CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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NOTES ON THE PROPOSAL FOR INCLUSION OF THE SHORTFIN MAKO (*ISURUS OXYRINCHUS*) AND LONGFIN MAKO (*ISURUS PAUCUS*) SHARKS IN APPENDIX II OF CITES IN RELATION TO THE STOCK STATUS AND SCIENTIFIC ADVICE PROVIDED TO THE ICCAT COMMISSION

1. This document has been submitted by the Secretariat at the request of the Chair of ICCAT's Panel 4 (swordfish, billfish, sharks and other bycatch), the Chair and Vice-chair of ICCAT's Standing Committee of Research and Statistics (SCRS) and the ICCAT's Shark Species Group Rapporteur in relation to agenda item 68.*

2. This document provides comments on the proposal for inclusion of shortfin and longfin makos in Appendix II of CITES from the perspective of the scientific work conducted and advice on Atlantic stocks provided to the ICCAT Commission.

Highlights

- The **International Commission for the Conservation of Atlantic Tunas (ICCAT)** is the Regional Fisheries Management Organization (tuna-RFMO) responsible for the management and conservation of tuna and tuna-like species in the Atlantic.
- ICCAT has **collected catch and effort data on shark bycatch** for several decades.
- In 2014 ICCAT established a **dedicated Sharks Research Programme**. This has produced important biological and catch information that has improved our knowledge about the biology and fisheries of shortfin mako in the Atlantic, and which have been used in the latest stock assessments.
- **ICCAT conducted the latest stock assessments for shortfin mako in 2017**. For the North Atlantic there is a **90% probability that the stock is overfished** (current biomass below the biomass that produces the Maximum Sustainable Yield) **and experiencing overfishing** (current fishing mortality above the fishing mortality rate that produces the Maximum Sustainable Yield). For the South Atlantic stock there is a **probability of the stock being overfished of 32.5% and of experiencing overfishing of 41.9%**.
- The **Proposal for listing shortfin mako in CITES Appendix II contains several inaccuracies with regards to the ICCAT assessment**. For example, the proposal calculates recent rates of decline of 4-5% per year, while the correct values range between 2.7%-4.4%.
- The Proposal extends recent rates of decline for another 10 years into the future and concludes that the CITES listing criteria would be met. Such a simplistic approach does not capture the dynamics of the species or the fisheries.
- **In 2019 ICCAT updated projections using integrated stock assessment models** that better capture the dynamics of the species and the fisheries. Those projections show that 1) current biomass was at **50%-51% of historical levels by 2015**, 2) future projections yield **rates of decline between**

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21-23%, lower than the 40% that would drive the population to the extent of decline threshold (i.e., 30%) within 10 years, and 3) these rates of decline mean that the population would be **reduced by 11% of historical levels from 2015 to 2025, and that by 2025 the population would be at 38-40% of historical levels**.

- This means that the **shortfin mako <u>does not meet</u> the CITES Appendix II listing criteria**.
- Finally, it is important to emphasize the **difficulties for collecting biological samples for highly migratory marine species that are already listed in CITES** and the urgent need for simplification of the processes, especially related with sampling on species in the high seas.

Detailed notes with regards to the ICCAT shortfin mako assessment and scientific work

(1) The International Commission for the Conservation of Atlantic Tunas (ICCAT) is the tuna-RFMO (Regional Fisheries Management Organization) responsible for the management and conservation of tuna and tuna-like species in the Atlantic Ocean and adjacent seas. Within ICCAT, the Standing Committee on Research and Statistics (SCRS) is the scientific body responsible for providing scientific advice to the ICCAT Commission. ICCAT has a specific Species Group dedicated exclusively to sharks (Sharks-SG) that regularly carries out stock assessments and provides advice for pelagic, oceanic and highly migratory shark species. ICCAT also has a Sub-committee on Ecosystems and Bycatch (SC-ECO) that deals with Ecosystem Based Fisheries Management, and provides advice for mitigation of the impact of ICCAT fisheries on vulnerable taxa, including sharks.

(2) The shortfin mako shark is a widely distributed and commercially exploited pelagic shark that is frequently captured in high seas fisheries, as well as in some coastal areas, mostly by fisheries targeting large pelagics. As such, tuna-RFMOs such as ICCAT in the Atlantic Ocean, have shown an increased focus and effort on assessing the status of those stocks, providing scientific advice, and establishing conservation and management regulations.

(3) Given that most of the fishing mortality for this species is from pelagic longline fisheries and that fisheries stock assessments are the primary source of information on stock status, the tuna-RFMOs are best placed to collect data, have the capacity for assessment of shark stocks, and to introduce appropriate and direct management measures.

(4) ICCAT established a dedicated Sharks Research Programme (SRDCP - *Sharks Research and Data Collection Programme*) in 2014, which has been funded by ICCAT's Members annually. The Programme focuses on all pelagic shark species, but a significant portion of the effort and funds have been allocated to shortfin mako, as one of the major and priority shark species to ICCAT. Since its inception multiple research projects have been carried out, focusing on issues such as stock structure (using satellite tagging and population genetics), population dynamics (ageing and reproductive biology), and movement patterns, habitat use, and post-release mortality (also using satellite telemetry). All these studies and results have contributed to improved understanding of the dynamics of this species in the Atlantic, and to provide scientific advice to the Commission with regards to the status of shark stocks, management and conservation measures.

(5) The latest full stock assessments conducted by ICCAT for shortfin mako took place in 2017, using catch data up to 2015. An update of the projections of future stock status was carried out in May 2019, which included three additional years of catches (official 2016 and 2017 catches and preliminary 2018 catch). The last assessment indicated that for the North Atlantic the stock abundance was below BMSY (biomass that supports maximum sustainable yield) but with large associated uncertainty. Several analytical models were used, with the results of production models (i.e., simpler models) being more pessimistic and those from an integrated age-structured model (more complex model that uses more data sources) being less pessimistic. The base run of the complex model indicated that the stock abundance was only slightly below MSY. The estimated fishing mortality for 2015 was consistently high for all models, and there was a 90% probability for all models combined that the stock was in an overfished state and experiencing overfishing.

(6) For the South Atlantic stock, four assessment model runs were used, in this case all from production (i.e., simpler) models. The results for this stock were less pessimistic, with a combined probability of the stock being overfished of 32.5%, and that of experiencing overfishing of 41.9%.

(7) For both stocks (North and South Atlantic), based on the diagnostics of model performance, the estimates of unsustainable harvest rates appeared to be fairly robust. Conversely, the estimates of biomass depletion and current biomass compared to biomass that produces MSY were highly uncertain. The technical

documentation from those stock assessments advises that such results should be treated with extreme caution.

(8) The population trends and magnitude of declines of shortfin mako vary across ocean basins. In the specific case of the Atlantic Ocean, the trends in biomass listed in the proposal, specifically in Table 1 and then represented in Figures 2 and 3, are not entirely accurate and should be interpreted with caution as those do not capture the uncertainties associated with such estimates. As noted above, the conclusions from the last stock assessments regarding biomass trends were highly uncertain, and both the stock assessment technical report and the ICCAT Sharks Executive Summary provided strong warnings with regards to trends. As such, the biomass and abundance trajectories represented in Figures 2 and 3 of the proposal should have provided levels of uncertainty associated with those estimates.

9) With regards to the biomass and abundance trends represented in Figures 2 and 3, the extrapolations made in the proposal for future years are misleading because they assume that the constant declines into the future are similar to those from past trends. This approach and the values presented are unlikely to be accurate for various reasons. Among those is that the proposal does not take into account the new regulations and management measures that were established since the last stock assessments. Specifically for the North Atlantic, catch restrictions and regulations for shortfin mako were implemented by ICCAT in 2018, after the 2017 stock assessment (ICCAT Recommendation 17-08[1]). It is of note that new projections conducted during the ICCAT Sharks Species Group in 2019 (20-24 May 2019) showed the CITES Appendix II listing criteria was not met. Paragraphs 16, 17 and 18 further below in this document provide specific technical notes regarding those 2019 updated projections and comparisons with the CITES listing criteria.

(10) In addition to the caveats mentioned above, there seem to be several inaccuracies in the proposal regarding the results of the 2017 ICCAT North Atlantic stock assessment. The proposal cites a historical extent of decline of 60% for the North Atlantic stock. But that decline is for a single run of one of the three modelling approaches used (Stock Synthesis 3; SS3) based on biomass; the corresponding decline based on SSF (spawning stock fecundity) was 50%, and the mean decline across the 9 runs from the three different modeling approaches was 56% (from 1950, or 1971 depending on the scenario, that is considered to be at an unfished level, until 2015). The proposal authors then extrapolate “recent rates of decline” of 4% per year for total biomass and 5% per year for SSF for 2016-2018 and then for another 10 years into the future. To be precise, an examination of the biomass and SSF trajectories for the single SS3 run considered in the proposal reveals that the “recent rates of decline” for a 10 and 5 year period, respectively, are 2.7% and 3.2% for biomass, and 4.1% and 4.4% for SSF."

(11) Specifically with regards to the Mediterranean Sea, the proposal makes references and highlights in various places the large declines described for the Mediterranean (96% decline), including in Table 1. This value comes mostly from one study (Ferretti et al., 2008) whose methods and interpretations have been widely questioned by the scientific community. For the Mediterranean, ICCAT has not yet conducted a quantitative stock assessments for this species due to very poor data in the region. It is also important to note that shortfin mako shark retention has been prohibited in the Mediterranean by a specific GFCM (General Fisheries Commission for the Mediterranean) regulation, implemented since 2012 (Recommendation GFCM/36/2012/31[2]).

(12) The proposal correctly mentions the relatively high values of post-release survival for this species, which can reach around 70%. This means that it is feasible to implement management measures such as catch limits or minimum retention sizes, as the discarded specimen will likely have high post-release survival.

(13) The proposal makes reference to the look-alike issue in mako sharks, i.e. between shortfin mako - *Isurus oxyrinchus* and longfin mako - *Isurus paucus*. Whilst these species are similar to some extent, they are actually very easy to separate especially when they still have the fins attached, as the pectoral fins of both species are very different in relative size and shape. It is also noted that fins-attached regulations have been increasingly adopted by several ICCAT member countries, as well as directly by some tuna-RFMOs (e.g., IOTC in the Indian Ocean, for fresh longline fleets). Such regulations contribute to a simpler and easier separation of the species, meaning that look-alike issues might not be relevant in this case.

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[1] *ICCAT Rec. 17-08: Recommendation by ICCAT on the conservation of North Atlantic stock of shortfin mako caught in association with ICCAT fisheries. https://www.iccat.int/Documents/Recs/compendiopdf-e/2017-08-e.pdf.*

[2] *Recommendation GFCM/36/2012/3 on fisheries management measures for conservation of sharks and rays in the GFCM area. http://www.fao.org/3/a-ax385e.pdf.*

(14) One last issue we believe is extremely important to emphasize are the difficulties associated with biological sampling of highly migratory marine species that are listed by CITES and the urgent need for simplification of the processes, especially related with sampling of species in the highs seas - Introductions from the Sea. This has been an ongoing issue especially since the 2013 and 2016 CITES listings of several highly migratory pelagic sharks. Many countries with highs seas fisheries have onboard scientific observer programs, that routinely collect biological samples on the high seas (Areas Beyond National Jurisdictions, ABNJ) in areas of competency of tuna-RFMOs (ICCAT in the case of the Atlantic Ocean and adjacent seas). In addition, RFMOs often have joint international research programmes and initiatives, like the SRDCP Programme described above for ICCAT, and therefore the biological samples have to be transferred from the country that collected and holds the samples to other countries that conduct specific analyses. While there are processes in CITES to deal with Introductions from the Sea and transfers, the processes are complex and most scientists or laboratories simply do not have the time, legal knowledge or precedent on how to do this in a simple and effective manner. As such, usually when a highly migratory species is listed in CITES, one immediate negative consequence is stopping scientific sampling in the high seas for that species.

(15) One possible way forward to solve this issue that has been previously suggested by ICCAT to the CITES Secretariat, would be for CITES permits to be issued directly to the RFMOs, allowing both introductions from the sea and the international transport of samples between countries that are working cooperatively within projects officially approved by the scientific committees of the RFMOs. In the specific case of ICCAT, this would mean that the biological sampling conducted within the ICCAT/SRDCP Programme, as described above could continue to be done (or resumed for the 2013 and 2016 species listings), allowing for better and improved scientific advice for those species in the future.

Additional notes following the update of the projections by ICCAT in 2019

(16) ICCAT conducted an update of the projections of future stock status of the North Atlantic stock of shortfin mako in 2019. These new projections were conducted with Stock Synthesis (SS), a modeling platform that incorporated important aspects of shortfin mako biology, which was not possible with the production model projections conducted in the 2017 assessment. These projections were thus considered a better representation of the stock dynamics because they can incorporate the time lag effects caused by the selectivity and maturity of the stock. Although projections were also conducted with a production model (BSP2JAGS), the fact that the fishery catches mostly juvenile animals, means that the production model is only tracking juvenile abundance. In contrast to the SS projections, production model projections are not informative about trends in the mature population which would lag behind trends in the exploitable population by 10 years or more (the time it takes for shortfin makos to reach maturity in the North Atlantic).

(17) Thus only projections with SS were considered. The criterion for Appendix II listing recommended by FAO guidance (FAO 2001) is a cumulative rate of decline that would drive the population down to the recommended Appendix I guideline for historical extent of decline in the near future (i.e. 10 years). The historical extent of decline guideline is a decline to 30% of historic levels (20% for species with low productivity such as sharks with a 10% buffer). The two SS model runs used in projections showed current declines to 50% and 51% of historic levels. Using the methodology described in Table 2 of the FAO guidance, a current population of 50% of baseline corresponds to a 10-year rate of decline that would drive the population to the extent of decline threshold (i.e., 30%) within 10 years of 40% ((50%-30%)/50%). Projections with SS model run 3 (less optimistic run) with known catches in 2016-2018 yield rates of decline in 2025 of 23% for all scenarios examined (Total Allowable Catches [TAC] ranging from 0 to 1,100 t). Similarly, projections with SS model run 1 (more optimistic run) with known catches in 2016-2018 yield rates of decline in 2025 of 21-22% for all scenarios examined (TAC ranging from 0 to 1,100 t). These declines would reduce the population to 38-40% of historical levels by 2025. Therefore, projections from the vetted stock assessment model (SS) predict that the CITES decline criteria will not be met.

(18) Furthermore, projections with SS model run 3 showed that the year of maximum decline with respect to historical levels (1950) ranged from 2034 to 2036 with TAC levels of 0 to 700 t and was 2070 for TAC levels of 800 t and higher. The declines in those years would reduce the population to 31%-34% of historic levels (for TAC levels of 0-800 t) and to 23%-28% of historic levels (for TAC levels of 900 t and higher). Similarly, projections with SS model run 1 showed that the year of maximum decline with respect to historical levels ranged from 2033 to 2036 with TAC levels of 0 to 1,100 t. The declines in those years would reduce the population to 34%-37% of historic levels.

Literature cited

FAO. 2001. Second technical consultation on the suitability of the CITES criteria for listing commercially-exploited aquatic species. Windhoek, Namibia, 22-25 October 2001. FAO Fisheries Report 667.

Ferretti, F., Myers, R.A., Serena, F.S., Lotze, H.K. 2008. Loss of large predatory sharks from the Mediterranean Sea. Conservation Biology, 22 (4): 952–964.