/species/39341/2903170

(MSY), that fishing mortality was already higher than expected at MSY, and finally, that there was evidence of historical declines. The ICCAT SCRS expressed its deep concern about the situation and the "significant risk" of the South Atlantic stock following the development of the North Atlantic one, and the long time it would require to recover "even after major reductions in catch" (2019b). That's why they recommended –again, based on data only up to 2015- "that, as a minimum, catch levels should not exceed the minimum catch in the last five years of the assessment (2011-2015; 2001 t with catch scenario C1)" (ICCAT, 2019d). As it is known ICCAT approved a recovery plan that started with a full retention ban for 2022 and 2023, while the EU SRG issued a negative opinion for the introduction of North Atlantic shortfin mako already in December 2020. The fact that ICCAT has approved a management plan in November 2022 reflects concerns about the South Atlantic shortfin mako. Unfortunately, the ICCAT SCRS was not able to perform an analytical model of the data or elaborate projections for this stock due to conflicting data, *it est*, due to a paucity of data which could produce more precise results (as opposed to the case of the North Atlantic stock).

It has been agreed by the SCRS that in 2024, following the results of the South Atlantic shortfin mako stock assessment, and upon analysis of the Kobe II strategy matrix provided by the SCRS, CPCs shall agree on a catch level that ensures that the stock is in the green zone of the Kobe II strategy matrix with a probability of between 60 and 70% by 2070 (using catch increments of 100 tonnes and time increments of 5 years). Until that time the SRG advises to stop fishing the South Atlantic stock of shortfin mako

All in all, there appears to be a high degree of uncertainty of the robustness of the models, and it is unknown if the catch levels agreed by ICCAT, both past and present, are precautionary enough to address this uncertainty. It seems that the effect of current harvest levels will only be able to be predicted once the new assessment has taken place.

The import, export and introduction from the sea of scientific samples does not fall under this NDF. Such applications, from both South and North Atlantic stocks, will be referred to the SRG and be decided upon on a case-by-case basis.

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*	NO – *go to C*
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*	NO

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

(For the justification of this finding, please read section 4.1 B above).

A **negative** NDF is formulated for imports, introductions from the sea, exports and re-exports of shortfin mako products from the South Atlantic stock caught by vessels registered in the EU.

The conclusions of this NDF are valid indefinitely, id est, as long as no new data, assessments or information emerge – including the provisions of the Scientific Review Group - that entail the need to review the opinion, therefore that from now on it will not be necessary to request an annual opinion from the Scientific Authority.

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ANNEX

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

SOUTH ATLANTIC SHORTFIN MAKO SUMMARY		
Current Yield (2018)		3,158t[1]
Yield (2015)		2,686 t[2]
Relative Biomass	B_{2015}/B_{MSY}	0.65-1.75[3]
	B_{2015}/B_0	0.32-1.18[4]
Relative Fishing Mortality:	F_{MSY}	0.030-0.034[5]
	F_{2015}/F_{MSY}	0.86-3.67[6]
Stock status (2015)	Overfished	Possibly[7]
	Overfishing	Possibly[7]
Management Measures in Effect:		Rec. 04-10, Rec. 07-06, Rec. 10-06, Rec. 14-06

[1] Task I catch.
[2] Task I catch from the stock assessment.
[3] Range obtained from 2 Bayesian production (BSP2JAGS) and 2 catch-only (CMSY) model runs. Low value is lowest value from the CMSY model runs and high value is highest value from the BSP2JAGS model runs.
[4] Range obtained from 2 Bayesian production (BSP2JAGS) and 2 catch-only (CMSY) model runs. Low value is lowest value from the CMSY model runs and high value is highest value from the BSP2JAGS model runs.
[5] Range obtained from 2 Bayesian production (BSP2JAGS) and 2 catch-only (CMSY) model runs. Low value is from the BSP2JAGS model runs and high value is from the CMSY model runs.
[6] Range obtained from 2 Bayesian production (BSP2JAGS) and 2 catch-only (CMSY) model runs. Low value is lowest value from the BSP2JAGS model runs and high value is highest value from the CMSY model runs.
[7] The Committee considers that results have a high degree of uncertainty.

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 and South 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).