SCRS / 2024 / 133

MIGRATORY SHARKS AND RAYS IN THE ATLANTIC: CHRONOLOGY OF THE WORK OF ICCAT, CMS AND THE SHARKS MOU, POTENTIAL SYNERGIES AND EMERGING ISSUES

Jim R. Ellis[1],[2] and Andrea Pauly[3]

SUMMARY

Several species of shark and ray that are of relevance to ICCAT are also listed in the Appendices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), as well as in Annex 1 of the non-legally binding Sharks MOU. Given the straddling interest across both fisheries management and nature conservation bodies regarding such species, there is an increasing need to develop closer links, and identify potential areas for more collaborative work. The present document provides a brief history of the shark-related initiatives of ICCAT, CMS and the Sharks MOU, and suggests various work areas that could possibly benefit from closer cooperation.

KEYWORDS

Biodiversity, bycatch, elasmobranchs, fisheries management, nature conservation, prohibited species, shark fisheries

1. Introduction

As various species and stocks of shark and ray have become more depleted, there has been increasing concern regarding their population status, both from the perspective of fisheries management (e.g. sustainable exploitation) as well as in relation to wider biodiversity and nature conservation concerns. Thus, many shark and ray species are of increased scientific and policy interest, both nationally and internationally, across multiple fora.

One area of overlapping interest is in relation to many of the oceanic sharks and rays that interact with high seas fisheries, including tuna fisheries. Given the migratory nature of many such species, they are of relevance to both those Regional Fisheries Management Organisations (RFMOs) involved in the management of fisheries for tuna and associated pelagic species, as well as the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

The aim of this paper is to provide a brief synopsis of the shark-related work of these fora, highlighting potential synergies and emerging issues.

2. ICCAT and shark-related work

The International Commission for the Conservation of Atlantic Tunas (ICCAT) arose following the 'Conference of Plenipotentiaries on the Conservation of Atlantic Tunas', held in Rio de Janeiro (Brazil) in May 1966. The Convention text states that ICCAT would be "*responsible for the study of the populations of tuna and tuna-like fishes (the Scombriformes with the exception of the families Trichiuridae and Gempylidae and the genus* Scomber*) and such other species of fishes exploited in tuna fishing in the Convention area as are not under*

[1] Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Pakefield Road, Lowestoft, Suffolk, NR33 0HT, United Kingdom, Email: jim.ellis@cefas.gov.uk

[2] Advisory Committee, Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU)

[3] Coordinator Sharks MOU, Associate Programme Management Officer, Aquatic Species Team, Convention on Migratory Species (CMS), United Nations Campus, Platz der Vereinten Nationen 1, 53113 Bonn, Germany

investigation by another international fishery organization". Whilst initial work focused on tunas, swordfish and billfish, there has been greater focus on oceanic sharks and rays over time.

The first meetings of the Shark Working Group of the ICCAT Sub-Committee on Bycatch were held in 1996 and 1997 (ICCAT, 1997, 1998). ICCAT then convened a data preparatory meeting (ICCAT, 2002) to help with preliminary, exploratory assessments for shortfin mako *Isurus oxyrinchus* and blue shark *Prionace glauca* (ICCAT, 2005). Subsequent assessments were also undertaken in 2008 (ICCAT, 2008a, 2008b). Since then, periodic assessments have been conducted for both shortfin mako (ICCAT, 2012, 2017a,b, 2019) and blue shark (2015a, 2015b, 2023a, 2023b).

The ICCAT Shark Species Group and the ICES Working Group on Elasmobranch Fishes (WGEF) met together in 2009 to conduct initial assessments for stocks of porbeagle *Lamna nasus* (ICCAT, 2009), with subsequent analyses and assessment work also undertaken in conjunction with WGEF (ICCAT, 2020, 2022a).

In terms of the wider shark and ray assemblage interacting with ICCAT fisheries, an Ecological Risk Assessment was developed (ICCAT, 2011, 2012), which included 16 species of shark and ray. These comprised common thresher shark *Alopias vulpinus* and bigeye thresher shark *A. superciliosus* (Family Alopiidae), shortfin mako, longfin mako *Isurus paucus* and porbeagle (Family Lamnidae), smooth hammerhead *Sphyrna zygaena,* scalloped hammerhead *S. lewini* and great hammerhead *S. mokarran* (Family Sphyrnidae), silky shark *Carcharhinus falciformis,* oceanic whitetip *C. longimanus,* dusky shark *C. obscurus,* sandbar shark *C. plumbeus,* night shark *C. signatus* and blue shark (Family Carcharhinidae), tiger shark *Galeocerdo cuvier* (Family Galeocerdonidae, formerly in the Carcharhinidae), and pelagic stingray *Pteroplatytrygon violacea* (Family Dasyatidae).

Outside the main stock assessments, the ICCAT Shark Species Group has held inter-sessional meetings addressing a range of topics and collating relevant data (ICCAT, 2013, 2014, 2016, 2018, 2022b), with such information also contributed to the regular reports of ICCAT's Standing Committee on Research and Statistics (SCRS). Species accounts for many elasmobranchs are also included in the ICCAT Manual (https://www.iccat.int/en/iccatmanual.html), and these provide important biological information for the main shark and ray species of relevance to ICCAT.

ICCAT have also agreed a range of Recommendations (**Table 1**), including prohibitions for a number of species listed on CMS (e.g. oceanic whitetip, and various hammerhead sharks), and have, since 2016, also agreed a range of recommendations that have sought to limit the landings of the main commercial stocks of shortfin mako and blue shark.

In 2023, ICCAT also agreed, subject to further advice from SCRS, prohibitions for whale shark *Rhincodon typus* and mobulid rays (*Mobula* spp.).

The Shark Species Group also oversees ICCAT's Shark Research and Data Collection Programme (SRDCP), which provides support and coordination for relevant work areas, including studies relating to age and growth, reproductive biology, stock identification and stock structure, movements and migrations, and discard mortality (e.g. post-release mortality). Tagging studies are used to inform on several of these work areas. This programme of work has facilitated an increasing number of peer-reviewed publications on the fisheries ecology of oceanic sharks.

3. Convention on the Conservation of Migratory Species of Wild Animals (CMS)

The treaty text for the Convention on the Conservation of Migratory Species of Wild Animals (CMS) was agreed in June 1979, and came into force in November 1983. CMS is an environmental treaty of the United Nations (UN). In practice, CMS acts as a 'framework Convention', including some legally binding agreements for CMS Parties, as well as some other instruments, such as Memoranda of Understanding, that are less formal.

The CMS shall list migratory species that are thought to be threatened with extinction, and CMS Parties that are Range States to such Appendix I-listed species shall "*prohibit the taking*" of such species. Appendix II shall list migratory species which have an '*unfavourable conservation status'* and which require international agreements for their conservation, as well as those which have a conservation status that would benefit significantly from the international cooperation that could be achieved by an international agreement. A species may be listed in both Appendices.

In terms of the commitment of CMS Parties that are Range States, it should be noted that flag vessels that fish outside national jurisdictional waters but interact with listed migratory species are also considered to be a Range State.

For the purposes of CMS, 'migratory' is defined as meaning "*the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries*". Jurisdictional boundaries would include crossing neighbouring EEZs, or moving between EEZs and high seas.

Taking is defined as meaning "*taking, hunting, fishing, capturing, harassing, deliberate killing, or attempting to engage in any such conduct*".

The Conference of Parties (COP) meets on a triennial basis, during when proposals to amend the Appendices are considered. The proposals are reviewed prior to this by the Scientific Council (ScC), including due consideration of whether the proposed species, or regional populations thereof, meet the criteria for listing in the proposed Appendices.

After the CMS came into force, the species accepted for listing in the Appendices of CMS were predominantly mammals, birds and reptiles (including sea turtles), although there has been greater consideration of fish species in recent years. The first shark to be listed under CMS was whale shark (included in Appendix II in 1999), followed by white shark *Carcharodon carcharias* (Appendices I and II in 2002) and basking shark *Cetorhinus maximus* (Appendices I and II in 2005). Since 2008, more species of shark and ray have been added, including some species of current or former importance to commercial fisheries.

4. Sharks MOU

Within the framework of the CMS, there is also a Memorandum of Understanding on the conservation of migratory sharks (henceforth, the Sharks MOU), which is a non-legally binding instrument. The original Sharks MOU text was agreed in February 2010, with 49 nations becoming MOU Signatories since that time.

The overall objective of the Sharks MOU is "*to achieve and maintain a favourable conservation status for migratory sharks based on the best available scientific information, taking into account the socio-economic and other values of these species for the people of the Signatories*".

Signatories to the Sharks MOU should strive for:

a) *Improving understanding of migratory shark populations through research, monitoring and information exchange;*
b) *Ensuring that directed and non-directed fisheries for shark are sustainable;*
c) *Ensuring to the extent practicable the protection of critical habitats and migratory corridors and critical life stages of sharks;*
d) *Increasing public awareness of threats to sharks and their habitats, and enhance public participation in conservation activities; and*
e) *Enhancing national, regional and international cooperation.*

Signatories to the Sharks MOU should also support "*measures to improve or restore a favourable conservation status of sharks listed in Annex 1 of the Memorandum of Understanding".*

Under the Sharks MOU there are regular Meetings of the Signatories (MOS), which have been held in 2012 (Sharks MOS1, Germany), 2016 (Sharks MOS2, Costa Rica), 2018 (Sharks MOS3, Monaco) and 2023 (Sharks MOS4, Germany). Each Signatory to the Sharks MOU has a national Focal Point, with the CMS Secretariat proving support, and an Advisory Committee (AC) tasked with providing scientific advice to the MOS and the Signatories. The AC comprises ten appointed representatives, two from each of Africa, Asia, Europe and 'South, Central America & the Caribbean', and one person from each of North America and Oceania.

The sharks and rays listed in Annex 1 of the Sharks MOU may differ slightly from the species listed in the Appendices of CMS. For example, the Sharks MOU listed two lookalike species (giant guitarfish *Rhynchobatus djiddensis* and smoothnose wedgefish *Rhynchobatus laevis*) when listing white-spotted wedgefish *Rhynchobatus australiae*. Whilst blue shark was considered for listing during MOS3 (given it had been listed in Appendix II of CMS the previous year), it was not listed in Annex 1 of the Sharks MOU at that time, given that the advice

provided by the AC was that blue shark did not meet the criterion for being in 'unfavourable conservation status' at that time. Nevertheless, the majority of shark and ray species listed in the Appendices of CMS are listed in Annex 1 of the Sharks MOU, and vice versa.

5. ICCAT CPCs, CMS Parties and Signatories to the MOU

Nations bordering the ICCAT Convention Area have varying obligations through ICCAT and/or CMS, with those nations that are also Signatories to the Sharks MOU also having a rationale for improving knowledge of listed species, and ensuring any exploitation is sustainable.

As of 2024, there were 53 CPCs and four cooperators within ICCAT, 133 Parties to the CMS (worldwide) and 49 Signatories to the Sharks MOU (worldwide). A summary of which nations bordering the ICCAT Convention area are involved in each agreement is provided in **Table 2**.

Excluding Bolivia (which is landlocked) and Saint Pierre and Miquelon, of the remaining 52 CPCs and three cooperators, a total of 33 (60%) are Signatories to the CMS and/or Sharks MOU, whilst 22 (40%) of the CPCs and cooperators are Signatories to neither.

There are 15 CPCs to ICCAT that are also Parties to CMS and Signatories to the Sharks MOU, these being Brazil, Costa Rica, Côte d'Ivoire, Egypt, European Union, Ghana, Republic of Guinea, Liberia, Libya, Mauritania, Philippines, Senegal, South Africa, Syrian Arab Republic and United Kingdom.

Given that more than half of the CPCs to ICCAT are also Parties to CMS, there may be potential for synergies to be better developed across these fora, which may facilitate improved knowledge for some species and stocks.

6. Shark and ray species listed in the Appendices of CMS and in Annex 1 of the Sharks MOU

As of 2024, the Convention listed 40 valid species of shark and ray in its Appendices, 24 of which are included in Appendix I[4], whilst the Sharks MOU listed 36 species. The recent changes in taxonomy that were implemented under CMS will be proposed for adoption under the MOU at its next Meeting of the Signatories, alongside the proposed inclusion of those species listed in the CMS Appendices in 2024 to Annex 1 of the Sharks MOU.

In total, 42 species are listed in either the Appendices of CMS and/or Annex 1 of the Sharks MOU. Of these, 31 species have been reported from (or may occur[5]) in the Atlantic Ocean and/or adjoining seas (e.g. Mediterranean Sea) and so are found in the ICCAT Convention Area. The remaining 11 species listed occur in the Indo-Pacific regions (**Table 3**).

Eight of the listed species occurring in the ICCAT Convention Area are found primarily in shelf seas and coastal waters and have no known (or negligible) interactions with tuna fisheries. These species are spurdog (or spiny dogfish) *Squalus acanthias*, sand tiger shark *Carcharias taurus*, angel shark *Squatina squatina*, common guitarfish *Rhinobatos rhinobatos*, blackchin guitarfish *Glaucostegus cemiculus,* bull ray *Aetomylaeus bovinus,* smalltooth sawfish *Pristis pectinata* and largetooth sawfish *Pristis pristis*, and these species are not considered further here. Lusitanian cownose ray *Rhinoptera marginata* is also a coastal species and, whilst it has been reported as a bycatch in purse seine fisheries in Turkish waters (Tıraşın and Başusta, 2018), the target species was not specified. Hence, this species is not considered further at the present time.

A further two species that are primarily shelf-associated, namely tope *Galeorhinus galeus* and dusky shark *Carcharhinus obscurus,* but are not considered of direct relevance to ICCAT (ICCAT, 2019b) may have a small degree of interaction with ICCAT fisheries, and so these are included here. For example, both these species were reported in pelagic fisheries operating off the southern Iberian Peninsula and off northwestern Africa (Muñoz-Chápuli, 1985), and in the Mediterranean Sea (Megalofonou et al., 2005; Damalas and Megalofonou, 2012).

[4] Including four species for which it is just the populations in the Mediterranean Sea that are listed on Appendix I.

[5] There is some uncertainty as to whether the reef manta occurs in the area, see Table 3.

Hence, at least 22 shark and ray species listed in the CMS and/or the CMS Sharks MOU may have some degree of interaction with those fisheries managed under the auspices of ICCAT. The degree of interactions, however, may vary given that they include both pelagic species that are often associated more closely with shelf seas (e.g., basking shark, and common thresher), as well as the more broadly distributed, oceanic species (e.g., blue shark, shortfin mako, oceanic whitetip, and silky shark).

Of the 22 species that may interact with ICCAT fisheries, ten are listed in Appendix I of CMS, and hence CMS Parties that are Range States (including where there are flag vessels operating outside jurisdictional waters), shall "*prohibit the taking*" of these species. These species are:

- Whale shark *Rhincodon typus*
- Basking shark *Cetorhinus maximus*
- White shark *Carcharodon carcharias*
- Oceanic whitetip *Carcharhinus longimanus*
- Reef manta *Mobula alfredi* (see footnote [5]); giant manta *Mobula birostris;* lesser devil ray *Mobula hypostoma* (including Lesser Guinean devil ray *M. rochebrunei*[6]); spinetail devil ray *Mobula mobular,* Chilean devil ray *Mobula tarapacana;* and smoothtail mobula *Mobula thurstoni*

A further 12 species are listed in Appendix II:

- Bigeye thresher *Alopias superciliosus*
- Common thresher *Alopias vulpinus*
- Shortfin mako *Isurus oxyrinchus*
- Longfin mako *Isurus paucus*
- Porbeagle *Lamna nasus*
- Tope *Galeorhinus galeus*
- Silky shark *Carcharhinus falciformis*
- Dusky shark *Carcharhinus obscurus*
- Blue shark *Prionace glauca*
- Scalloped hammerhead *Sphyrna lewini*
- Great hammerhead *Sphyrna mokarran*
- Smooth hammerhead *Sphyrna zygaena*

ICCAT had previously identified the range of fish species that were considered to fall within the scope of ICCAT fisheries (ICCAT, 2019b; ICCAT Recommendation 19-01), with many of these species also listed on CMS. Indeed, the only shark and ray species considered to be of relevance to ICCAT that are <u>not</u> listed on CMS are crocodile shark *Pseudocarcharias kamoharai*, Galapagos shark *Carcharhinus galapagensis,* and pelagic stingray *Pteroplatytrygon violacea*.

7. Fisheries management and conservation: The parallel evolution of ICCAT and CMS

Overall, the increased focus on sharks and rays within both fisheries and conservation fora have been relatively parallel (**Table 4**), with broader scientific and societal concern over the status of shark and ray populations since the 1990s. For example, ICCAT first convened a shark subgroup in 1996, and CMS first listed a shark species in 1999.

Of the species listed in Appendix I of CMS and that may interact with ICCAT fisheries, most are listed as prohibited species, including oceanic whitetip (Recommendation 2010-07), whale shark (Recommendation 2023-12) and mobulid rays (Recommendation 2023-14), but noting that the two latter recommendations require scientific advice from SCRS before they can enter into force in 2025.

There are, however, two shark species that are listed in Appendix I of CMS that may have some interaction with ICCAT fisheries, that are listed in ICCAT (2019b), but that are not listed currently as prohibited species, namely basking shark and white shark.

8. Key data gaps and other emerging issues

[6] Some authors consider these two species to be distinct due to the contrasting distributions of these coastal species, whilst recent genetic studies imply that that they may be treated as a single species.

ICCAT have made considerable progress in assessing the stocks of blue shark, shortfin mako and, in association with ICES, porbeagle. However, a range of other shark and ray species remain, at least over an Atlantic scale, unassessed. These including a range of data-limited species, such as hammerhead sharks, thresher sharks, silky shark, and longfin mako.

Much of the available data and information on longfin mako were collated by Ellis et al. (2022), with available information on mobulid rays also being collated Ellis et al. (in prep.). Future work could usefully evaluate available data for other relevant taxa in the ICCAT Convention Area, notably hammerhead sharks and thresher sharks, as some members of these families may have important habitats in both shelf seas, where there can be interactions with various artisanal fisheries, as well as in the high seas. Given that hammerhead sharks and common thresher are often associated with shelf sea ecosystems, it would be expected that important, relevant information and data would be held on national databases. Given that more collaborative work on such stocks is required, but noting that such species may be of a lower priority to the ICCAT community, their listing on CMS may be a useful supporting rationale to develop more collaborative work over the longer-term.

Whilst the main priorities for the scientists supporting the shark-related work of ICCAT will be the assessments of the main shark species that are (or were) of relatively higher commercial importance – particularly shortfin mako, blue shark, and porbeagle – collating relevant data and information for the more data-limited species could be considered as a potentially relevant work area in those years between stock assessments. This could include due consideration of nominal stock units, and identifying where more focused studies could usefully be undertaken. Much of the underlying information is summarised in the species accounts of the ICCAT Manual, and these accounts may serve as an important starting point for developing appropriate options for longer-term work plans for the various data-limited species.

Whilst many nations that are CPCs to ICCAT are also Parties to CMS and/or Signatories to the Sharks MOU, a range of other CPCs are not Parties/Signatories. Conversely, there are also several nations that are Parties to CMS that are not CPCs to ICCAT, including some nations that have are relatively important in terms of shark fisheries. Consequently, there are potential benefits in developing closer links between the Sharks MOU and ICCAT, as this may be a useful mechanism to facilitate greater knowledge exchange, and enhance engagement between relevant scientific bodies.

References

Damalas, D. and Megalofonou, P. (2012) Occurrences of large sharks in the open waters of the southeastern Mediterranean Sea. *Journal of Natural History*, 46: 2701–2723.

Ellis, J. R. et al. (in prep). Mobulid rays in the ICCAT Convention Area: A review of current knowledge.

Ellis, J. R., Reeves, S. and McCully Phillips, S.R. (2022). Longfin mako Isurus paucus: the forgotten cousin. *Collective Volume of Scientific Papers ICCAT*, 79(4): 183–202.

ICCAT (1997). Report of the First Meeting of the Shark Working Group of the ICCAT Sub-Committee on Bycatch. Miami, Florida, USA (26-28 February 1996). Col. Vol. Sci. Pap. ICCAT, 46 (4) : 289-371. Available at: https://www.ICCAT.int/Documents/CVSP/CV046_1997/n_4/CV046040289.pdf

ICCAT (1998). Report of the Second Meeting of the Working Group on Sharks of the ICCAT Sub-Committee on Bycatch. Shimizu, Japan (11-14 March 1997). Col. Vol. Sci. Pap. ICCAT, 48 (3) : 1-55. Available at: https://www.ICCAT.int/Documents/CVSP/CV048_1998/n_3/CV048030001.pdf

ICCAT (2002). ICCAT Data Preparatory Meeting for Atlantic Shark Stock Assessment. Halifax, Canada (11-14 September 2001). Col. Vol. Sci. Pap. ICCAT, 54 (4): 1064-1106. Available at: https://www.ICCAT.int/Documents/CVSP/CV054_2002/n_4/CV054041064.pdf

ICCAT (2005). Report of the 2004 Inter-Sessional Meeting of the ICCAT Sub-Committee on By-Catches: Shark Stock Assessment. Tokyo, Japan (14-18 June 2004). Col. Vol. Sci. Pap. ICCAT, 58(3): 799-890. Available at: https://www.ICCAT.int/Documents/CVSP/CV058_2005/n_3/CV058030799.pdf

ICCAT (2008a). Report of the 2007 Data Preparatory Meeting of the Shark Species Group. Punta del Este, Uruguay (June 25-29 2007). Collect. Vol. Sci. Pap. ICCAT, 62(5): 1325-1404. Available at: https://www.ICCAT.int/Documents/CVSP/CV062_2008/n_5/CV062051325.pdf

ICCAT (2008b). Report of the 2008 Shark Stock Assessments Meeting. Madrid, Spain (1-5 September 2008). SCRS/2008/017 – SHK Assessment. Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2008_SHK_Report.pdf

ICCAT (2009). Report of the 2009 Porbeagle Stock Assessments Meeting. Copenhagen, Denmark (June 22-27 2009). SCRS/2009/014 – Sharks Stock Assessment SCI-032/2009. Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2009_POR_ASSESS_ENG.pdf

ICCAT (2011). Sharks Data Preparatory Meeting to apply Ecological Risk Assessment. Madrid, Spain (June 20-24 2011). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2011_SHK_DATA_PREP_EN.pdf

ICCAT (2012). Shortfin Mako Stock Assessment and Ecological Risk Assessment Meeting. Olhão, Portugal (11-18 June 2012). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2012_SHK_ASS_ENG.pdf

ICCAT (2013). Inter-Sessional Meeting of the Sharks Species Group. Mindelo, Cape Verde (8-12 April 2013). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2013_SHK_INTER-SESS_ENG.pdf

ICCAT (2014). Inter-Sessional Meeting of the Sharks Species Group. Piriapolis, Uruguay (10-14 March 2014). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2014_SHK_INTER-SESS_REP.pdf

ICCAT (2015a.) Blue Shark Data Preparatory Meeting. Tenerife, Spain (23–27 March 2015). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2015-BSH_DATA_PREP_Rep-ENG.pdf

ICCAT (2015b). Report of the 2015 ICCAT Blue Shark Stock Assessment Session. Oceanário de Lisboa, Lisbon, Portugal (27-31 July 2015). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2015_BSH%20ASSESS_REPORT_ENG.pdf

ICCAT (2016). Report of the 2016 Intersessional Meeting of the Shark Species Group. Madeira, Portugal (25-29 April 2016). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2016_SHK_REPORT_ENG.pdf

ICCAT (2017a) Report of the 2017 ICCAT Shortfin Mako Data Preparatory Meeting. Madrid, Spain (28-31 March 2017). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2017_SMA_DATA_PREP_ENG.pdf

ICCAT (2017b) Report of the 2017 ICCAT Shortfin Mako Assessment Meeting. Madrid, Spain (12-16 June 2017). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2017_SMA_ASS_REP_ENG.pdf

ICCAT (2018) Report of the 2018 ICCAT Intersessional Meeting of the Sharks Species Group. Madrid, Spain (2-6 July 2018). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2018/REPORTS/SHK_2018_ENG.pdf

ICCAT (2019a) Report of the 2019 Shortfin Mako Shark Stock Assessment Update Meeting. Madrid, Spain (20-24 May 2019). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2019/REPORTS/2019_SMA_SA_ENG.pdf

ICCAT (2019b) Report for biennial period, 2018-19, Part I (2018), Volume 2 (SCRS). Available at: https://www.iccat.int/Documents/BienRep/REP_EN_18-19_I-2.pdf

ICCAT (2020) Report of the 2020 Porbeagle Shark Stock Assessment Meeting. Online (15-22 June 2020). Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2020/REPORTS/2020_POR_SA_ENG.pdf

ICCAT (2022a) Report of the Joint ICES-ICCAT Benchmark Workshop in advance of the North-Eastern Atlantic Porbeagle Stock Assessment. Available at: https://www.ICCAT.int/Documents/Meetings/Docs/2022/REPORTS/2022_POR_ICES_ENG.pdf

ICCAT (2022b) Report of the 2022 ICCAT Intersessional Meeting of the Sharks Species Group. Online (16-18 May 2022). Collect. Vol. Sci. Pap. ICCAT, 79(4): 61-132 (2022). Available at: https://www.ICCAT.int/Documents/CVSP/CV079_2022/n_4/CV079040061.pdf

ICCAT (2023a) Report of the ICCAT 2023 Blue Shark Data Preparatory Meeting. Olhão, Portugal (17-21 April 2023; hybrid). Available at: https://www.iccat.int/Documents/Meetings/Docs/2023/REPORTS/2023_BSH_DP_ENG.pdf

ICCAT (2023b) Report of the 2023 ICCAT Blue Shark Stock Assessment Meeting. Madrid, Spain (17-21 July 2023, hybrid). Available at: https://www.iccat.int/Documents/Meetings/Docs/2023/REPORTS/2023_BSH_ENG.pdf

Marshall, A.D., Compagno, L.J. and Bennett, M.B. (2009) Redescription of the genus *Manta* with resurrection of *Manta alfredi* (Krefft, 1868)(Chondrichthyes; Myliobatoidei; Mobulidae). *Zootaxa*, 2301(1): 1–28.

Megalofonou, P., Damalas, D. and Yannopoulos, C. (2005) Composition and abundance of pelagic shark by-catch in the eastern Mediterranean Sea. *Cybium*, 29: 135–140.

Muñoz-Chápuli, R.(1985) Análisis de las capturas de escualos pelágicos en el Atlántico nororiental (15º-40º N). Investigación Pesquera, 49: 67–79.

Tıraşın, E.M. and Başusta, N. (2018) Near-term embryos and gravid females of Lusitanian cownose ray (*Rhinoptera marginata*) in Mersin Bay, eastern Mediterranean Sea. *Marine and Freshwater Research*, 69(9): 1365–1371.

Table 1. List of ICCAT Recommendations relating to sharks and rays, including those that are no longer in force or that have been superseded (shaded cells).

Number	Title
1995-02	Resolution by ICCAT on cooperation with the Food & Agriculture Organization of the United Nations (FAO) with regard to study on the status of stocks and by-catches of shark species.
2001-11	Resolution by ICCAT on Atlantic Sharks
2003-10	Resolution by ICCAT on the shark fishery.
2004-10	Recommendation by ICCAT concerning the conservation of sharks caught in association with fisheries managed by ICCAT
2005-05	Recommendation by ICCAT to amend recommendation [rec. 04-10] concerning the conservation of sharks caught in association with fisheries managed by ICCAT
2006-10	Supplementary recommendation by ICCAT concerning the conservation of sharks caught in association with fisheries managed by ICCAT
2007-06	Supplemental recommendation by ICCAT concerning sharks
2008-07	Recommendation by ICCAT on the conservation of bigeye thresher sharks (*Alopias superciliosus*) caught in association with fisheries managed by ICCAT
2008-08	Resolution by ICCAT on porbeagle shark (*Lamna nasus*)
2009-07	Recommendation by ICCAT on the conservation of thresher sharks caught in association with fisheries in the ICCAT convention area
2010-06	Recommendation by ICCAT on Atlantic shortfin mako sharks caught in association with ICCAT fisheries
2010-07	Recommendation by ICCAT on the conservation of oceanic whitetip shark caught in association with fisheries in the ICCAT convention area
2010-08	Recommendation by ICCAT on hammerhead sharks (family Sphyrnidae) caught in association with fisheries managed by ICCAT
2011-08	Recommendation by ICCAT on the conservation of silky sharks caught in association with ICCAT fisheries
2012-05	Recommendation by ICCAT on compliance with existing measures on shark conservation and management
2013-10	Recommendation on biological sampling of prohibited shark species by scientific observers
2014-06	Recommendation by ICCAT on shortfin mako caught in association with ICCAT fisheries
2015-06	Recommendation by ICCAT on porbeagle caught in association with ICCAT fisheries
2016-12	Recommendation by ICCAT on management measures for the conservation of Atlantic blue shark caught in association with ICCAT fisheries
2016-13	Recommendation by ICCAT on improvement of compliance review of conservation and management measures regarding sharks caught in association with ICCAT fisheries
2017-08	Recommendation by ICCAT on the conservation of North Atlantic stock of shortfin mako caught in association with ICCAT fisheries

Table 1 (continued). List of ICCAT Recommendations relating to sharks and rays, including those that are no longer in force or that have been superseded (shaded cells).

Number	Title
2018-06	Recommendation by ICCAT to replace recommendation 16-13 on improvement of compliance review of conservation and management measures regarding sharks caught in association with ICCAT fisheries
2019-01	Recommendation by ICCAT on fishes considered to be tuna and tuna-like species or oceanic, pelagic, and highly migratory elasmobranchs
2019-07	Recommendation by ICCAT amending the recommendation 16-12 on Management measures for the conservation of the North Atlantic blue shark caught in association with ICCAT fisheries
2019-06	Recommendation by ICCAT on the conservation of North Atlantic stock of shortfin mako caught in association with ICCAT fisheries
2019-08	Recommendation by ICCAT on management measures for the conservation of South Atlantic blue shark caught in association with ICCAT fisheries
2021-09	Recommendation by ICCAT on the conservation of the North Atlantic stock of shortfin mako caught in association with ICCAT fisheries
2021-10	Recommendation by ICCAT amending recommendation 19-07 amending the recommendation 16-12 on management measures for the conservation of the North Atlantic blue shark caught in association with ICCAT fisheries
2021-11	Recommendation by ICCAT amending recommendation 19-08 on management measures for the conservation of South Atlantic blue shark caught in association with ICCAT fisheries
2022-11	Recommendation by ICCAT on the conservation of the South Atlantic stock of shortfin mako caught in association with ICCAT fisheries
2023-10	Recommendation by ICCAT to replace recommendation 19-07 on management measures for the conservation of North Atlantic blue shark caught in association with ICCAT fisheries
2023-11	Recommendation by ICCAT to replace recommendation 19-08 on management measures for the conservation of South Atlantic blue shark caught in association with ICCAT fisheries
2023-12	Recommendation by ICCAT for the conservation of whale sharks (*Rhincodon typus*) caught in association with ICCAT fisheries
2023-14	Recommendation by ICCAT on mobulid rays (family Mobulidae) caught in association with ICCAT fisheries

Table 2. Parties bordering the ICCAT Convention Area and whether they are Parties to ICCAT, CMS and the Sharks MOU, as of 2024 [d].

Parties to ICCAT, CMS and the Sharks MOU	Parties to ICCAT, but neither CMS nor Sharks MOU
Brazil	Barbados
Costa Rica	Belize
Côte d'Ivoire	Canada
Egypt	China, People's Republic of [b]
European Union (also Belgium, Denmark, France, Germany, Italy, Netherlands, Portugal, Romania, and Sweden)	China-Taipei [a,b]
Ghana	Curaçao
Guinea, Republic of	El Salvador
Liberia	Grenada, Republic of
Libya	Guatemala
Mauritania	Guyana [a]
Philippines [b]	Iceland
Senegal	Japan [b]
South Africa	Korea, Republic of [b]
Syrian Arab Republic	Mexico
United Kingdom	Namibia
	Nicaragua
Parties to ICCAT and CMS	Russian Federation
Albania	Saint Vincent and the Grenadines
Algeria	Sierra Leone
Angola	Suriname [a]
Bulgaria [c]	Türkiye, Republic of
Cabo Verde	Venezuela
Croatia [c]	**Parties to CMS and the Sharks MOU**
Cyprus, Republic of [c]	Monaco
Equatorial Guinea	Togo
Gabon	Benin
Gambia, The	Republic of the Congo [Brazzaville]
Greece [c]	
Guinea Bissau	**Parties to CMS**
Honduras	Cuba
Ireland [c]	Dominican Republic
Malta [c]	Antigua and Barbuda
Morocco	Argentina
Nigeria	Bosnia and Herzegovina
Norway	Montenegro
Panama	Ukraine
São Tomé and Príncipe	Georgia
Slovenia [c]	Lebanon
Spain [c]	Israel
Trinidad and Tobago	Cameroon
Tunisia	Democratic Republic of the Congo [Congo Kinshasa]
Uruguay	**Parties to Sharks MOU**
Parties to ICCAT and the Sharks MOU	Columbia
United States of America	**Not Parties to ICCAT, CMS or the Sharks MOU**
	The Bahamas
	Jamaica
	Haiti
	Saint Kitts and Nevis
	Dominica
	Saint Lucia

Footnotes: [a] Nations that are cooperators to ICCAT, rather than Parties; [b] ICCAT CPCs that do not border the ICCAT Convention Area, but fish in the area; [c] EU nation that has not signed up individually to the Sharks MOU; [d] Excluding Bolivia (whilst a cooperator to ICCAT and member of CMS, it is landlocked) and Saint Pierre and Miquelon (France)

Table 3. Sharks and rays of relevance to ICCAT and/or CMS. The species considered of relevance to ICCAT based on ICCAT (2019b). Rows shaded in green reflect those species of relevance to both the Sharks MOU and ICCAT (with tope and dusky shark also included). Rows shaded in orange reflect those species that occur in the Atlantic Ocean and of relevance to either the CMS or the Sharks MOU or ICCAT. Rows shaded in red reflect those species that do not occur in the Atlantic Ocean and are of relevance to either the CMS or Sharks MOU, but of no direct relevance to ICCAT.

	Family	Scientific name	Common name	FAO Code	Atlantic species	ICCAT	CMS Appendix I	CMS Appendix II	CMS Sharks MOU
1	Rhincodontidae	*Rhincodon typus*	Whale shark	RHN	Yes	Yes	2017	1999	2010
	Carchariidae	*Carcharias taurus*	Sand tiger shark	CCT	Yes	-	2024	2024	[(i)]
	Pseudocarchariidae	*Pseudocarcharias kamoharai* [(a)]	Crocodile shark	PSK	Yes	Yes	–	–	–
	Alopiidae	*Alopias pelagicus*	Pelagic thresher shark	PTH	No	–	–	2014	2016
2	Alopiidae	*Alopias superciliosus* [(a)]	Bigeye thresher shark	BTH	Yes	Yes	–	2014	2016
3	Alopiidae	*Alopias vulpinus* [(a)]	Common thresher shark	ALV	Yes	Yes	–	2014	2016
4	Cetorhinidae	*Cetorhinus maximus*	Basking shark	BSK	Yes	Yes	2005	2005	2010
5	Lamnidae	*Carcharodon carcharias*	White shark	WSH	Yes	Yes	2002	2002	2010
6	Lamnidae	*Isurus oxyrinchus* [(a)]	Shortfin mako	SMA	Yes	Yes	–	2008	2010
7	Lamnidae	*Isurus paucus* [(a)]	Longfin mako	LMA	Yes	Yes	–	2008	2010
8	Lamnidae	*Lamna nasus* [(a)]	Porbeagle	POR	Yes	Yes	–	2008	2010
9	Triakidae	*Galeorhinus galeus* [(b)]	Tope (shark)	GAG	Yes	-	–	2020	2023
10	Carcharhinidae	*Carcharhinus falciformis* [(a)]	Silky shark	FAL	Yes	Yes	–	2014	2016
	Carcharhinidae	*Carcharhinus galapagensis*	Galapagos shark	CCG	Yes	Yes	–	–	–
11	Carcharhinidae	*Carcharhinus longimanus* [(a)]	Oceanic whitetip shark	OCS	Yes	Yes	2020	–	2018
12	Carcharhinidae	*Carcharhinus obscurus*	Dusky shark	DUS	Yes	-	–	2017	2018
13	Carcharhinidae	*Prionace glauca* [(a)]	Blue shark	BSH	Yes	Yes	–	2017	-
14	Sphyrnidae	*Sphyrna lewini* [(a)]	Scalloped hammerhead shark	SPL	Yes	Yes	–	2014	2016
15	Sphyrnidae	*Sphyrna mokarran* [(a)]	Great hammerhead shark	SPK	Yes	Yes	–	2014	2016
16	Sphyrnidae	*Sphyrna zygaena* [(a)]	Smooth hammerhead shark	SPZ	Yes	Yes	–	2020	2018
	Squalidae	*Squalus acanthias* [(b)]	Spiny dogfish (spurdog)	DGS	Yes	–	–	2008	2010
	Squalidae	*Squalus suckleyi* [(g)]	Pacific spiny dogfish	QYW	No	–	–	2008	
	Squatinidae	*Squatina squatina* [(b)]	Angel shark	AGN	Yes	–	2017	2017	2018
	Rhinobatidae	*Rhinobatos rhinobatos* [(b)]	Common guitarfish	RBX	Yes	–	2017 (Med)	2017	2018
	Rhinidae	*Rhynchobatus australiae*	White-spotted wedgefish (bottlenose wedgefish)	RCA	No	–	–	2017	2018

Table 3 (continued). Sharks and rays of relevance to ICCAT and/or CMS.

	Family	Scientific name	Common name	FAO Code	Atlantic species	ICCAT	CMS Appendix I	CMS Appendix II	CMS Sharks MOU
	Rhinidae	*Rhynchobatus djiddensis*	Giant guitarfish	RCD	No	–	–	–	2018
	Rhinidae	*Rhynchobatus laevis*	Smoothnose wedgefish	RZL	No	–	–	–	2018
	Glaucostegidae	*Glaucostegus cemiculus* [b]	Blackchin guitarfish	RBC	Yes	–	2024 (Med)	2024	[i]
	Pristidae	*Anoxypristis cuspidata*	Narrow sawfish (pointed sawfish)	RPA	No	–	2014	2014	2016
	Pristidae	*Pristis clavata*	Dwarf sawfish	RPC	No	–	2014	2014	2016
	Pristidae	*Pristis pectinata* [b]	Smalltooth sawfish [b]	RPP	Yes	–	2014	2014	2016
	Pristidae	*Pristis pristis* [b]	Largetooth sawfish [b]	RPR	Yes	–	2014	2014	2016
	Pristidae	*Pristis zijsron*	Green sawfish (longcomb sawfish)	RPZ	No	–	2014	2014	2016
	Dasyatidae	*Pteroplatytrygon violacea* [a]	Pelagic stingray	PLS	Yes	Yes	–	–	–
	Myliobatidae	*Aetomylaeus bovinus* [b]	Bull ray	MPO	Yes	–	2024 (Med)	2024	[i]
	Rhinopteridae	*Rhinoptera marginata* [b]	Lusitanian cownose ray	MRM	Yes	–	2024 (Med)	2024	[i]
17	Mobulidae	*Mobula alfredi* [c]	Reef manta ray	RMA	? [f]	Yes	2014	2014	2016
18	Mobulidae	*Mobula birostris* [c]	Giant manta	RMB	Yes	Yes	2011	2011	2016
	Mobulidae	*Mobula eregoodootenkee* [h]	Longhorned mobula	RME	No	–	2014	2014	2016
19	Mobulidae	*Mobula hypostoma* (*Mobula rochebrunei* [d])	Lesser devil ray (Lesser Guinean devil ray)	RMH (RMN)	Yes	Yes Yes	2014	2014	2016
	Mobulidae	*Mobula kuhlii*	Shortfin devil ray	RMK	No	–	2014	2014	2016
20	Mobulidae	*Mobula mobular* (*Mobula japanica* [e])	Spinetail devil ray (spinetail mobula)	RMM	Yes	Yes Yes	2014	2014	2016
	Mobulidae	*Mobula munkiana*	Munk's devil ray	RMU	No	–	2014	2014	2016
21	Mobulidae	*Mobula tarapacana*	Chilean devil ray	RMT	Yes	Yes	2014	2014	2016
22	Mobulidae	*Mobula thurstoni*	Smoothtail mobulid	RMO	Yes	Yes	2014	2014	2016
				Total			40 species (24 on Appendix I)		36

Footnotes: **(a)** Detailed species account included in Chapter 2 (Description of species) of the ICCAT Manual (https://www.iccat.int/en/iccatmanual.html); **(b)** Primarily a demersal and/or coastal species occurring in inner shelf seas, and expected to have no or minimal interactions with ICCAT fisheries; **(c)** Species listed on the CMS and Sharks MOU as *Manta*, but species now included in the genus *Mobula;* **(d)** *Mobula rochebrunei* considered as a junior synonym of *Mobula hypostoma* by some authors; **(e)** *Mobula japanica* considered as a junior synonym of *Mobula mobular;* **(f)** Whilst *Mobula alfredi* is generally recorded from the Indo-Pacific, Marshall et al. (2009) reported the tentative presence of this species from northwestern Africa; **(g)** Previously included as a North Pacific population of *Squalus acanthias* prior to taxonomic revisions, and accepted under the recently resurrected scientific name in 2024; **(h)** Sometimes listed as *Mobula eregoodoo*; (**i**) listed on CMS in 2024, and will be considered for listing on the Sharks MOU at the next MOS

Table 4: Chronology of the work and outcomes of ICCAT, CMS and the Sharks MOU, with relevance to sharks and rays.

Year	ICCAT	CMS	Sharks MOU
1966	ICCAT established.		
1979		CMS Convention text agreed.	
1983		CMS entered into force.	
1985		First Meeting of the Conference of the Parties to CMS (COP1), Bonn (Germany).	
1988		COP2, Geneva (Switzerland).	
1991		COP3, Geneva (Switzerland).	
1994		COP4, Nairobi (Kenya).	
1995	**First ICCAT Resolution for sharks.**		
1996	First meeting of the Shark Working Group.		
1997		COP5, Geneva (Switzerland)	
1999		**COP6, Cape Town (South Africa).** **Whale shark listed in Appendix II of CMS.**	
2002		COP7, Bonn (Germany). White shark listed in Appendices I and II of CMS.	
2004	First ICCAT Recommendation for sharks.		
2005	Exploratory stock assessments for the main shark stocks.	COP8, Nairobi (Kenya). Basking shark listed in Appendices I and II of CMS.	
2008	Further stock assessments for the main shark stocks. ICCAT agrees non-retention of bigeye thresher.	COP9, Rome (Italy). Four commercial shark species listed in Appendix II of CMS.	
2009	First ICCAT/ICES stock assessment for porbeagle. ICCAT prohibits retention of bigeye thresher.		
2010	ICCAT prohibits retention of oceanic whitetip and various hammerhead sharks.		**Sharks MOU text agreed, Manila (Philippines).**
2011	ICCAT prohibit retention of silky shark.	COP10, Bergen (Norway). *Mobula birostris* listed in Appendices I and II of CMS.	
2012	Stock assessment for shortfin mako.		First Meeting of the Signatories (MOS1), Bonn (Germany).
2014		COP11, Quito (Ecuador). All species of sawfish and mobulid ray listed in Appendices I and II of CMS, and six shark species added to Appendix II.	

Table 4 (continued): Chronology of the work and outcomes of ICCAT, CMS and the Sharks MOU, with relevance to sharks and rays.

Year	ICCAT	CMS	Sharks MOU
2015	Stock assessment for blue shark.		
2016			Second Meeting of the Signatories (MOS2), San Jose (Costa Rica).
2017	Stock assessment for shortfin mako.	COP12, Manila (Philippines). Further five shark and ray species listed.	
2018			3rd Meeting of the Signatories (MOS3), Monaco.
2019	Stock assessment for shortfin mako.		
2020		COP13, Gandhinagar (India). Oceanic whitetip listed in Appendix I of CMS. Tope and smooth hammerhead listed in Appendix II of CMS.	
2023	Stock assessment for blue shark. ICCAT agree Recommendation on prohibiting retention of whale shark and basking shark.		4th Meeting of the Signatories (MOS4), Bonn (Germany).
2024		COP14, Samarkand (Uzbekistan). Sand tiger shark listed in CMS Appendices I and II. Blackchin guitarfish, bull ray, and Lusitanian cownose ray listed in CMS Appendices I (Mediterranean Sea) and II.	