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

by

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Below we provide comments on the 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.

(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 widespread and commercially exploited pelagic shark that is frequently captured in high seas fisheries, as well as in some coastal areas, mostly on fisheries targeting large pelagics. As such, tuna-RFMOs such as ICCAT in the Atlantic Ocean, have shown an increased focus and efforts on assessing the status of those stocks, provide scientific advice, and establish 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 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 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 improve 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 and management and conservation measures.

(5) The latest 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 is planned for May 2019, which will include 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 B_{MSY} (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 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. The biomass and abundance trajectories represented in Figures 2 and 3 of the proposal do not capture the real level 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). Until an updated evaluation of the impact of those new regulations is carried out, it is not possible to estimate future population trends. It is also of note that such work will be conducted during the upcoming ICCAT Sharks Species Group in 2019 (20-24 May 2019). However, the 2017 assessment of the North Atlantic stock of shortfin mako included projections of future stock status under several exploitation regimes based on production models, finding that biomass would only continue to steeply decline with catches of about 2500 t or more.

(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 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 any 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/36/2012/3[1]).

[1] 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.

(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 rates.

(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 countries members to ICCAT, 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.

(14) One last issue we believe it is extremely important to emphasize are the difficulties for biological sampling for highly migratory marine species that are listed by CITES and the urgent need for simplification of the processes, especially related with sampling on 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.

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.