Report of the 2025 ICCAT Shortfin Mako Shark Data Preparatory Meeting
(Hybrid/Malaga, Spain, 10-14 March 2025)

The results, conclusions and recommendations contained in this report only reflect the view of the Sharks Species Group. Therefore, these should be considered preliminary until the SCRS adopts them at its annual Plenary meeting and the Commission revises them at its annual meeting. Accordingly, ICCAT reserves the right to comment, object and endorse this report, until it is finally adopted by the Commission.

1. Opening, adoption of agenda and meeting arrangements and assignment of rapporteurs

The Shortfin Mako Shark Data Preparatory Meeting Chair, Dr Rodrigo Forselledo, opened the meeting and welcomed the participants (the Group). The Assistant Executive Secretary welcomed the participants and wished them success in their meeting. The Chair proceeded to review the agenda, which was adopted with minor changes (**Appendix 1**). The List of participants is included in **Appendix 2**. The List of documents and presentations provided at the meeting is attached as **Appendix 3**. Document and presentation summaries are included in **Appendix 4**.

Rapporteurs were assigned as follows:

Section 1.	Nathan G. Taylor
Section 2.	Charmaine Jagger, José Fernández, Federico Mas
Section 3.	Nathan G. Taylor and Carlos Mayor
Section 4.	Mariela Narváez, Lucía Rueda, Xinsheng Zhang
Section 5.	Rodrigo Sant'Ana, Carmen Fernández, Heather Bowlby, Enric Cortés, Mauricio Ortiz, Dean Courtney
Section 6.	Rui Coelho
Section 7.	Rui Coelho, Gustavo Cardoso, Rodrigo Forselledo
Section 8.	Gustavo Cardoso, Rodrigo Forselledo, Miguel Neves dos Santos
Section 9.	Rodrigo Forselledo, Miguel Neves dos Santos
Section 10.	Nathan G. Taylor

2. Review of life history information

SCRS/P/2025/010 presented a comprehensive summary of the published literature on the relationship between vertebral band pair deposition ratio and age of shortfin mako sharks.

It was noted that from different past studies that shortfin mako sharks have varying band pair counts along the vertebral column and ontogenetic changes in their band pair deposition. The band pair depositions are more closely correlated with girth as opposed to length because deposition rates change along the column in adults when growth in length slows and girth increases.

There was a question about whether the lengths used in the mark-recapture analysis were measured or estimated. The authors informed the Group that most lengths were measured at the time of tagging and recapture. The authors clarified that only individuals with more than 3.5 years at liberty were included in the analysis. The Group asked if the analysis was done by sex or combined sexes, and it was clarified that the analysis was done for females only.

The authors argued that the change in two band pairs per year to only one band pair per year has only been validated for males and that this change is related to the onset of reproductive maturity. Based on this premise, the authors suggested that the same criteria should be applied to females when fitting the growth model by considering their respective age-at-maturity. Therefore, the document suggested that females would deposit two band pairs per year until age 10 and only one band pair per year afterwards.

Further discussion on this presentation and other related documents is presented in Section 5.1 of this report.

SCRS/2025/045 presented size-at-maturity estimation for shortfin mako sharks caught in the southwestern Atlantic Ocean, as well as length-weight and updated Pre-caudal Length (PCL) to Fork Length (FL) conversion equations.

The Group recommended that these conversion equations be presented to the Subcommittee on Statistics, for subsequent adoption by the Committee and to include in the ICCAT manual and webpage. In addition, the authors informed the Group that this study would be included in the ICCAT Collective Volume of Scientific Papers.

Results showed that mako sharks were present throughout the year in the SW Atlantic Ocean, with their size distribution showing a significant difference between sexes. There were more males captured than females, which was perhaps due to gear used or depth. The study updated the FL-PCL relationship by Mas *et al.,* (2014) by adding more than 2500 individuals from a broader area and with a larger size range. Also, the FL-HG relationship presented in this study is the first one for the South Atlantic.

SCRS/2025/046 presented an update of growth estimates based on mark-recapture data in the NW Atlantic by incorporating the Bayesian method of the Fabens (1965) and Francis (1988) models into the analysis and comparing the results obtained with non-Bayesian models (Fabens, 1965; Francis, 1988; Gulland and Holt, 1959), based on the von Bertalanffy equation.

The results obtained with the two Bayesian models were similar and more plausible than those based on non-Bayesian models. The Group questioned the degree of flexibility of the priors used in the models derived from Natanson *et al.* (2006). There were suggestions from the Group that the author show the priors, as it was noted that the priors could have small variance and so that the posterior is more influenced by the prior than the likelihood. Another suggestion was to plot the prior distribution and posteriors together to get more information on the relative effect of the prior and the statistical likelihood. The Group asked which method was used in the Bayesian models to determine the uncertainty.

The Group agreed that, given that males and females exhibit different growth patterns, the present model, fitted to data from combined sexes, should be interpreted with caution.

The authors were asked whether the fork length (FL) used/presented was curved or straight FL. The response was that the measurements were in curved FL and that anglers are encouraged to measure in curved FL as well.

Further discussion on this presentation and other documents related is presented in Section 5.a of this report.

SCRS/P/2025/011 presented maturity estimates using a Bayesian approach for female and male shortfin mako sharks caught in the southwestern Atlantic Ocean. The results presented are part of an already published paper that was included as a background document for the meeting.

The Group valued the importance of these estimates, especially for this region of the Atlantic Ocean where reproductive biology data is particularly scarce. There were no questions raised by the Group.

SCRS/2025/047 presented an update on the maturity parameters of the shortfin mako from the Northwest Atlantic. These estimates were in general very similar to those obtained in previous analyses from the same area.

The Group noted the peculiar shape of the maturity ogive fitted to the female data, which appeared to not reach the asymptote at any given point. The Group discussed that it may be related to the limited number of samples.

There was a question on if the length data used were either straight or curved FL, to which the authors responded that the lengths were curved FL, since the program only uses curved FL measurements.

SCRS/2025/037 provided a brief literature review of studies on both at-vessel mortality and post-release mortality rates for the shortfin mako.

The authors informed the Group that the literature review was preliminary, and that a more in-depth review would be required to evaluate each immediate and delayed discard-mortality rate identified from the literature for its utility in stock assessment. The Group agreed that the study was a good review of the literature on the subject and that it could be useful in responses to questions by the COM on the subject.

3. Review of fishery statistics/indicators

The Secretariat presented the most up-to-date fisheries statistics (T1NC: Task 1 nominal catches, T2CE: Task 2 catch and effort, T2SZ: Task 2 size frequencies) and tagging information (conventional and electronic) of shortfin mako shark (SMA, *Isurus oxyrinchus*) for both stocks: northern Atlantic (SMA-N) and southern Atlantic (SMA-S). The existing information for the Mediterranean is still minimal. The Secretariat also reminded the Group that since 2018, the species code MAK (*Isurus spp.*) has been discontinued, with all the information available in ICCAT-DB already reclassified as SMA, as requested by the SCRS in 2017 (ICCAT, 2017).

3.1 Task 1 (catches) data and spatial distribution of catches, including landings, dead discards, and live releases

SCRS/P/2025/012 reviewed the T1NC information jointly with the availability of T2CE and T2SZ datasets using the SCRS catalogue, for the last 30 years (1995 to 2024). These data consisted of the spatial distribution of catches by ICCAT sampling areas, including landings, dead discards, and live releases. Most data for the assessment are from 2023 and earlier. The Secretariat noted that SMA catches of unclassified gears (codes UNCL and SURF) are irrelevant and are decreasing every year.

The Group noted the availability for some Contracting Parties to provide missing data identified. The Group agreed that all these updates would be posted on Nextcloud. In addition, CPCs noted that they have been able to recover historical data and that these data could be sent to the Secretariat, so that these data could be updated. The Group noted that to update historical data (older than the most recent four years) an SCRS document would be needed.

The Group inquired if the quality of the live and dead discard data had improved. In response the Secretariat noted that in the last few years the trend had been towards increased live and dead discards. To finalize the catch tables for the assessment, the Group agreed to use the updated data once they have reviewed the data from all CPCs to see if additional estimates were required for live and dead discards.

After a detailed revision, a summary of updates to the Task 1 Nominal Catch (T1NC) for both SMA stocks was agreed as follows:

- Gap completion using T2CE official data transformed in live weight (Mexico, Namibia, Philippines)
- Corrections of inconsistent catches using T2CE official statistics (Namibia)
- Gap completion using interpolation of prior/posterior years (Japan)
- UNCL gear catches merged with longline (EU-Portugal)
- Data recoveries/updates provided by CPCs during the meeting (Morocco, USA, Venezuela gillnet)

The details of these updates to T1NC, stored as preliminary SCRS estimations in ICCAT-DB, are available on request. The existing catch series (landings and dead discards) of SMA in T1NC statistics by stock, flag, and gear, are presented in **Table 1**. The SCRS catalogues of both SMA stocks (SMA-N and SMA-S) for the last 30 years (1994-2023) are presented in **Table 2** and **Table 3**, respectively. These catalogues highlight missing data from several CPCs, as well as the top ten catch series for shortfin mako in the North and South Atlantic. An overall perspective of the entire catch series trends (1950 to 2023) is given in **Figure 1** (1950 to 2023 for the northern stock), and **Figure 2** (1971 to 2023 for the southern stock). The reported SMA live releases are presented in **Table 4**.

SCRS/2025/024 addresses the ICCAT Commission's request for estimation of discards of shortfin mako shark for the North and South Atlantic stocks. The ratio-based method previously used for the North Atlantic was applied to the South Atlantic. In this way, it was: i) possible to estimate discards back as far as 2012; and ii) having a coherent methodology applied to data of both northern and southern stock for the Portuguese fleet.

The Group discussed the presentation and asked what data could be used to apply this method and if it could be applied to other CPC's data. In response, the authors noted that observer data and logbook data were needed, as well as the total effort to extrapolate the total number of hooks set by set. It was not clear how applicable the methods were to other fleets, since it is very fleet specific. However, broadly speaking, the methodology could be applied to other fisheries.

The Group noted that a set of methodologies is available in the Bycatch Estimator Tool (Babcock, 2021) and asked if this tool could be applied. In response, the author noted that the methods available in the Bycatch Estimator Tool are similar to what is already used. He noted the ratio-based estimators are preferred in the case of SMA because these estimators are all that it is possible to use with only logbook data.

The Group discussed the Bycatch Estimator Tool. Regarding model-based vs. ratio-based estimate of bycatch it was noted an advantage of model-based estimators is that they also include diagnostic tools and some measure of uncertainty.

SCRS/2025/035 showed that shortfin mako by-catch occurs through the western Mediterranean Spanish coast with spatial differences in the CPUEs being observed. Captures of shortfin mako were infrequent, with majority occurring between May and September. CPUEs and sizes of individuals caught in these fisheries vary with the different gears used.

The Group noted the importance of getting this information from the Mediterranean stock. It was further noted that this would need to be expanded to get enough data in the Mediterranean so that the possibility of doing a stock assessment could be explored. In this case, the SCRS could definitively inform the Commission whether it was possible to do an assessment or not.

The Group asked if there were any specificities of the fleets that tended to catch more shortfin mako. In response the author noted one aspect that affected catch rates was the depth at which the gear is set.

The Group further discussed how to define the boundaries of the stock or stocks in the Mediterranean Sea, noting that in some areas, there appear to be migrations with the Northeast Atlantic, while there do not in others. To conduct an assessment for the Mediterranean, all relevant CPCs will have to perform similar analyses to those presented during the current meeting.

SCRS/2025/039 integrated data from Venezuelan logbooks for longline fisheries for a period of 20 years, covering multiple fishing zones in the Caribbean Sea and nearby waters of the Atlantic. It showed that there are notable variations over time in effort, catch and CPUE across different regions and time periods.

The Group discussed the presentation and requested a characterization of this fleet activity in terms of longline type and target species. The authors clarified that the LL fleet extends close to the management boundary of the stock (5°N), but the Group considered all catch as coming from the North stock. They also noted that this is essentially a surface longline commercial fleet targeting mostly yellowfin tuna, with SMA and other sharks being caught as bycatch.

The Group noted that the series presented in this document was not a standardized series of catch and effort, and suggested that a standardized index to be explored in the future.

SCRS/2025/048 presented information on the artisanal gillnet fishery off La Guaira, Venezuela where there is billfish hotspot. There are several species caught as bycatches in this fishery, among them is shortfin mako shark. The document aimed to update catch and effort data from 2015 to 2023.

The Group thanked the authors for the report and noted one particularly interesting aspect that large females (gravid) were seen in the La Guaira hot spot. The Secretariat received data from this fishery and integrated them into the Task 1 and Task 2 databases (see above).

3.2 Task 2 catch/effort

The detailed T2CE catalogue was made available to the Group. The Secretariat noted that no major improvements, including historical revisions, were made. The SCRS catalogues of SMA provide information on the available data for T2CE (**Table 2** and **Table 3**).

3.3 Task 2 size data

The detailed T2SZ catalogue was made available to the Group. The Secretariat noted that no major improvements, including historical revisions were made. A recent Spanish surface longline size frequency samples historical recovery for both stocks from 1993 to 2023 (SCRS/2025/027) was not yet included in the ICCAT-DB system. The SCRS catalogues of SMA provide information on the available data for T2SZ (**Table 2** and **Table 3**).

3.4 Tagging data

SCRS/P/2025/013 presented a summary of conventional and electronic tagging. For conventional tagging data, the Secretariat has produced online dashboards, maps, and datasets. For electronic tagging, there are datasets and dashboards to view the electronic tag metadata. All this information is available on the ICCAT website under the "Statistics" tab in the "Access to ICCAT statistical databases" section.

There has been a full cross-validation of both conventional and electronic ICCAT and USA tagging databases. As a result, 812 new conventional tags (8% of the total) tags from National Oceanic and Atmospheric Administration (NOAA) fisheries Narragansett (Apex Predators Program) and 48 new conventional tags from the cooperative Tagging Program (NOAA) and Billfish foundation have been added to the ICCAT database.

Work is underway to add 32 ICCAT-owned miniPAT tags to the electronic tagging database (ETAG). The main objective is to integrate all the information obtained from electronics tags, including their metadata and tracks in a centralized relational database. The Group asked if the Secretariat only had miniPAT type tags. It was clarified that it did not; the Secretariat has all models in the metadata, but the Secretariat has only added the miniPAT to the electronic tagging database for the time being. The Group also asked whether the Secretariat has received information on the conventional tagging of those steel dart tags. The Secretariat noted not having received information about those tags. In addition, the Group noted that the most recent lot of steel dart tags must be bent to tag fish. Accordingly, the Group should consider different tags for future orders.

4. Review of available indices of abundance

Relative indices of abundance were presented for several fleets and areas in the Atlantic and discussed by the Group. Brief information about the SCRS documents and main points of the Group discussion are presented below.

Document SCRS/2025/025 updates the catch, effort, and standardized CPUE for the North Atlantic shortfin mako shark captured by the Portuguese pelagic longline fleet for the period 1993-2023. The updated CPUEs were standardized with Tweedie GLMs and in general, there was a large variability with the standardized series following, the nominal CPUE.

The Group discussed the document and raised several concerns. These were: the extremely high confidence intervals (CIs) in 2023, which the author will review and report back on; the observed higher proportion of zero-catch sets alongside an increased catch rate in positive-catch sets; the very small observer coverage (approximately 1%) in 2022 and 2023, leading to small sample sizes and increased uncertainty. Also, it was pointed out that due to the recent prohibition on retaining SMA, the logbook data, in spite of its large sample size, might not be suitable for developing relative indices because of the potential underreporting or discards. While observer data are available, the sample size remains very small, which has been highlighted as the main issue in the estimations from the model. It was suggested that the uncertainty of the recent indices (as represented by their CIs) be reflected in the stock assessment model-fitting procedure.

Document SCRS/2025/026 presented and updated for standardized catch rates from the Spanish longline fleet targeting swordfish by using Generalized Linear Models (GLM) with data from trip records provided voluntary for research and covering the period 1990-2023. The CPUE variability can be mainly attributed to the area factor and the results showed a stable trend until 2018 with fluctuations in the years following implementation of *Recommendation by ICCAT on the conservation of North Atlantic stock of shortfin mako caught in association with ICCAT fisheries* (Rec. 19-06) and *Recommendation by ICCAT on the conservation of the South Atlantic stock of shortfin mako caught in association with ICCAT fisheries* (Rec. 22-11) due to few data for those years. The standardization was done in number of individuals instead of weight as has usually been done before. This is because for most recent years, data are only available in number of individuals.

The Group discussed that the confidence intervals were unusually large in recent years, potentially due to the small observer program coverage. This went from 71% up until 2015 to a minimum of 3% in 2020 and rising to around 20% in 2022 and 2023. Document SCRS/2025/030 presented an update on the standardized CPUE for shortfin mako caught by the Japanese tuna longline fishery in the Atlantic Ocean through 2023, using observer data collected after 2008 for the North stock and after 2012 for the southern stock. The author proposed utilizing previous estimates based on logbook data up to 1994 for the North stock and up to 2007 for the southern stock. For the northern stock, the current CPUE series (based on observer data) would be used from 2008 onwards, while for the southern stock, previous estimates from 1994 to 2011 would be used, with the current catch per unit effort (CPUE) applied from 2012 onward. The Group had no further questions or comments on this document.

Document SCRS/2025/031 provided an update on estimation of shortfin mako catches and CPUE standardization corresponding to the Chinese Taipei longline fishery, based on logbook data. The standardized index was estimated using a Zero Inflated Negative Binomial model (ZINB), for two areas: North Atlantic and South Atlantic.

The Group asked if the discards were considered in the analysis and authors mentioned that only data from landings were used. Also, the Group pointed out that the proportion of zeros had increased over the years, so that while the data might be well-fitted by the model, this high percentage (around 99% for recent years) could be causing problems in the model fitting particularly for capturing positive catch rates trends.

Other concerns were expressed by the Group about the inclusion of latitude and longitude as predictors that might be redundant because the area factor was also included, the differences since 2008 in catch data presented in the document and catch data of Task 1, the exclusion of the factor year for not being significative which must be included because this temporal factor is required for the index to be included in stock assessment models. Given all these concerns, the Group requested that the models be run again to consider the observations provided.

During the meeting, an updated version of the index (SCRS/2025/031) was presented in which the year effect was included as requested by the Group. The Group asked about the coverage rates for the analysis, which the author explained it was 100%. Also, it was of concern that the nominal and standardized CPUE were too similar. The Group suggested that this similarity is probably due to the index not being correctly calculated, or that the predictions were not correctly estimated; for this reason, further revision was required. Additionally, given that the index was estimated using only retained catch and that there were further issues with the year effect, it was suggested not to use the entire time series.

Another point mentioned by the Group was that the assumptions of linear relation between the CPUE and continuous predictors (such a longitude and latitude) was something to consider. In the end, the Group suggested cutting the index time series to the year before the ban on retention of live species went into effect in 2020 (Rec. 19-06). Moreover, the Secretariat offered to help the authors to update the index in the two weeks following the meeting, to which the authors agreed.

Document SCRS/2025/033 presented an updated index of abundance of mako shark from the U.S pelagic longline observer program from 1992 to 2023 in the western North Atlantic Ocean. The index was calculated using a two-step delta-lognormal approach that treats the proportion of positive sets and the CPUE of positive catches separately. The standardized index showed a concave pattern from the early 1990s to 2011, followed by a declining trend to 2020. From 2020 to 2023, the index showed a subsequent increase. Large confidence intervals were observed due to small sample sizes for the observer dataset.

The Group asked the author about the adequacy of quartile catch rates as a proxy of targeted species. The authors answered that these catch rates have been used for some time now and have been agreed to by the Group, but if the Group thought this was not a good proxy to account for target species, then other options could be explored.

Document SCRS/2025/036 presented results for standardized CPUE indices for blue shark and mako shark from the large pelagic longline fishery off South Africa by using a spatio-temporal GLMM with spatial and spatio-temporal components modelled as random fields.

The Group had several questions about the spatial origin of the data due to the fact that the index was calculated with data that covers two different units of management, Atlantic and Indian Oceans. Participants expressed doubts about whether the index used for the assessment should be calculated with data only from the Atlantic side or from both oceans. The authors explained that the center of the distribution of the catches is actually very close to the line separating the International Commission for the Conservation of Atlantic tunas (ICCAT) and the Indian Ocean Tuna Commission (IOTC) Convention areas and that biologically it would not make sense to split the data by ocean as individuals belong to a single population. Moreover, tagging studies have indicated that juveniles are resident in the area right at the boundary between both management units (ICCAT and IOTC) and, consequently fishing vessels operate in both areas.

The Group asked about the proportion of catches reported to ICCAT and IOTC, respectively. In this regard concern was raised about the definition of the subpopulation from the South Atlantic due to this continuity between the South Atlantic and the Indian ocean and how this could be reconciled with ICCAT's management units. It was suggested that ICCAT and IOTC should further study the contribution of the South African population on each management unit.

The Group also discussed what the best approach would be to include this uncertainty in the assessment model, because juvenile individuals can be an indicator of the recruits and hence the productivity of the stock. Accordingly, this should be considered when thinking about the uncertainty grid of the model. One possibility could be to do a sensitivity analysis including individuals from the whole area on one hand, and only from the ICCAT unit on the other hand. Some participants from CPs in the same situation proposed limiting the data from ICCAT Convention area for the standardization to ensure consistency with other CPUE indices.

The Group also asked about the principal component analysis (PCA) analysis to account for the targeting variable and its use as explanatory variable in the standardization model, because catches of shortfin mako are used to do the PCA so there might be a confounding effect from having the response on both sides of the equation. The authors referred to previous studies that have demonstrated that this is one of the best approaches to account for the target species.

Document SCRS/2025/038 presented a CPUE standardization combining data from two longline fleets, the Brazilian and Uruguayan operating in the South Atlantic Ocean for the period 1978-2022 using a Hurdle general linear model (GLM).

The Group asked if the data came from observer programs or from fishery logbooks. It was clarified that data used came from logbooks. The Group asked if the logbook data included information on discards and authors clarified that the data consists of only retained catches but that there were no restrictions on the retention of shortfin mako in the South, so it is assumed that all catches were retained.

The Group asked if the high catches observed in the last years could be due to a problem of underreporting in the previous years, and if this could be related to the high proportion of zero catches. The authors responded that the increase in the last years could be due to underreporting during the previous years and also to improvements in data collection in Brazil, which might provide more reliability to the data in recent years. In addition, there have been spatio-temporal changes in the Brazilian fishing effort, with the fleet fishing in the northern area, where abundances are lower and moving to southern areas in the recent years, where abundances are known to be higher, so this could another plausible explanation for those increases in recent catches.

Regarding the standardized CPUE index not tracking the nominal CPUE, the Group noted that this might be actually a desired effect of the standardization, in that it is correcting for the effect of those variables included in the model.

The Group asked for further clarification on the use of hooks per float as an explanatory variable. Furthermore, the Group asked why in years in which there was catch data from Brazil in ICCAT Task 1 database, the proportion of zeros in shortfin mako catches was low in the input from Brazil and yet not from Uruguay, and authors explained that data available for modelling does not cover total catch.

The Group acknowledged this collaborative work and recognized the benefits of having combined indices for the assessment models.

Document SCRS/2025/042 presented a CPUE standardization for the Moroccan longline fleet in the Atlantic using Boosted Regression Trees (BRT).

The Group asked whether catches included discards. The authors clarified that they were only landings. In addition, questions were raised on the size distribution of the data, with larger individuals missing in the last years of the series. The authors noted that a possible explanation is that fishermen have been avoiding areas with higher concentration of shortfin mako. The Group asked if another reason could be the lower number of samples in the more recent years, but the authors mentioned that sampling size has not changed much except for 2021 when the sample size was smaller due to smaller catches.

The Group expressed concern about the drop in CPUE in 2020 and 2021 and asked whether this could be due to the effect of Rec. 19-06 or a real decrease in abundance. The author pointed out that the number of vessels decreased in 2020 due to the COVID pandemic but after that, effort went back to normal. Authors respond that they do not know if the decrease was due to a drop in the abundance or the effect of the ban.

The Group asked about the values of the standard deviations, which seemed low. Finally, clarifications about how the different sources of data were used. The authors explained that they used different data sources to be able to compile the best information. More specifically, interviews with fishermen were not used to adjust catches, but rather to improve the information regarding the fishing strategies followed by the fishermen.

Discussion about inclusion CPUE indices

After reviewing the CPUE documents presented above, the Group examined the CPUE Evaluation Tables for the North and South stocks (**Table 5** and **Table 6**). The Group also discussed which CPUE indices should be included in the 2025 stock assessment and recommended that the following indices be used:

North Atlantic stock:

- SCRS/2025/026 - Spain LL
- SCRS/2025/033 - US observer LL
- SCRS/2017/054 (Semba et al., 2017) - Japan LL1 (longline index from previous assessment in 2017)
- SCRS/2025/030 - Japan LL2
- SCRS/2025/025 - Portugal LL
- SCRS/2025/042 - Morocco LL, which was considered adequate, but the Group recommended to set a time block for the last two years (2020 and 2021), since the index values could be biased by underreporting of catches in logbook data due to shortfin mako regulations. In case it generates major issues in the stock assessment models it could be excluded.

South Atlantic stock:

- SCRS/2025/026 - Spain LL
- SCRS/2016/084 (Semba & Yokawa not published) - Japan LL1. It was agreed to use this series up to year 2011
- SCRS/2025/030 - Japan LL2. The Group agreed to use data up to 2020 for this series because there is no information for 2021 and 2022, so 2023 should be removed
- SCRS/2025/038 - Brazil-Uruguay LL

- SCRS/2025/036 - South Africa LL, the Group agreed to use this index including data from both, Atlantic and Indian Oceans

Indices excluded or pending decision:

- SCRS/2025/031 - Chinese-Taipei LL index for both stocks will be reconsidered for discussion, after the submission of an updated version (28 March 2025) that should take into account the suggested changes with assistance provided by the Secretariat.

Additional discussion on indices

Additional discussion about the percentage coverage in the Evaluation Table was raised. Specifically, the Group discussed how to proceed in those cases in which the percentage has changed over the years. On this subject, the Secretariat clarified that the percentage must reflect coverage only for the most-recent years and that any yearly changes in this percentage can be explained in the section "Other comments" of the Table. The Group was also reminded to consider the annual CV of estimates when using each index in the stock assessment.

The Group agreed that stock assessment modelers will have the freedom to make exclusions besides the ones specified during this meeting, as long as they present a well-explained justification of why the index is not included in the assessment models. They will also have the liberty to explore minimum CVs following the guidelines from the Working Group on Stock Assessment Methods (WGSAM).

5. Discussion on assessment models to be developed, their assumptions, and data input

5.1 Biological parameters

Document SCRS/2025/040 presented the update on the age and growth of shortfin mako sharks in the South Atlantic, integrated in the collaborative works of the Shark Research and Data Collection Programme (SRDCP).

The Group noted that the current model uses a 2-band per year until a certain age (in this case 5) and then changes to 1 band per year for the older ages. The Group mentioned that it is necessary to note the scientific basis for selecting the band deposition hypothesis (biannual deposition until sexual maturity and annual deposition afterward) for the South Atlantics population clearly. It was explained that there are two competing hypotheses in the literature regarding whether the species displays a 1BP or a 2BP formation pattern (Natanson *et al.,* 2006; Wells *et al.,* 2013; Doño *et al.,* 2015; Barreto *et al.,* 2016; Kinney *et al.,* 2016), but that the authors decided to adhere to the 2BP hypothesis up until size at maturity. It was noted that this has been validated for males (northeastern Pacific Ocean), and that the age, when there is the switch from 2BP to 1BP, seems to be related with maturation. However, such validation has not yet been conducted for females, and it is possible, as seen on other studies, that females mature at older ages. When considering the size at maturity of 278 cm TL (or 247 cm FL) from the Cabanillas-Torpoco *et al*. (2024) maturity study, this length corresponded to an age at maturity of approximately 8 years. This could mean that the switch in the banding pattern for females could be taking place at older ages. The authors mentioned they are available to re-run the models to account for this hypothesis.

There was also discussion about the growth model derived from mark-recapture data. The authors explained that they considered a potential change in the rate of band deposition when reaching size at maturity both in males and females, which would correspond to about age 10 for females. It remains uncertain whether band deposition reflects ages (Natanson *et al.,* 2018).

Mejuto *et al.* (2021) and SCRS/2025/P/010 conducted a review of the relationship between the deposition rate of band pairs in vertebrae and the age of shortfin mako. They compared graphically the published growth curves for the northern SMA stock both based on examination of vertebral bands and based on their mark-recapture study. They further examined how the Natanson *et al.* (2006) and the Rosa *et al.* (2017) growth models performed under the 2BP hypothesis until the age at which the growth curve (based on mark-recapture data) reaches the size at maturity. Under this assumption, graphically the curves up to age 10 were rather similar.

The life history spreadsheet containing tables listing parameter values from multiple studies on reproduction, maturity, age and growth, length-length, and weight-length relationships was briefly presented. Subsequently, summary tables were presented showing the biological parameter values and associated uncertainty required to conduct deterministic and stochastic demographic analyses, which in turn will be used to develop population dynamics parameters for input into the production and age-structured stock assessment models.

When reviewing the growth curve from Rosa *et al.* (2017) derived from vertebral analysis for the North Atlantic, some opposition was expressed on the grounds that there was evidence for faster growth at early ages from the mark-recapture study. A vigorous discussion ensued. One of the arguments against using the Rosa *et al.* (2017) growth curve was the lack of consistency between the growth studies from the North and South stocks since the analysis for the North used a 1BP hypothesis and the analysis for the South stock used the 2BP/1BP hypothesis. It was pointed out that the Rosa *et al.* (2017) study was a first step in improving the authors' vision of the northern stock age and growth dynamics, while representing an improvement over previous published study for that stock.

Arguments in favour of the Rosa *et al.* (2017) study included evidence from Ardizzone *et al.* (2006) who analyzed shortfin mako vertebrae across a range of sizes and putative ages using bomb radiocarbon (the gold standard for age validation) and found overall results consistent with annual band pair interpretation, although a few samples were difficult to place in context to the available reference chronologies and could indicate variable growth in the first few years of life. Natanson *et al.* (2006) examined available data including length frequency modes and tagging information. While growth in early life seemed faster than modeled by vertebral growth curves, the overall ageing across the lifespan was consistent with annual BP deposition, as was used to inform the Rosa *et al.* (2017) study. Finally, while according to Natanson *et al.* (2018) shortfin mako vertebrae (like those of sharks in general) may not record actual age, the available evidence seems to support an annual cycle of band deposition when averaged across the lifespan. Without actual evidence to support a variable deposition rate up to the age at maturity, it could be premature to use this hypothesis as a mechanism for ageing. While the use of tagging data would be ideal, the lack of sufficient samples precludes making strong sex-specific conclusions.

In the interest of making progress, it was finally decided that it would be preferable to re-run the Rosa *et al.* (2017) study using the same 2BP (up to size at maturity), followed by the 1BP (thereafter) approach to make the northern and southern studies more comparable and consistent. The authors of that study volunteered to conduct this analysis in the first few weeks following the meeting.

A table containing the alternative hypothesis on age and growth based on mark-recapture was also discussed and it was noted that it was only available for females and that no maturity ogive was available, just an estimated median age at maturity of 10 years. The lack of data for males implies that this model could only be used to develop demographic models, which will provide other inputs for production models, but it should not be used for the age-structured Stock Synthesis model. However, the Group decided that under certain circumstances (if the vertebral analysis is not similar to the mark-recapture estimate), then the use of a growth curve derived from vertebral analysis for northern stock males as a proxy for the growth curve derived from mark-recapture analysis for males could be considered.

Biological information for males and females for the northern and southern stocks was compiled on a spreadsheet and was posted on the meeting's Nextcloud folder for the Group's review. Tables will be updated after the informal meeting in early April and included in the Shortfin Mako Assessment Report.

5.2 Size data by sex and region

SCRS/2025/023 presented revised length-frequency distributions for shortfin mako in the North and South Atlantic. This paper updated the information available for the 2017 stock assessment (ICCAT, 2017) and incorporated substantial new data.

The Group provided a recent publication that could be used to convert curved to straight fork length to improve the comparability of data from different fleets. The authors clarified that the data was primarily from onboard observers and so should reflect the characteristics of landings and discards. It was stressed that this data would be made available for assessment.

There was a question of how length would be partitioned into bins and a subsequent analysis by the authors suggested 10 cm bins would be more appropriate than 5 cm.

The Group discussed that the size distribution histograms appear to be smaller than the size at maturity for most fleets and that pregnant females are rarely sampled in their observer programs. The Group noted the large individuals in the Mexican data and received clarification that these were measured values from 100% observer coverage. Thus, the length information from Mexico will become important in the assessment for the North to estimate spawning stock biomass.

Several participants cautioned that the landings restriction for shortfin mako may affect the length data, as larger animals would be released in the water and their length estimated rather than measured. Future work could explore differences in the length distributions related to fishing strategy (e.g. deep vs. shallow sets) and gear characteristics (e.g. wire vs. monofilament leaders).

SCRS/2025/027 presented results from data mining of lengths for shortfin mako North and South stocks from the Spanish surface longline fleet, 1993-2023.

The Group noted that there could also be length measurements from monitoring, but the authors responded that all records were taken by onboard observers and dockside monitoring. All data was provided to ICCAT.

5.3 Catch

The Group reviewed the shortfin mako catch statistics available in the ICCAT dbase Task 1NC as reported by CPCs, updates and the Group's recommendations for completing data gaps are reflected in section 3 of this report.

The Group reviewed alternative possible catch scenarios recognizing that SMA catch reports and completeness for (early) 1950 to the 1990's is partial and potentially much lower than the historical catches based on analysis of catch ratios, catch reports for similar fleet/gear, and catch and effort data for the longline fleets for the North and South Atlantic region (Coelho and Rosa, 2017; Mejuto *et al.,* 2021).

For the North Atlantic stock, during the 2017 stock assessment (ICCAT, 2017) the Group already provided estimates of shortfin mako shark historical catches that were considered in the evaluation (Coelho and Rosa, 2017). At this meeting, the discussion of the Group focused on the reliability and completeness of the reports in Task 1 nominal catches for the 1950-1984 period, noting that the studies presented (Coelho and Rosa 2017; Mejuto *et al.,* 2021) using ratios of catches of shortfin mako and major target species (swordfish, albacore, yellowfin tuna), as well as information on fishing effort (number of vessels) and literature reports, the estimated catches of shortfin mako were substantially higher.

The Group concluded that these estimated catches of shortfin mako represented the best scientific estimates of total removals and decide to use this catch series (1950-1984) presented in Mejuto *et al.* (2021) instead of the reported Task 1 NC. The analyses showed better agreement in total catch after 1985, thus the Group recommended using the 1985-2023 Task 1 nominal catches as best estimates of shortfin mako catches. In order to use these catch series in the assessment, the Group requested to split the captures using the agreed fleet structure. This work should be presented in the next informal meeting to be discussed. It was recommended that the Secretariat contact the CPCs Statistical correspondents informing of the estimated shortfin mako catches for their review and approval or, alternatively, provide better estimates to update the ICCAT Task 1 NC dbase, as done with the blue shark in the past.

The Group recommended not including in the North Atlantic shortfin mako stock catches of reported for the Mediterranean Sea. However, the need for the CPCs to review and update the catches for sharks in general in the Mediterranean Sea including shortfin mako was stressed.

Finally, the Group considered the option to use an alternative initial year(s) instead of 1950 for the catch series to be used in the assessment models for the northern shortfin mako stock. It was indicated that 1950 has been used in previous assessments because the Group concluded that minimal or none catches did take place prior to 1950. However, given the uncertainty in the early part of the catch series, it was proposed for other initial year(s). The Group noted that in this case it would require making assumptions about the level of depletion of the stock in the initial year. The Group recommended that alternative initial year options be explored with the Surplus production models (i.e. JABBA) as sensitivity analyses.

For the south Atlantic stock, the Group also noted that in the 2017 stock assessment (ICCAT, 2017) estimated potential catches of SMA-S based on ratios for the main longline fleets for the period 1971 to 2015 were presented by Coelho and Rosa (2017). During this meeting the Group agreed to use the same methodology to estimate potential non-reported catches for the north and south stocks (Coelho and Rosa, 2017; Mejuto *et al.,* 2021). The Group agreed to use the South SMA estimates of catch 1971-2015 as an alternative plausible catch series but did not consider them as the best estimates of total removals.

The new estimates of total SMA catch presented differ substantially from the reported Task 1 NC. The Group agreed to consider these two as plausible scenarios (Task 1 NC and Catch ratio estimates) for the assessment models, and to treat them as equally probable and representing the uncertainty of total removals. It was further agreed that the estimated catch series will be used from 1971 (initial year of assessment) to 2015, thereafter and considering that reporting of shark statistics has improved, the Task 1 NC values will be used for 2016-2023. In order to use these catch series in the assessment, the Group requested to split the captures using the agreed fleet structure. This work should be presented in the next informal meeting to be discussed.

Following the discussions of post release mortality (PRM) (SCRS/2025/034) the Group concluded that sufficient scientific information was available that indicates mortality associated with the catch and release of shortfin mako individuals during fishing operations. It was recognized that PRM is influenced by several factors, including soak time, sea surface temperature, area and handling of the specimen, among others. However, given that current management regulations prohibit the retention of shortfin mako and recommend the release of live individuals, the Group proposed including within the total removal catch series an estimate of an overall average PRM of 29.4% (0.203 – 0.374 95% CI) mortality (SCRS/2025/034) for both the North and South stock starting in 2018 forwards. The Group also agreed to explore alternative high and low values for PRM as sensitivity analysis within the surplus production models (JABBA).

5.4 Fleet structure

For the North Atlantic shortfin mako stock, the Group reviewed the 2017 fleet structure and based on new information available suggested the following updates:

- Consolidate the historical catch series (1950-1970) into a single fleet. The modelers will explore options for selectivity assumptions, given that size information is not available for the early period;
- For 1971-2023 the fleet structure will use individual fleets that have catch, size and index information available;
- Split the EU-Spain and EU-Portugal fleets with their own catch, size frequency and index of abundance;
- Add Mexico LL as different fleet given the size distribution of their catches, and possible combine it with the VEZ LL/GN given the low catches of MEX;
- Revise if Belize LL fleet should be a separate fleet, noting that no index of abundance is available;
- Review the catches and size data for PS fleets and consider whether it merits a fleet by itself or should be added to the "others" category.

The Group agreed that some flexibility should be given to modelers for the fleet structure of models based on model fit and diagnostics, but the Group should provide clear guidelines on the catch series, indices of abundance and size data to be included in the evaluation.

For the southern SMA stock, the Group also considered the fleet structure input for Stock Synthesis, using the size-frequency distribution presented (SCRS/2025/023). The longline fleets of Brazil, Chinese Taipei, EU-Portugal, EU-Spain, Japan, Namibia, South Africa and Uruguay account for over 95% of the total historical catch series. There was a proposal to combine the Brazil and Uruguay longline fleet and be associated to the combined index presented (SCRS/2025/038) for these fleets. However, it was noted that within the Brazil fleet(s) there was apparent differences between the northern and southern fleet operations, noting that the southern fleets operated closer to the Uruguay fleet.

The Group agreed to keep separate the Namibia and South Africa longline fleets.

The Group reiterated that some flexibility should be given to modelers for the fleet structure of models based on model fitting and diagnostics. It was indicated that exploratory work will be done to evaluate the selectivity at start year and level of depletion for initial year for the case of not close to zero catches.

Final decisions on the fleet structure were taken during the informal meeting, after the presentation of the estimation of historical captures. After the informal meeting, fleet structure tables were provided to the Group and included in the Report of the 2017 Shortfin Mako Assessment Meeting (ICCAT, 2017).

5.5 Other relevant data

SCRS/2025/028 presented a preliminary analysis of the northern stock of shortfin mako using an Incidental Catch Model, a method developed in 2020 for porbeagle.

The Group thanked the authors for the presentation and generally found the simplicity of the approach appealing for data-limited contexts. A question was asked about the sensitivity of model results to the assumption made about population abundance in a recent year, noting that this should be a main output from a stock assessment rather than an input. In addition, it was asked how sensitive the projections from this model were to that assumption. Initial exploration suggests the model was not overly sensitive but should be more fully explored. It was explained that the objective of this model was not to replace stock assessments, but to provide a way of quickly evaluating different assumptions (e.g. different removals series, alternate life history parameters), using an approach that can replicate the abundance time series predicted by a traditional stock assessment, without having to make assumptions on the representativeness or relative weighting of alternate CPUE series, or other assumptions from traditional stock assessments which are difficult in data-limited situations.

The Group noted that other data-limited approaches already exist in current frameworks, such as running the JABBA model using only catch data and prior distributions on parameters. The importance of validating this model against well-known stocks with well-known dynamics was also noted, and the authors indicated it has only been applied to porbeagle at present for sharks.

5.6 Production models

The Group discussed all the assumptions to be applied in the 2025 shortfin mako shark assessment models and decided that, for both stocks (SMA North and SMA South), two distinct frameworks based on Bayesian surplus production models will be implemented: JABBA (Winker *et al.,* 2018) and its extension, JABBA-Select (Winker *et al.,* 2020).

JABBA is a flexible Bayesian framework for state-space biomass dynamic models that provide robust and re-producible stock status estimates relevant to fisheries management. However, a primary limitation is its inability to incorporate stock size/age structure, and it struggles to account for potential changes in gear selectivity. A limitation particularly relevant for shortfin mako stocks is that, as fisheries predominantly catch immature individuals, the selectivity of the fishery does not coincide with the maturity ogive, and the exploitable biomass will tend to not track the spawning stock biomass (SSB).

To address these concerns, the Group decided to also implement JABBA-Select, an advanced Bayesian state-space surplus production modeling framework designed to overcome key limitations of conventional surplus production models. JABBA-Select can account for variations in selectivity and fishing mortality across fleets and over time. It also allows for the incorporation of life history parameters commonly used in Age-Structured Pro-duction Models (ASPMs) as priors, differentiating between Exploitable Biomass (EB)

and Spawning Biomass (SSB). These features make JABBA-Select particularly useful for the shortfin mako assessment, as it can handle situations where the fishery primarily targets immature individuals and does not align with SSB.

Although JABBA-Select is not currently listed in the ICCAT catalog as a framework for management purposes, the Group agreed to implement it in this year's assessment to evaluate its potential. The standard ICCAT process requires that the WGSAM reviews any model before it is included in the official catalog. If JABBA-Select proves useful, a paper should be submitted to the WGSAM in 2026, with the goal of including it in the ICCAT catalogue. The Group also noted that JABBA-Select has already under-gone review by an international panel of stock assessment experts in South Africa and was used there for multiple domestic stocks.

Even though JABBA-Select is not ultimately used to provide management advice in the 2025 stock assessment, the Group recognized the importance of investigating JABBA-Select and its capabilities. It could serve as a valuable backup option should JABBA and SS3 encounter difficulties. Thus, the Group agreed to apply JABBA-Select to both the North and South shortfin mako stocks in the upcoming assessment besides JABBA and SS3.

For both Bayesian frameworks, the priors used will be derived from the life history parameters recommended by the Group for each shortfin mako shark stock. The structure of these priors will be defined using the method provided by Cortés and Taylor (2023). Priors and posteriors should be compared with the implicit production function from Stock Synthesis.

5.7 Integrated models

North Atlantic

A presentation (SCRS/P/2025/014) was provided recalling the main work done for the North Atlantic stock SS3 stock assessment in 2017 and the projections conducted in 2019. Concerning the work to be conducted for the 2025 assessment, the presentation proposed to start by updating the base case model, then conduct sensitivities (as some uncertainties may impact on results but some others may not have an impact on results), and noted that a structural uncertainty grid can be used to deal with some uncertainty axes. Doing the latter work can be helpful preparation for the approaches to be used for the blue shark MSE.

The Group discussed the potential use of model ensembles to capture the uncertainty of data input into the integrated SS model. It was noted that it would be important for the Group to provide consensus recommendations on the range of uncertainty in data input to be included within the integrated model ensembles.

The Group also discussed the weighting of model ensembles. It was noted that the 2017 Small Shark assessment combined multiple production model runs and one integrated model run to provide stock status. It was recommended that the current SMA assessment include equal, or greater, number of integrated model runs as model ensembles because it is reasonable to use the SS model for the shortfin mako, which has biological characteristics such as significant sex-specific growth and sex-specific maturity at size. The SS model can account for those differences by including age-and sex-structures and growth. However, it was noted that development of model ensemble weighting recommendations might be treated more effectively at a later time, for example within the intersessional technical team(s) working on model development.

The Group also discussed recommendations to simplify the integrated model fleet structure to make it more similar to that of other ICCAT assessments. Refer to Sections 5.3 and 5.4 for these discussions.

South Atlantic

After presenting the data structures available for assessing the southern stock of shortfin mako shark, the Group considered it feasible to explore the development and implementation of the Stock Synthesis (SS3) model for the southern region as well. Unlike the last assessment of this stock, where three distinct variations of production models (BSP2JAGS, JABBA, and CMSY) were considered.

The SS3 model is particularly suitable as it can account for the species' unique biological characteristics, including significant sex-specific growth patterns and maturity-at-size differences, by incorporating age- and sex-structured dynamics.

The Group also discussed the availability of modelers, the data to be used, and the fleet structure, which is detailed in Section 5.3 and 5.4 of this report.

5.8 Discussion on base cases, model ensembles and sensitivity analysis

For both the North and South Atlantic stocks, it was agreed to develop JABBA, SS3 and JABBA Select models. In principle, and as noted earlier, management advice will be based on JABBA and/or SS3 results, and JABBA Select will be used in an exploratory mode.

North Atlantic

For the North Atlantic stock, the previous assessment included JABBA and SS3, as well as other model platforms (Bayesian Surplus Production with process error, BSP2), for use in developing management advice.

For both JABBA and SS3, continuity runs will be conducted this year, using the same biological parameters and prior distributions used in the previous assessment, extending the time series of catches used in the previous assessment to the year 2023 and using the same abundance indices from that assessment. Projections from the last assessment, using the catches observed after the last assessment until 2023, will be conducted and compared to estimated stock status from this year's assessments to examine consistency.

- CPUE series:
  The following standardized CPUE series were accepted by the Group for use in this year's stock assessment (see Section 4): Spain LL (1990-2023), USA observer LL (1992-2023), Japan LL1 (1994-2007), Japan LL2 (2008-2023, with a gap in 2021), Portugal LL (1999-2023), Morocco LL (2010-2019). It was noted that the Japan LL2 series has low spatial coverage and, although the Group accepted it for potential use in the assessment, it was agreed that, if it were seen to create problems when introduced in the assessment, it could be removed. The decision on whether a CPUE series from Chinese Taipei is accepted for use in the stock assessment will be taken after reviewing the updated series to be presented at the 3 or 4 April informal meeting (TBD).

- Catches:
  Catches (landings + dead discards) to be used in the assessment:

  For the years 1985-2023, the T1NC from the ICCAT database will be used.

  For the years before 1985, the Base Case scenario will use the catch estimates of scenario C3_6 from Mejuto *et al.* (2021), as explained in Section 5.3.

  This series is for all fleets combined, whereas SS3 requires catches by fleet. For years 1971-1984, this series coincides with the alternative catch series (C2) used for sensitivity runs in the previous stock assessment, which can be split by fleet, so this split by fleet will be used in SS3. This work will be completed by the 3 or 4 April informal meeting. For the years 1950-1970 the Group decided to assign the annual catches to a single separate "historical fleet".

  Based on recent work presented at the meeting (SCRS/2025/034) and a literature review, the Group decided to apply a 29.4% mortality ratio for the live releases. The sharks estimated to die from the live releases will be added to the landings and dead discards, to obtain the total removals for use in the stock assessment.

  The T1NC series available in the ICCAT database since 1950, corresponds one of the two catch series used in the previous assessment production model and will be used this year for the continuity runs.

  Sensitivity runs starting in 1971, as in the previous assessments, will be conducted, at least JABBA.

- Fleet structure for SS3:
  The agreed fleet structure for SS3 is described in Section 5.4. The EU fishing fleet, which was treated in the previous assessment as a single fleet, will be split into two fleets, corresponding to the longline fleets of Spain and Portugal, respectively. Longline fleets of Canada, Chinese Taipei, Japan, Morocco, USA and Venezuela will be kept as in the previous assessment. A separate longline fleet will now be created for Mexico, and an "Others" fleet will include all other catches. A "historical fleet" will include catches for the years 1950-1970 of all fishing fleets combined, and a couple of simple hypotheses will be examined by the modellers with regards to the selectivity of that fleet (for example, it could be mirrored to the selectivity of the Spanish or the Japanese fleets).

  Two fleet sensitivities will be: combining Mexico and Venezuela longline catches into a single fleet, or combining Mexico and Venezuela longline and Venezuela gillnet into a single fleet.

  Sensitivities within SS3 will also include selectivity shapes (domed vs logistic, which now may be possible to distinguish given the large lengths from Mexico available for this year's assessment), and Beverton-Holt versus Low Fecundity Stock-Recruit relationship.

- Size compositions for SS3:
  Size compositions for use in SS3 are as described in Section 5.2.

- Biological parameters:
  Biological parameters to be used in the stock assessment are presented in Section 5.1.

  For the base case, the Group agreed to use growth curve calculated from the vertebrae interpretation of ages after recalculating the ages from band-pairs agreed to be conducted after this meeting and presented to the Group at the early-April informal meeting, and to explore the use of the curve estimated from mark-recapture as an alternative (sensitivity) for females. Reconsideration may take place at the early-April informal meeting if unexpected problems are encountered in the analyses to be presented at that meeting.

South Atlantic

For the South Atlantic stock, the previous assessment was based on two different model frameworks (CMSY and BSP2JAGS), so both JABBA and SS3 will be newly developed for this year's assessment.

- CPUE series:
  For this year's assessment, the following standardized CPUE series were accepted by the Group for use in the stock assessment (see Section 4): EU-Spain LL (1990-2023), Japan LL1 (1994-2011), Japan LL2 (2012-2020), Brazil-Uruguay (1978-2022), South Africa (2000-2024). The decision on whether a CPUE series from Chinese Taipei is accepted for use in the stock assessment will be taken after reviewing the updated series to be presented at the early-April informal meeting.

- Catches:
  The following scenarios were considered for catches (landings + dead discards):

  A. The T1NC series available in the ICCAT database since 1971.
  B. A series of estimated catches of shortfin mako, as explained in Section 5.4. This series is available for the years 1971-2015 and the T1NC data will be used for 2016-2023.

     The Group had no clear basis for selecting one catch scenario over the other and decided to conduct the assessment with each of the catch scenarios and to weigh equally the assessment results (i.e. use a grid approach with two equally weighted scenarios).

     The sharks estimated to die from the live releases (applying a 29.4% mortality ratio) will be added to the landings and dead discards, to obtain the total removals for use in the stock assessment.

- Fleet structure for SS3:
  The agreed fleet structure for SS3 is described in Section 5.4, and consists of eight longline fleets (Chinese Taipei, Brazil-Uruguay, EU-Portugal, EU-Spain, Japan, Namibia, South Africa, and LL-Others), and an Others (everything else) fleet.

- Size compositions for SS3:
  Size compositions for use in SS3 are as described in Section 5.2.

- Biological parameters:
  Biological parameters to be used in the stock assessment are presented in Section 5.1.

  For the South, the growth curve calculated from the vertebrae interpretation of ages, which was recalculated during this meeting, will be used for the stock assessment.

Model ensembles and sensitivities

In addition to continuity runs, model-ensemble approaches, and various sensitivities will be conducted. Some of these runs have been discussed earlier in this subsection, and others may occur in the process of developing the assessment models. Further inputs on weighting of different results, such as weighting of JABBA and SS3 model results, and weighting of different scenarios within each of those models, which may occur along the process will be presented to the Group for decision.

5.9 Discussion on model validation and diagnostics to prepare, and projections

The importance of having a common set of diagnostics across the different models that will be developed was highlighted by the Group. This is not only across models but also across stocks. In this regard, the Group decided that SS3 diags could be a good tool for that. SS3diags is an R library that provides an extensive list of diagnostics and can be used across the different frameworks that will be used in the shortfin mako shark stock assessments.

The Group decided that the definitions regarding the procedures to be used in projections for both stocks depend on a broader discussion, and that this process could be better defined during the intersessional meetings to be held in April and May. Although briefly discussed, considering that projections will start from the year 2026 and the assessments for both stocks will be updated up to 2023, a potential approach to determine catch values for 2024 and 2025 for projection purposes could be based on historical averages from the last 3 years for each respective stock catch time series (SMA-N 1,262.27 t; SMA-S 2,053.00 t)

5.10 Plan for intersessional work related to the stock assessment

There were several comments about the need to coordinate across modelling teams, especially because JABBA is nested within Stock Synthesis. It is important that the same set of diagnostics be used to select and weight scenarios both within (production models for the North and South stock and Stock Synthesis models for the North and South stocks) and across modelling approaches. It is also important to agree in advance how the scenarios will be chosen and weighted.

There was also a comment about the need to incorporate the main axes of uncertainty in the assessments and that the methods to propagate uncertainty should be consistent across modelling platforms while bearing in mind that Stock Synthesis is a more complex and time-consuming approach compared to JABBA.

In terms of intersessional work, as noted in Section 5.1, the Group agreed that the age and growth study for the North Atlantic be repeated but considering 2 band pairs per year up to the size at maturity and 1 band pair per year thereafter, making the re-analysis fully comparable with the Marquez *et al.* (2025) (SCRS/2025/040) study for the South Atlantic. Once the new growth curve and associated parameter estimates become available, as soon as possible after the DP meeting, a paper will be produced that will contain estimates of productivity, generation time, shape parameter of the production curve to be considered as input to JABBA as well as estimates of steepness and natural mortality for Stock Synthesis.

Other work to be conducted as soon as possible after the meeting will be the assignment of catches to fleets for the estimated catch series for the North Atlantic stock during the years 1971-1984, as well as for the entire estimated catch series for the South Atlantic stock (1971-2015).

The Group also agreed to provide updated standardized CPUE series for Chinese Taipei, within the next few weeks after this meeting, for consideration by the Group.

The Group agreed to hold an online Group informal meeting in early April to present all these results and to provide all final data to modellers by 7 April 2025.

Several participants with stock assessment expertise volunteered to lead the different assessment groups for the North and South stocks. There will be teams for JABBA, SS3 and JABBA-Select, for the North and for the South stocks.

The Group will organize another online session around the second half of May (date TBD) to review progress of modelling work and to agree on decisions that may be required during model development (e.g. some weighing options). Settings for projections will also be agreed at those sessions.

6. Shark Research and Data Collection Programme (SRDCP)

SCRS/2025/034 presented an update on the post-release mortality (PRM) of shortfin mako in the Atlantic using satellite telemetry, integrated in the collaborative SRDCP works.

The Group commented that this is important work under the SRDCP, with the use of multiple satellite tags both from ICCAT and other national programs and projects (non-ICCAT) that collaborate in this analysis.

The Group noted that the time limit to define what is considered a PRM event used in the study was set to 28 days, but that some mortality occurred later than that, and could still be associated with the fishing events. One researcher noted another ongoing work analyzing PRM for silky shark from PS fisheries, which is using shorter time periods, in that case 10 days. Regarding this last comment, it was noted that the definition of the time period is very variable and subjective.

The Group noted that this work provides valuable results, at this point based mostly on descriptive analysis. It was agreed that the next step should be to develop some modelling strategies. As a starting point, one participant suggested experimenting with analysis such as Kaplan-Meier curves and survival analysis models. Considering this, an update was presented during the meeting and updated in the document.

The Group noted the importance of the metadata on those studies and the incorporation of other variables that are associated with those tags. The ICCAT Secretariat is presently developing databases for satellite tagging data and it would be good to add those variables. It was noted on the case of the tags from other programs (non-ICCAT) to obtain data, there is the need to request this information directly from the tag owners.

The Group noted that in some cases the specimens' vertical movements can lead them to dive to depths deeper than the 1400-1700m that is set to trigger the tags safe-release mechanism. As such it is important to analysis not only the tag release reason (e.g. sinkers) but also to understand that the sharks were making regular movements before achieving such depths (which could be indicative of a shark diving at great depths naturally), versus a straight-line sinking pattern (which would be indicative of a mortality event). For this work, such detailed analysis was carried out, but only for tags that produce time-series of depths, as other tags such as sPATs only produce min and max daily values and as such it is not possible to do such detailed analysis over time.

The Group also noted that there are interesting depth movement patterns in the data related to the vertical habitat use of the species and encouraged further work on that.

Document SCRS/2025/040 presented the update on the age and growth of shortfin mako sharks in the South Atlantic, integrated in the collaborative works of the SRDCP, including samples from Brazil, Namibia, EU-Portugal and Uruguay.

The Group noted the importance of this cooperative work under the SRDCP, that has been progressing over the years and has now produced more reasonable results that can be considered for use in stock assessments. Further discussion regarding this document is presented in Section 5.1 of this report.

7. Recommendations

The Group discussed a number of recommendations, as follows:

On statistics

- To include in the Appendices (section A4.4 – Conversion factors) of the ICCAT Manual and on the ICCAT webpage the length-length and length-weight equations for shortfin mako in the southwestern Atlantic presented in document SCRS/2025/045 by Albornoz *et al.* (2025).

- As previously discussed by the Sharks Species Group, it was noted the importance of improving shark statistics in the Mediterranean Sea. During the 2023 blue shark stock assessment (ICCAT, 2023) and during this meeting, it was noted that it is not possible to conduct a traditional stock assessment with the current available information. Therefore, the Group recommended establishing this issue as a priority and start working in a strategy to work with the CPCs operating in the Mediterranean Sea.

On science

- The Group recommended strengthening the activities of the SRDCP (on genetics, tagging, electronic tagging, others) to address the connectivity between the southeastern Atlantic Ocean and the southwestern Indian Ocean. The importance of this matter has been already noted in previous meetings and assessments conducted for other species (i.e. porbeagle and blue shark).

- The Group recommended that Venezuela estimate their standardized indices of abundances for their shark fisheries.

- In line with the new rules for the provision of science funding in ICCAT (see section 9.2 of this report), the Group shall discuss during the 2025 mako shark stock assessment meeting draft proposals of funding needs for the next two biennial cycle (2026-2029). This is essential to assist the Secretariat in preparing the "Explanatory note on the draft ICCAT budget for financial years 2026-2027", which should be circulated in July 2025 to ICCAT CPCs.

8. Responses to the Commission

No responses to the Commission were provided during the meeting. However, the Commission request regarding the MSE for blue shark was discussed.

The Group discussed the MSE roadmap for blue shark, established by the Commission in its 24th Special Meeting. Discussion was mainly focused on the feasibility study as a first step. During the initial discussions, concerns were raised about the increasing number of MSEs that the SCRS must manage. It was also mentioned that the revision made by an external consultant regarding all the MSE process conducted in ICCAT (SCRS/2025/019) recommended that ICCAT should not develop more than two MSE processes simultaneously. However, in addition to those already in progress, the Commission has requested MSEs for both blue shark stocks and southern albacore stock. Given this scenario, the Group emphasized the importance of the feasibility study in order to assess the available technical capacity and to help the Group setting priorities for the coming years.

While the Group possesses the necessary technical expertise to develop the MSE, it was recognized that the process of defining the Operating Model (OM), uncertainty grid, and Management Procedures (MPs) will be very time-consuming, and therefore will probably be a challenge. To address this, the potential engagement of an external consultant for technical programming support for a potential BSH MSE was highlighted as a beneficial option. The need for funds for this consultant was highlighted and the Group agreed that it should be included in the 2026 budget.

To move forward, it was agreed that the feasibility study for blue shark will be conducted throughout 2025, with a preliminary draft to be presented at the 2025 Shortfin Mako Stock Assessment meeting. A dedicated working group, led by the ICCAT Secretariat and composed of scientists' part of the Sharks Species Group, will be responsible for preparing the initial version of this study.

9. Other matters

9.1 Other sharks

Document SCRS/2025/041 reviewed the conservation status of basking shark and white shark in the ICCAT area. It was noted that these species have some interaction with ICCAT fisheries and that both species would meet the definition of being "a taxon of the greatest biological vulnerability and conservation concern for which there are very few data". The authors recommended a non-retention measure for both species in ICCAT fisheries.

The Group welcomed the information and the presented proposal, noting that both species are a bycatch in ICCAT fisheries, and recommended the authors present the document to the Subcommittee on Ecosystems and Bycatch (SC-ECO), for its consideration.

The Group also highlighted that the reported catches for both species are likely to be underestimated. Therefore, it was suggested the SCRS address the potential impact of ICCAT fisheries on these two species, to support the need for conservation measures for these species. The authors agreed to update the document based on Groups comments in order to be presented to the SC-ECO at the upcoming 2025 intersessional meeting.

9.2 New rules regarding the requests related to science funding

The Secretariat provided the background for the new rules related to SCRS science funding requests that should be followed by the Group while drafting the Recommendations with financial implications. It was explained that the "Explanatory note on the draft ICCAT budget for financial year XXXX", which is annually prepared by the ICCAT Secretariat and discussed during the annual meeting of the Commission aiming the approval of the regular budget, shall now include much more information regarding the science budget, including among others: i) a general overview on the use of funds made available over the previous 5 years; ii) the balance of the science budget; iii) clear description and justification on the activities to be developed, together with thorough estimates of the associated funding requests; iv) the rationale for those activities that are planned for multi-years; and, v) that the funding requests to be estimated for the upcoming two biennial cycles of the Commission regular budget, and compiled in the budget table template developed by the Secretariat.

The Group was informed that the SCRS Science Strategic Plan Ad Hoc Drafting Group will be working intersessionally to advance the drafting of the 2026-2031 SCRS Science Strategic Plan for review at the SCRS Science Strategic Plan Meeting (9-11 July 2025). The SCRS Chair reminded the Group that all species groups have been asked to develop 6-year plans within their research programs, in parallel with the Strategic Plan development, to encourage strategic research planning and facilitate collaborative efforts across species groups. He suggested that the budget table template could serve as a good format for 6-year research plan summary tables, as well, since the headings included are fairly comprehensive, and new rows could be added under each heading for separate research projects. This would also greatly facilitate synchronizing the budget template for the funding requests with the strategic research plans.

10. Adoption of the report and closure

The report was adopted during the meeting and the meeting was closed.

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Table 1. Estimated catches (landings and dead discards) in t of shortfin mako (SMA *Isurus oxyrinchus*) by area, gear, and flag from 1994 to 2023.

				1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
TOTAL				5844	8407	7707	5732	5870	4475	5190	4796	5539	7225	6528	7648	7322	6946	5684	6740	7316	7193	7349	6283	6762	6231	6126	6403	5558	4833	4599	3450	3325	2473
	ATN			3662	5307	5312	3539	3853	2864	2598	2682	3434	3987	4000	4114	3932	4158	3802	4543	4783	3724	4440	3606	3471	3288	3362	3126	2399	1890	1742	1195	841	1103
	ATS			2182	3100	2395	2187	2008	1606	2588	2107	2103	3235	2526	3517	3380	2786	1881	2196	2531	3467	2907	2677	3290	2943	2765	3277	3158	2943	2857	2254	2484	1369
	MED						6	8	5	4	7	2	2	2	17	10	2	1	1	2	2	2	0	0	0			1	0	0	0	1	0
Landings	ATN		Longline	3310	3829	5059	3354	3678	2762	2270	2451	3163	3970	3645	3806	3660	3976	3623	4346	4588	3500	4147	3315	2588	2839	3119	2714	1998	1622	1625	521	18	3
			Other surf.	331	1448	252	183	175	99	320	231	271	17	355	308	273	175	169	177	193	215	273	286	871	639	234	407	376	211	41	33	32	4
	ATS		Longline	2161	3085	2379	2163	1996	1596	2566	2090	2088	3204	2450	3503	3336	2745	1799	2190	2530	3405	2844	2643	3257	2928	2748	3110	3149	2926	2820	2234	2462	778
			Other surf.	21	15	16	25	12	10	22	18	15	31	76	14	43	30	82	7	1	62	55	34	31	12	13	162	7	8	29	9	3	
	MED		Longline				6	8	5	4	7	2	2	2	17	10	2	1	1	2	2	2	0	0	0				0			0	
			Other surf.																0									1	0	0	0	0	0
Discards	ATN		Longline	21	29	0	2		1	8							7	9	20	2	9	19	5	12	10	8	4	24	56	74	642	791	1094
			Other surf.						2								0	1	0	0	0	0			0	0	1	1	1	2	0		1
	ATS		Longline														12	0			0	8	0	2	2	3	3	2	9	7	12	19	591
			Other surf.																						0	1	1	1	1	0		0	0
	MED		Longline																						0						0	1	0
Landings	ATN	CP	Barbados																						4	3	3						
			Belize																23	28	69	114	99	1	1	1	9	12	2		3			
			Canada		111	67	110	69	70	78	69	78	73	80	91	71	72	43	53	41	37	29	35	55	85	82	109	53	63	1	0		0
			China PR							0							81	16	19	29	18	24	11	5	2	4	2						
			Costa Rica								0						0	1	1	1	2	2	1	2	1	1	0	1	0	0			
			Curaçao																								0						
			EU-España	2164	2209	3294	2416	2223	2051	1561	1684	2047	2068	2088	1751	1918	1814	1895	2216	2091	1667	2308	1509	1481	1362	1574	1784	1165	866	870			
			EU-France																15	2	0	0	0	1	1	2	1	0	1	0	1	1	0
			EU-Netherlands																								0						
			EU-Portugal	649	657	691	354	307	327	318	378	415	1249	473	1109	951	1540	1033	1169	1432	1045	1023	820	219	222	264	276	272	289	342	202	1	0
			FR-St Pierre et Miquelon														1	2		4	0		4	0									
			Great Britain						2	3	2	1	1	1	0	0	0	1	15	0	0	0							0	0			0
			Guatemala																								0						
			Japan	214	592	790	258	892	120	138	105	438	267	572	420	358	82	131	98	116	53	56	33	69	45	74	89	20	4				
			Korea Rep																		27	27	15	8	2	1	3	5	4				
			Liberia																											10			
			Maroc										147	169	215	220	151	283	476	636	420	406	667	624	947	1050	450	594	501	382	299		
			Mauritania																							2							
			Mexico		10	5	2	6	5	10	16	8	10	6	9	5	8	6	7	8	8	8	4	4	4	3	5	2	2	2	2	3	2
			Panama						1	0						0	49	33	39				19	7			0						
			Philippines						1									1	1		2	0	1	2									
			Russian Federation																										0				
			Senegal														8	17	21			2	0	2	2	2	68	68	26				
			St Vincent and Grenadines			0			3																2				3				
			Trinidad and Tobago	3	1	1	1	2	1	3	6	2	3	1	2	1	1	1	1	1	0	2	1	1	1	1	2	2	1	1	1	1	0
			UK-Bermuda				1	2								0	0	0	0	0	0	0	0	0	0	0	0		0		0		
			USA	574	1658	400	345	296	198	414	350	372	106	477	422	353	319	296	314	350	332	371	363	961	572	271	302	165	57	48	39	40	0
			Venezuela	7	7	17	9	8	6	9	24	21	28	64	27	14	19	8	41	27	20	33	9	13	14	11	16	14	12	10	5	4	4
		NCC	Chinese Taipei	29	32	45	42	47	75	56	47	53	37	70	68	40	6	23	11	14	13	14	8	4	13	7	1						
		NCO	Sta Lucia															0		0	1		1	0						0	1		
	ATS	CP	Angola																								31				7	23	14
			Belize												38		17	2		32	59	78	88	1	15	14	34	15	7	2	1		
			Brazil	95	119	83	190	233	27	219	409	226	283	238	426	210	145	203	99	128	192	196	276	268	173	124	275	399	739	542	477	557	121
			China PR	45	23	27	19	74	126	305	22	208	260	68	45	70	77	6	24	32	29	8	9	9	5	3	1						
			Curaçao																								0						
			Côte d'Ivoire	20	13	15	23	10	10	9	15	15	30	15	14	16	25		5	7		20	34	19	11	13	161	4	8	14	9	1	
			EU-España	552	1094	1482	1356	984	861	1090	1235	811	1158	703	584	664	654	628	922	1192	1535	1207	1083	1077	862	882	1049	1044	1090	799	650	657	
			EU-Portugal		92	94	165	116	119	388	140	56	625	13	242	493	375	321	502	336	409	176	132	127	158	393	503	300	243	449	357	358	
			El Salvador																								0						
			Great Britain													5			11														
			Guatemala																								0						
			Japan	1369	1617	514	244	267	151	264	56	133	118	398	258	243	72	115	108	103	132	291	114	182	109	77	96	93	53	1		0	
			Korea Rep																	29	13	7	7	4	4	18	8	9	1			
			Namibia						1			459	375	509	1415	1345	1002	295	155	349	584	586	483	950	829	799	684	980	634	945	637	789	545
			Panama						24	1								10									0						
			Philippines						2	0								1	1	3	2	2	2	20	16								
			Russian Federation													0																	
			Senegal																		13	34	23		11	6	39	4	7				
			South Africa	24	49	37	31	171	67	116	70	12	116	101	111	86	224	137	146	152	218	108	250	476	613	339	305	244	110	46	70	66	96
			UK-Sta Helena																		0	0	0	0	0	0	0	0	0				
			Uruguay	12	17	26	20	23	21	35	40	38	188	249	146	68	36	41	106	23	76	36	1										
		NCC	Chinese Taipei	65	87	117	139	130	198	162	120	146	83	180	226	166	147	124	117	144	203	150	157	158	152	92	85	64	42	52	35	13	2
		NCO	Vanuatu											52	12	13	1	0														
	MED	CP	EU-Cyprus													1	1	0	0	0	1												
			EU-España				6	7	5	3	2	2	2	2	2	4	1	0	0	1	2	2	0	0	0								
			EU-France																0										0	0	0	0	0
			EU-Italy																									1	0				
			EU-Portugal					1		1	5		0		15	5				0													
			Japan															0															
			Maroc																			0											
Discards	ATN	CP	Canada																						0	1	0	2	1	20	22	26	12
			China PR																										20	2	1	5	4
			Curaçao																								0						
			EU-España																								0				585	588	936
			EU-France																								0	0	0				1
			EU-Portugal																											11	14	141	87
			El Salvador																								0						
			Guatemala																								0						
			Japan																										30	28	15	10	12
			Korea Rep																						1		0					0	0
			Maroc																													9	9
			Mexico		1												0					0			0	0	0	0	0			0	0
			Panama																								0						
			Russian Federation																								0	0					
			UK-Bermuda						2																						0		
			USA	21	28	0	2		1	8							7	10	20	2	9	18	5	11	8	6	4	2	1	3	4	10	29
		NCC	Chinese Taipei																		0	1	0	0	1	1	0	22	5	12	1	2	7
	ATS	CP	Brazil														12	0															
			China PR																											1	1	3	3
			Curaçao																								0						
			EU-España																								0						187
			EU-France																						0	1	0	1	1	0		0	0
			EU-Portugal																														388
			El Salvador																								0						
			Guatemala																								0						
			Japan																										2	5	9	3	3
			Korea Rep																							0	0		5			0	0
			Panama																								0						
			South Africa																														0
		NCC	Chinese Taipei																		0	8	0	2	2	3	3	2	2	2	2	13	9
	MED	CP	EU-España																						0						0	1	0

Table 2. SCRS Catalogue of Task 1 (T1, in t) and Task 2 (T2 availability) data for North Atlantic shortfin mako (SMA-N), detailing the 10 most important fisheries between 1994 and 2023. T2 availability is classified as: 'a' (T2CE only), 'b' (T2SZ only), 'ab' (both T2CE & T2SZ), and '-1' (no data).

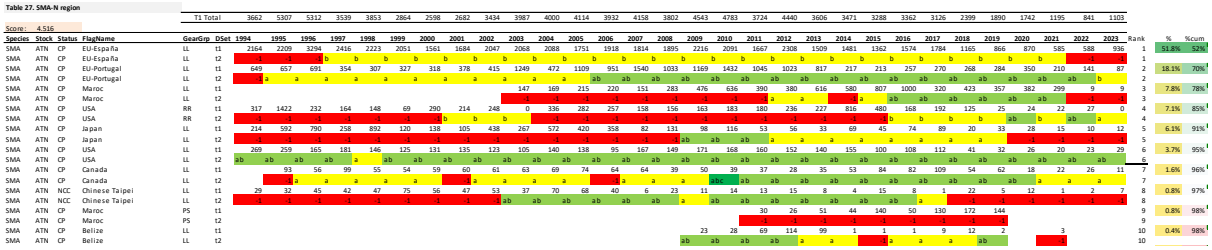

Table 3. SCRS Catalogue of Task 1 (T1, in t) and Task 2 (T2 availability) data for South Atlantic shortfin mako (SMA-S), detailing the 10 most important fisheries between 1994 and 2023. T2 availability is classified as: 'a' (T2CE only), 'b' (T2SZ only), 'ab' (both T2CE & T2SZ), and '-1' (no data).

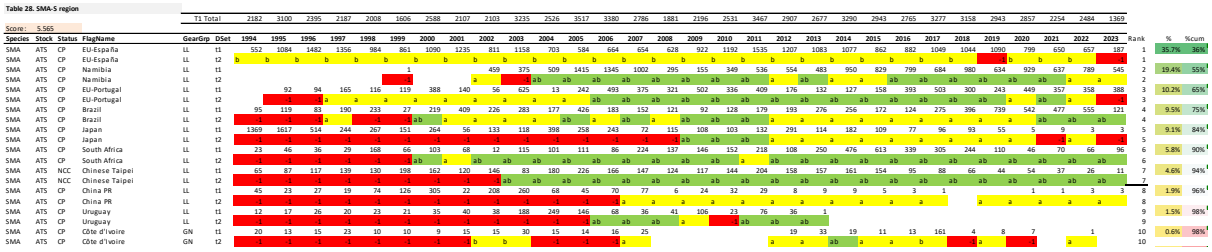

Table 4. Live releases of shortfin mako (SMA, *Isurus oxyrinchus*) in all stocks (North Atlantic - ATN, South Atlantic - ATS, and Mediterranean) reported in live weight (t).

Species	Stock	FlagName	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
SMA	ATN	Canada								0		1	2	2	28	12	81	63	83	23
		China PR														7	3	2	9	7
		Chinese Taipei													10	2	6	1	1	6
		Curaçao												0						
		El Salvador												0						
		EU-España												1				329	331	706
		EU-France											0	0		1		0	0	0
		EU-Netherlands																		0
		EU-Portugal															20	26	256	158
		Guatemala												0						
		Japan															17	11	7	9
		Korea Rep											0	1					0	0
		Maroc									0		0	0				0		15
		Mexico	0	0	0	0	0	0	0	0	0	0	1	2	0	1	1	1	1	1
		Panama												0						
		Russian Federation												0				0	0	0
		Trinidad and Tobago							0	0	0		0	0					0	0
		UK-Bermuda														0	0	0	0	0
		USA														24	31	68	47	43
	ATS	Brazil		16	0															
		China PR															1	1	6	6
		Chinese Taipei																	9	6
		Curaçao												1						
		El Salvador												1						
		EU-España												1						120
		EU-France										0	1	0	1	0	0	0	0	1
		Guatemala												1						
		Japan															8	17	5	6
		Korea Rep											1	0					0	0
		Panama												1						
		South Africa																		0
		UK-Sta Helena																0		0
	MED	Chinese Taipei																	0	0
		EU-Cyprus							0											
		EU-España																0		
		EU-France																	0	0
		Maroc									0									
TOTAL			**0**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**6**	**10**	**39**	**47**	**169**	**519**	**754**	**1108**

Table 5. CPUE Evaluation Tables for the northern shortfin mako stock.

Use in stock assessment?	Adequate	Adequate	Adequate	Adequate		Adequate	Adequate
SCRS Doc No.	SCRS/2025/026	SCRS/2025/033	SCRS/2017/054	SCRS/2025/030	SCRS/2025/031	SCRS/2025/025	SCRS/2025/042
Index Name:	Spain LL	US observer LL	Japan LL 1	Japan LL 2	Chinese-Taipei LL	Portugal LL	Morocco LL
Data Source (state if based on logbooks, observer data etc)	voluntary scientific reporting fleet, observer data	Observer data	logbook data	Observer data	Logbook	Observers, self-sampling and port-sampling (only observers in recent years)	logbook
Do the authors indicate the percentage of total effort of the fleet the CPUE data represents?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If the answer to 1 is yes, what is the percentage?	61-70%	0-10%	11-20%	0-10%	91-100%	0-10%	91-100%
Are sufficient diagnostics provided to assess model performance??	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient
How does the model perform relative to the diagnostics ?	Well	Well	Well	Well	Well	Well	Well
Documented data exclusions and classifications?	NA	Yes	Yes	Yes	NA	Yes	Yes
Data exclusions appropriate?	NA	Yes	NA	Yes	Yes	Yes	NA
Data classifications appropriate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Area	Atl N	Atl NW	Atl N	Atl N	Atl N	Atl NE	Atl NE
Data resolution level	trip	Set	trip	Set	Set	OTH	Set
Ranking of Catch of fleet in TINC database (use data catalogue)	1-5	1-5	1-5	6-10	1-5	1-5	6-10
Length of Time Series	longer than 20 years	longer than 20 years	longer than 20 years	11-20 years	11-20 years	longer than 20 years	11-20 years
Are other indices available for the same time period?	Many	Many	Many	Few	Few	Many	Many
Are other indices available for the same geographic range?	Few	Few	Few	Few	Few	Few	Many
Does the index standardization account for Known factors that influence catchability/selectivity? (eg. Type of hook, bait type, depth etc.)	Yes	Yes	Yes	No	Yes	Yes	Yes
Estimated annual CV of the CPUE series	Variable	Medium	Medium	Medium	Low	Variable	Medium
Annual variation in the estimated CPUE exceeds biological plausibility	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Possible	Possible
Is data adequate for standardization purposes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is this standardised CPUE time series continuous?	Yes	Yes	Yes	No	Yes	Yes	Yes
For fisheries independent surveys: what is the survey type?							
For 19: Is the survey design clearly described?							
Other Comments	Coverage in recent years has been low		use series until 2007, after this time use the updated series (SCRS/2025/030)	no observation for 2021 due to Covid-19, limited spatial coverage in recent years . If there are fitting problems, then consider removing this index	For 18&19, observer data is available but not standardized because of the low reported catch rate.	Data resulution is sub-trips	remove years 2020 and 2021

Table 6. CPUE Evaluation Tables for the southern shortfin mako stock.

: in stock assessment?	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
:c No.	SCRS/2025/026	SCRS/2016/084	SCRS/2025/030	SCRS/2025/031	SCRS/2025/038	SCRS/2025/036
ame:	Spain LL	Japan LL 1	Japan LL 2	Chinese-Taipei LL	Brazil-Uruguay LL	South Africa LL
Data Source (state if based on logbooks, observer data etc)	voluntary scientific reporting fleet, observer data	Logbook	observer data	Logbook	logbooks	logbooks
Do the authors indicate the percentage of total effort of the fleet the CPUE data represents?	Yes	Yes	Yes	Yes	No	Yes
If the answer to 1 is yes, what is the percentage?	61-70%	11-20%	21-30%	91-100%	41-50%	91-100%
Are sufficient diagnostics provided to assess model performance??	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient
How does the model perform relative to the diagnostics ?	Well	Well	Well	Well	Mixed	Well
Documented data exclusions and classifications?	NA	Yes	Yes	NA	Yes	Yes
:lusions appropriate?	NA	Yes	Yes	Yes	Yes	Yes
ssifications appropriate?	Yes	Yes	Yes	Yes	Yes	Yes
)hical Area	Atl S	Atl S	Atl S	Atl S	Atl SW	Atl SE
:olution level	trip	Set	Set	Set	Set	Set
Ranking of Catch of fleet in TINC database (use data catalogue)	1-5		1-5	1-5	1-5	1-5
)f Time Series	longer than 20 years	11-20 years	6-10 years	11-20 years	longer than 20 years	longer than 20 years
Are other indices available for the same time period?	Many	Many	Many	Many	Many	Many
Are other indices available for the same geographic range?	Few	Few	Few	Few	Few	Few
Does the index standardization account for Known factors that influence catchability/selectivity? (eg. Type of hook, bait type, depth etc.)	Yes	Yes	No	Yes	Yes	Yes
Estimated annual CV of the CPUE series	Variable	Low	Variable	Low	Variable	Low
Annual variation in the estimated CPUE exceeds biological plausibility	Unlikely		Unlikely	Unlikely	Unlikely	Unlikely
Is data adequate for standardization purposes	Yes	Yes	Yes	Yes	Yes	Yes
Is this standardised CPUE time series continuous?	Yes	Yes	No	Yes	Yes	Yes
For fisheries independent surveys: what is the survey type?						
For 19: Is the survey design clearly described?						
)mments	low coverage in recent years	use up to 2011	no observation for 2021-2022 due to Covid-19, use from 2012 onwards. Use only 2012-2020	For 18&19, observer data is available but not standardized because of the low reported catch rate.		

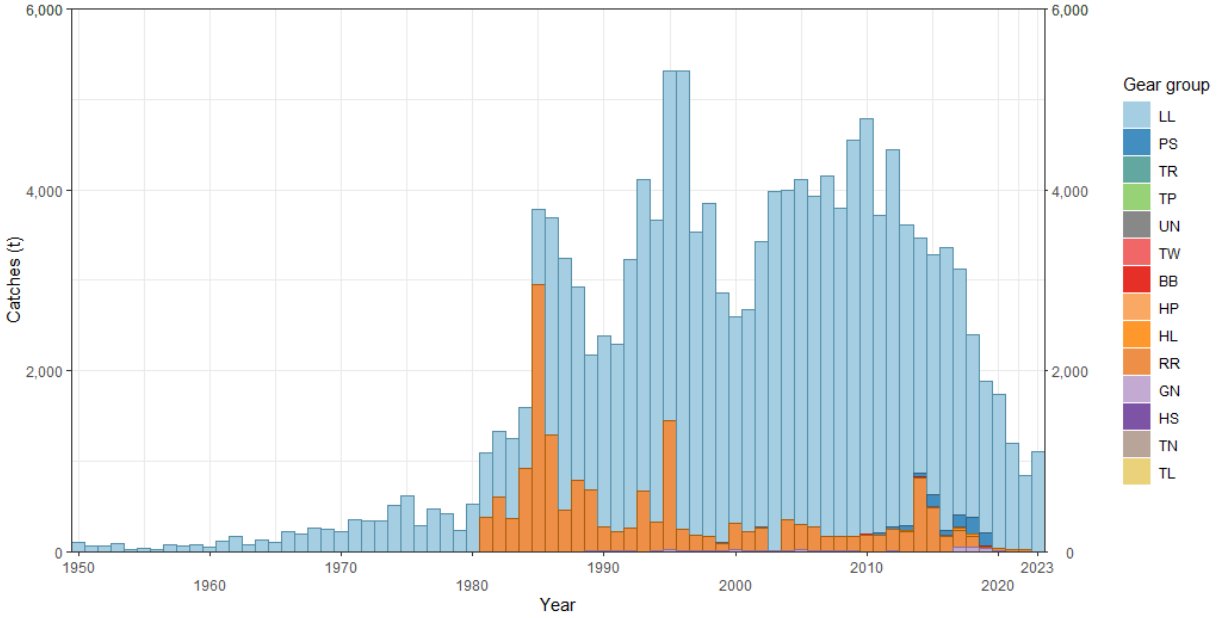

Figure 1. Task 1 Nominal catches of shortfin mako (SMA, *Isurus oxyrinchus*) in the northern stock (SMA-N) in t by gear group.

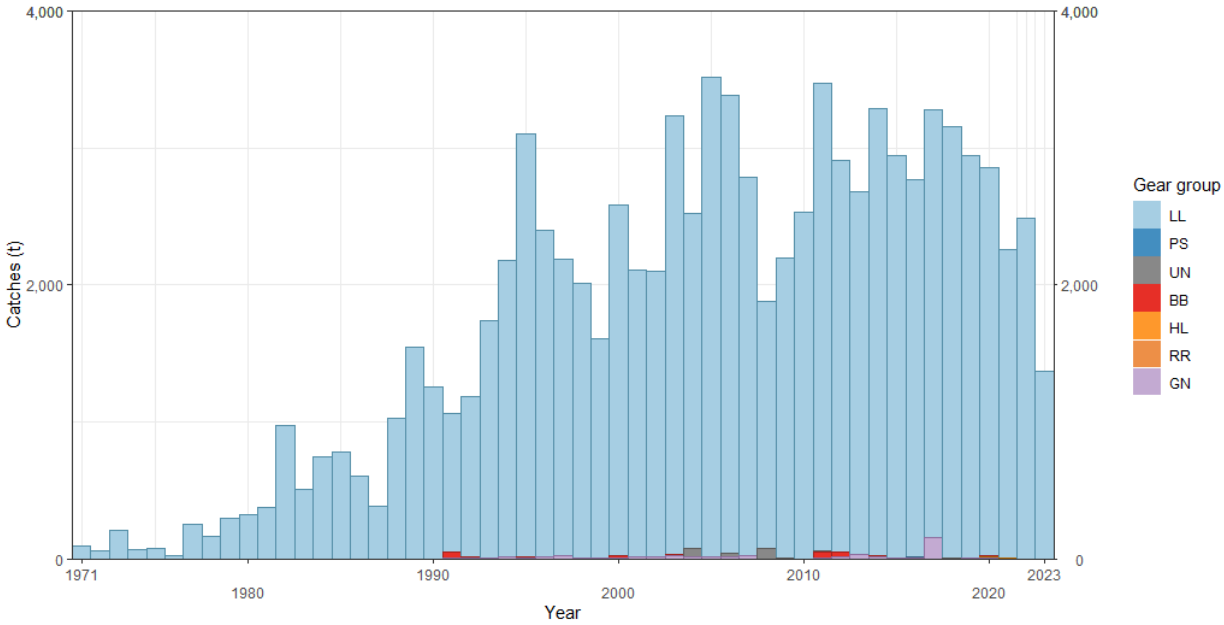

Figure 2. Task 1 Nominal catches of Shortfin Mako (SMA, *Isurus oxyrinchus*) in the southern stock (SMA-S) in t by gear group.

Appendix 1

Agenda

1. Opening, adoption of agenda and meeting arrangements

2. Review of life history information

3. Review of fishery statistics/indicators

    a) Task 1 (catches) data and spatial distribution of catches, including landings, dead discards and live releases. Make estimations to fill the gaps as necessary
    b) Task 2 catch/effort
    c) Task 2 size data
    d) Tagging data

4. Review of available indices of abundance

5. Discussion on assessment models to be developed, their assumptions, and input data

    a) Biological parameters
    b) Size data by sex and region
    c) Fleet structure
    d) Other relevant data
    e) Production models
    f) Integrated analysis models
    g) Discussion on base cases, model ensembles and sensitivity analysis
    h) Discussion on model validation and diagnostics to prepare
    i) Plan for intersessional work related to the stock assessment

6. Shark Research and Data Collection Programme (SRDCP)

7. Recommendations

8. Responses to the Commission

9. Other matters

10. Adoption of the report and closure

Appendix 2

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Appendix 3

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DocRef	*Title*	*Authors*
SCRS/2025/002	Shortfin mako shark data preparatory meeting	ICCAT
SCRS/2025/023	Revision of the shortfin mako shark size distribution in the Atlantic	Coelho R., Arocha, F., Baez, J.C., Baibbat, S.A., Cardoso, L.G., Carlson, J., Courtney, D., Da Silva, C., Domingo, A., Forselledo, R., Bowlby, H., Kerwath, S., Kuo, T-C., Lino, P.G., Liu, K-M., Macias, D., Mariela, N.R., Mas, F., Mikihiko, K., Moreno, J., Mourato, B., Ramírez, K., Rosa, D., Rueda, L., Sabarros, P., Salmerón, P., Santos, C.C., Santos, M.N., Yasuko, S., Zhang, X.
SCRS/2025/024	Updated methods and estimation of shortfin mako shark discards from the Portuguese pelagic longline fleet in the Atlantic Ocean	Coelho, R., Rosa D., Lino P.
SCRS/2025/025	Standardized CPUE of the shortfin mako shark captured in the Portuguese pelagic longline fishery in the North Atlantic, with data up until 2023	Coelho R., Lino P.
SCRS/2025/026	Standardized catch rates of the Atlantic stocks of shortfin mako (*Isurus oxyrinchus*) inferred from Spanish surface longline fishery targeting swordfish during the 1990-2023 period	Ramos-Cartelle, A., García-Cortés, B., Fernández-Costa, J.
SCRS/2025/027	Data-mining of shortfin mako shark (*Isurus oxyrinchus*) lengths of North and South Atlantic stocks from the Spanish surface longline fleet from the period 1993-2023	Fernández-Costa, J., Pérez-Casal, P., Ramos-Cartelle, A.
SCRS/2025/028	An incidental catch model for shortfin mako assessment and status evaluation	Bowlby, H., Cortés, E., Semba, Y.
SCRS/P/2025/010	Relationship between vertebral band pairs deposition and age in shortfin mako sharks	Ramos-Cartelle, A., Carroceda, A., Fernández-Costa, J.
SCRS/2025/030	Update of standardized CPUE of shortfin mako (*Isurus oxyrinchus*) caught by Japanese tuna longline fishery in the Atlantic Ocean through 2023	Semba, Y., Kai, M.
SCRS/2025/031	Updated size, standardized CPUE and catch estimates of the shortfin mako shark caught by the Chinese Taipei longline fishery in the Atlantic Ocean	Kuo, T-C., Liu, K-M., Su, K-Y.
SCRS/2025/033	Standardized catch rates of mako sharks in the western North Atlantic Ocean from the U.S. pelagic longline observer program 1992-2023	Zhang, X., Courtenay, D., Carlson, J.

SCRS/2025/034	Post-release mortality of shortfin mako in the Atlantic Ocean using satellite telemetry	Domingo, A., Baez, J-C., Bowlby, H., Cardoso, L.G., Carlson, J., Coelho, R., Cortés, E., Da Silva, C., Forselledo, R., Kerwath, S., Macías, D., Miller, P., Natanson, L., Ortiz de Urbina, J., Rosa, D., Santos, C.C., Travassos, P., Mas, F.
SCRS/2025/035	Exploratory analysis of shortfin mako (*Isurus oxyrinchus*) catches in the Spanish Mediterranean waters	Rueda, L., Báez, J-C, García-Barcelona, S., Moreno, J., Borrego-Santos, R., Macías, D.
SCRS/2025/036	Standardised CPUE indices of abundance for pelagic sharks, mako shark (*Isurus oxyrinchus*) and blue shark (*Prionace glauca*), off South Africa	Yemane, D., Da Silva, C., Kerwath, S.
SCRS/2025/037	A preliminary literature database review of post-release live-discard mortality rate estimates for mako sharks	Hilton, A., Courteney, D.
SCRS/2025/038	CPUE standardization for shortfin mako (*Isurus oxyrinchus*) in the southwestern Atlantic based on Brazilian and Uruguayan longline fishery data (1978–2022)	Cardoso, L.G., Kikuchi, E., dos S. Rodrigues, L., Freire, M.A., Mourato, B., Forselledo, R.R, Mas, F., Jiménez, S., Domingo, A., Sant'Ana, R.
SCRS/2025/039	Spatio-temporal distribution of shortfin mako (*Isurus oxyrinchus*) in the catch from Venezuelan pelagic longline fleet in the Caribbean Sea and adjacent waters: period 2004-2023	Narváez, M., Marín, H., Evaristo, E., Gutiérrez, X., Arocha, F.
SCRS/2025/040	Preliminary results on the age and growth of the shortfin mako shark (*Isurus oxyrinchus*) in the South Atlantic Ocean	Marquez, R., Santos, C., Semba, Y., Rosa, D., Jagger, C., Forselledo, R., Mas, F., Domingo, A., Sant'Ana, R., Coelho, R., Gustavo Cardoso, L.
SCRS/P/2025/011	Reproductive biology and population structure of the shortfin mako shark (*Isurus oxyrinchus*) in the southwestern Atlantic Ocean	Cabanillas Torpoco, M., Márquez, R., Oddone, M.C., Cardoso, L.G.
SCRS/2025/041	Conservation status of basking shark *Cetorhinus maximus* and white shark *Carcharodon carcharias* in the ICCAT area	Ellis, J., Bowlby, H., Coelho, R., da Silva, C., Domingo, A., Forselledo, R., Reeves, S., Taylor, N.G.
SCRS/2025/042	Standardized catch per unit effort (CPUE) of shortfin mako (*Isurus oxyrinchus*) caught by the Moroccan longline fleet operating in the Atlantic waters	Serghini, M., Baibbat, S.A., Bensbai, J., Abid, N., Ikkis, A.
SCRS/2025/045	Size, maturity, length-length and length-weight relationships of shortfin mako, *Isurus oxyrinchus*, from the southwestern Atlantic Ocean	Albornoz, P., Mas, F., Forselledo, R., Jiménez, S., Domingo, A.
SCRS/P/2025/012	Summary of available shortfin mako statistical data	ICCAT Secretariat
SCRS/2025/046	Updated growth parameters using mark-recapture data from the NOAA fisheries cooperative shark tagging program	McCandless, C., Passerotti, M.

SCRS/2025/047	Life history of shortfin mako (*Isurus oxyrinchus*) in the northwest Atlantic Ocean	Carlson, J., Passerotti, M., Natanson, L.
SCRS/P/2025/013	Tagging summary for shortfin mako (SMA)	ICCAT Secretariat
SCRS/P/2025/014	North Atlantic shortfin mako stock synthesis model development	Courtney, D., Rice, J., Zhang X.
SCRS/2025/048	Shortfin mako (*Isurus oxyrinchus*) catch and effort caught by the Venezuelan artisanal gillnet off la Guaira: Period 2010-2022	Narvaez, M., Marín, H., Evaristo, E., Gutiérrez, X., Arocha, F.

Appendix 4

SCRS Documents and Presentation Abstracts as provided by the authors

SCRS/2025/023 - As part of the ongoing and cooperative Shark Research and Data Collection Program (SRDCP), carried out by the ICCAT Sharks Working Group, information on the size distribution of shortfin mako shark was collected and analyzed. The data came mostly from fishery observers and scientific projects conducted by several fishing nations in the Atlantic that collaborate in such programmes. Most datasets included information on geographic location, size and sex of the specimens. A total of 81,556 shortfin mako records collected between 1992 and 2023 were compiled, with the sizes ranging from 35 to 448 cm FL (fork length). Considerable variability was observed in the size distribution by fleets, areas and seasons, with larger sizes tending to occur in equatorial and tropical regions and smaller specimens in higher latitudes. The Gulf of Mexico seemed to be a particular area with mostly larger specimens, while the temperate North Atlantic had mostly smaller specimens. Most fleets showed unimodal distributions in the size distribution. The distributional patterns presented provide a better understanding of the size distribution of shortfin mako in the Atlantic, and can be considered for the 2025 ICCAT SMA stock assessment.

SCRS/2025/024 - This document updates information to address the ICCAT Commission request for estimation of discards of shortfin mako shark (*Isurus oxyrinchus*) for the North and South Atlantic (ICCAT Recs. 21-09 and 22-11). A preliminary method was presented previously for the North Atlantic, and this paper now presents a method for the South Atlantic and provides a proposal to update the method for the North Atlantic, to maintain consistency in the estimation methods between stocks. The method is based on observer data CPUEs and discard rates by area and quarter, which are then raised to total estimated discards using the Portuguese pelagic longline total fleet effort, by year, date and location. The estimations include total discards, split into dead discards and live releases. In this paper we provide new and updated estimations for the years 2012-2023. Updates of the discards will be regularly provided on a yearly basis in the future.

SCRS/2025/025 - This document updates the standardized CPUE for the shortfin mako shark captured by the Portuguese pelagic longline fishery in the North Atlantic. The analysis was based on data collected from fishery observers, port sampling and skippers logbooks (self sampling), between 1999 and 2023. The updated CPUEs were standardized with Tweedie GLMs and in general there was a large variability, with the standardized series following in general the nominal series. The final standardized series shows a general increase until 2010 with a peak in 2008, followed by a general decrease until 2021, and then an increase for the more recent years. The data presented in this document can be considered for use in the upcoming 2025 shortfin mako stock assessment, specifically the standardized CPUE for the North Atlantic.

SCRS/2025/026 - Standardized catch rates in number and weight per unit of effort were obtained for the North and South Atlantic shortfin mako stocks using Generalized Linear Models. A total of 17,613 trips (nominal effort 538.4 million hooks) for the North stock and 7,665 trips (nominal effort 316.7 million hooks) for the South stock were available in the analysis between 1991 and 2023. The base case models explained the 33% and 49% of the CPUE variability in number of fish for the North and South Atlantic stock, respectively. The CPUE variability can be mainly attributed to the area factor. The results in number of fish showed a stable slightly increasing trend until 2018, with large fluctuations in the last years after the implementation of the recommendations, probably due to the small amount of data for those years. The results do not show signs of stock depletions during the period analyzed. In general terms, the models suggest overall stable CPUE trend in the North and South stocks.

SCRS/2025/027 - This paper summarizes the length data of the shortfin mako shark (*Isurus oxyrinchus*) carried out between 1993 and 2023 for the North and South Atlantic stocks. The data-mining was carried out through an intense compilation of records from samples on board commercial trips, experimental and tagging surveys as well as through sampling during landings.

SCRS/2025/028 - The prohibition on landings of shortfin mako shark in the North Atlantic (Rec 21-09) is expected to affect the standardization of recent CPUE data used to develop abundance indices for assessment, potentially rendering the time series unusable. Associated biological data collection (e.g. length, sex) has also been sparce in recent years. An Incidental Catch Model (ICM) developed for porbeagle was deemed appropriate for assessment when length-frequency data and CPUE series were not available or

reliable to index changes in abundance. The Incidental Catch Model (ICM) is based on the same general premise as data-poor, length-based assessments, in that it uses life history information and equilibrium assumptions to derive a theoretical age-structured population in the absence of fishing. Using backwards projections, the effect of historical fishing pressure on productivity is taken into account prior to projecting forwards to evaluate fishery removals and abundance relative to reference points. The ICM was fit to data on shortfin mako shark in the North Atlantic to provide a preliminary evaluation of overfished status in advance of more comprehensive modeling

SCRS/2025/030 - Standarized CPUE of shortfin mako (*Isurus oxyrinchus*) caught by Japanese tuna longline fishery in the Atlantic Ocean was updated based on observer data collected through 2023. Due to the regulations on this species, the catch numbers in logbook data sharply decreased since around 2017 in the Atlantic. Therefore, it was unreasonable to update the abundance index based on logbook data. We used observer data after 2008 (for the North stock) and after 2012 (for the South stock) because the observed set was skewed to either fishing ground for bluefin tuna (in North) /southern bluefin tuna (in South) or tropical tunas in earlier period. For the standardization, we applied GLM assuming zero-inflated negative binomial model because of high zero catch ratio (>80% of total sets). The estimated annual abundance index for the North stock largely fluctuated between 2008 and 2012 followed by an increase until 2016 and decrease until 2020. It showed an increasing trend between 2022 and 2023. For the South stock, the index showed a decreasing trend between 2012 and 2014 followed by an increase in 2015 and then it gradually decreased until 2020.

SCRS/2025/031 - In the present study, the shortfin mako shark catch and effort data from the logbook records of the Chinese Taipei longline fishing vessels operating in the North and South Atlantic Ocean from 2007-2024 were analyzed. Due to large percentage of zero shortfin mako shark catch, the catch per unit effort (CPUE) of shortfin mako shark, as number of fish caught per 1,000 hooks, was standardized using a zero inflated negative binomial model. The standardized CPUE for the North Atlantic shortfin mako shark from 2007 to 2017 showed fluctuations, while in the South Atlantic from 2007 to 2024, it exhibited three peaks. Estimated shortfin mako shark catch in weight ranged from 2-89 metric tons (MT) in North Atlantic and 29-280 MT in South Atlantic. In recent years the overall trend has been increasing from 2022 to 2024.

SCRS/2025/033 - An updated index of abundance was developed for mako sharks (*Isurus* spp.) from the U.S. pelagic longline fishery observer program (1992-2023). The index was calculated using a two-step delta-lognormal approach that treats the proportion of positive sets and the CPUE of positive catches separately. Observations affected by fishing regulations (time-area closures or bait restrictions) were excluded from the analysis. The standardized index, reported with 95% confidence intervals, showed a concave pattern from the early 1990s to 2011, followed by a declining trend to 2020, except for 2 anomalously high values in 2016 and 2017. From 2020 to 2023, the index showed a subsequent increase.

SCRS/2025/034 - This paper presents data from 128 tags used to determine the post-release mortality (PRM) of the shortfin mako (*Isurus oxyrinchus*). The tags include 14 sPATs, 21 Mk10-PATs, and 63 miniPATs from Wildlife Computers; 16 PSATLIFE tags from Lotek Wireless; and 14 X-Tags from Microwave Telemetry. Sharks were tagged during multiple research and commercial fishing trips aboard pelagic longliners in different areas of the Atlantic Ocean. To maximize tag comparability for the PRM analysis, we set the mortality threshold at 28 days. The overall PRM rate for shortfin mako sharks caught by pelagic longliners was 28%. Operational factors, such as in-water or onboard tagging and hook removal, may play a critical role in improving post-release survival rates.

SCRS/2025/035 - This paper analyses information on catches of shortfin mako collected from the IEO Observer Programme from the longline fleet operating in the Spanish Mediterranean waters from 2000 to 2023. The number of individuals by-caught has been decreasing during the last years of the series. Shortfin mako by-catch occurs thorough the western Mediterranean Spanish coast with spatial differences in the CPUEs observed. CPUEs and sizes of the individuals by-caught vary with the different gears used.

SCRS/2025/036 - This report provides preliminary results for standardized Catch per Unit Effort indices based on catches of the large pelagic longline fishery to track abundance of two pelagic shark stocks off South Africa: blue shark (*Prionace glauca*) and mako sharks (*Isurus oxyrinchus*). Given the spatio-temporal nature of the data, the standardized index of abundance was generated based on a model that takes advantage of this information to learn about the long-term trend in the abundance of modelled stock, accounting both for catchability and abundance covariates. Data from both indicator vessels (former shark

longline vessels that continue to catch a significant proportion of sharks) and from the entire large pelagic longline fleet were considered. This fleet targets multiple tuna species, thus, to account for changes in targeting, a multivariate index of species composition of the catch was included in the model. A spatio-temporal Generalized Linear Mixed Effect Model (GLMM) was applied, accounting both for catchability and abundance covariates. Multiple models were fitted of which the best model was selected based on information theoretical approach using the AIC. The standardized indices of abundance for both mako and blue sharks were then calculated from the best model.

SCRS/2025/037 - This working paper summarizes a literature database review of post-release live-discard mortality (PRLDM) rates for mako sharks. The literature database was updated from an existing U.S. domestic shark stock assessment literature database and then reviewed for estimates of delayed discard-mortality rates (MD) and immediate (i.e. at-vessel or acute) discard-mortality rates (MA) for the shortfin mako shark (*Isurus oxyrinchus*) and longfin mako shark (*Isurus paucus*). The literature review is preliminary. A more in-depth review would be required to evaluate each immediate and delayed discard-mortality rate identified from the literature for its utility in stock assessment.

SCRS/2025/038 - Catch and effort data from Brazilian and Uruguayan tuna longline fishery distributed along a wide area in the Southwestern Atlantic Ocean from 1978 to 2022 were analyzed. The CPUE of the southern shortfin mako was standardized by a GLM using a Delta Lognormal approach. The factors used in the models were: year, quarter, flag, vessel, hooks per floats, hooks, and the lat-long reference for each five by 5 degrees square. After the data cleaning, an index was estimated for the period between 1978 to 2022. The estimated delta-lognormal index revealed a relatively stable pattern with moderate fluctuations from 1978 to 2018, without a clear long-term trend. A notable peak was observed in 1995, followed by a period of stability until the mid-2010s, when a declining phase occurred between 2013 and 2016. From 2017 onwards, the index showed a gradual recovery, culminating in a sharp increase between 2020 and 2022, reaching the highest values in the entire series. This pattern suggests possible changes in SMA availability, increased variability in catch rates, or modifications in fleet behavior and data reporting in the most recent years.

SCRS/2025/039 - Shortfin mako is a bycatch species in the Venezuelan pelagic longline fleet that operates in the Caribbean and adjacent Atlantic Ocean. Although it represents a low percentage in the total catches of this fleet (less than 6%), it plays a significant role in marine ecosystems. The analysis integrates data from logbooks for a period of 20 years, covering multiple fishing zones in the Caribbean Sea and nearby waters of the Atlantic. Information is also presented in maps in 1º x 1º to analyze possible changes in patterns during the period 2004-2023. Fishing effort of the fleet has increased over the years and is usually higher in the first trimester. Catch and CPUE have decreased for the last years of the time series but the spatial distribution of the effort has not declined. Results indicate notable variations in effort, catch, and CPUE across different regions and time periods, in terms of years and trimesters.

SCRS/2025/040 - Age determination and growth studies are essential information for assessing fish stock dynamics. Samples of 751 individuals of shortfin mako shark, *Isurus oxyrinchus*, were obtained from catches of the Portuguese, Japanese, Namibian, Brazilian and Uruguayan fleets, operating in the South Atlantic Ocean between 2012 and 2023. Sampling included vertebrae extraction, fork length measurements, and sex determination. Growth parameters were estimated for a subsample of 321 analyzed vertebrae, using a frequentist 3-parameter approach considering two band-pair formation until the age of five (2BP) and one band-pair for older ages. The AIC test indicated that the von Bertalanffy model fit the data better than the Gompertz and Logistic models for pooled sexes and females, but the Gompertz model was the more suited for males. The estimated growth parameters using both back calculated and observed fork lengths (FL) by age for pooled sexes were L8 = 310.66 cm FL, k = 0.156, and L0 = 64.51 cm FL, for males were L8 = 251.15 cm FL, k = 0.35, and L0 = 66.49 cm FL and for females L8 = 320.63 cm FL, k = 0.145, and L0 = 65.04 cm FL. These findings will support the ICCAT Commission – Shark Species Group and Shark Research and Data Collection Program (SRDCP) in their stock assessment scheduled for 2025.

SCRS/2025/041 - Basking shark *Cetorhinus maximus* and white shark *Carcharodon carcharias* are both species of low productivity. Whilst life-history data are limited for both species are limited, published estimated rates of population growth are low (r = 0.1346 year–1for basking shark, and 0.026 to 0.074 year–1for white shark). Both species are of conservation concern, being listed on CITES (Appendix II) and CMS (Appendices I and II). Their population sizes in the ICCAT Area are unknown, and catch data are incomplete. Both species will have some interaction with ICCAT fisheries. Available evidence indicates that both species

would meet the definition of being "a taxon of the greatest biological vulnerability and conservation concern for which there are very few data". A prohibition on the retention of both species would align ICCAT Recommendations with the requirements their CMS Appendix I listings.

SCRS/2025/042 - In Morocco, shortfin mako shark (*Isurus oxyrinchus*) is caught as bycatch by the large longliners (>20m) targeting swordfish (*Xiphias gladius*) in the southern Atlantic waters. To assess trends in its abundance, we developed and updated a standardized catch per unit effort (CPUE) for this species. This process began with the identification of fishing tactics using a multi-table method, followed by estimating the duration of individual fishing trips based on commercial fishing, and scientific survey data. Two statistical models were applied, including Boosted Regression Trees model (BRT) with main effects and two-way interactions. BRT with two-way interactions was selected as the best model to estimate CPUE due to its lower RMSE (Root Mean Squared Error) and higher Percentage Deviance Explained (PDE). The standardized CPUE remained relatively stable from 2010 to 2016, followed by a gradual increasing trend peaking in 2019. However, a sharp decline was observed in 2020-2021, reaching the lowest recorded values. The comparative analysis suggests that nominal CPUE may have overestimated actual stock abundance, especially before 2019.

SCRS/2025/045 - This document presents size distribution of the shortfin mako, *Isurus oxyrinchus*, from the southwestern Atlantic Ocean, male size at maturity, and length-length and length-weight relationships. All data analyzed was gathered by the Uruguayan National observer Program and onboard the R/V Aldebarán form DINARA. Male size at maturity based on maturity ogives and clasper-fork length relationships rendered consistent results with a median size at maturity (LMat50%) of 178.6cm FL and a full size at maturity (LMat100%) of 183 cm FL. Median size at maturity estimates were smaller than those reported for the North Atlantic, as it has also been reported to be the case in females, but consistent with what has been reported by other authors for the southwestern Atlantic.

SCRS/2025/046 - Growth parameter estimates for the northwest Atlantic population of shortfin mako (*Isurus oxyrinchus*) were updated from previous studies with mark-recapture data collected from 2006-2024. Growth rates from five models were developed from tag-recaptured individuals. The Gulland & Holt (1959), Fabens (1965), and Francis (1988) models using mark-recapture data produced biologically unrealistic results. The Bayesian versions of the Fabens (1965) and Francis (1988) models produced more biologically realistic results than the same models without the Bayesian methods. The von Bertalanffy growth parameters (sexes combined) derived from the Bayesian Fabens and the Bayesian Francis models produced similar results estimating an L8 = 364.8-365.1 cm FL, K= 0.13-0.16 yr-1. These estimates fall within the range of previously published estimates for this population. Four variance functions were examined for the Bayesian Francis model, including a constant variance structure that is the homoscedastic case equivalent to the Bayesian Fabens model. Parameter estimates were not significantly different between variance functions, although the resulting WAIC values suggest the model using proportional variance with respect to change over time provided the best fit: L8 = 364.9 cm FL, K= 0.16 yr-1.

SCRS/2025/047 - To inform the upcoming stock assessment, we conducted a review of all available information and updated, as necessary, the age, growth and maturity of the northwest population of shortfin mako in the Northwest Atlantic Ocean since 2017. There is no new information on age and growth using vertebral analysis. Maturity ogives were generated using available vertebral ages and paired maturity data for n=128 individuals (61 males, 67 females) for comparison to previously generated length-based ogives. The median size and age at maturity estimates from the new data were 178.5 cm FL and 6.7 years for males and 274.1cm FL and 19.7 years for females. Overall, updated length- and age-based maturity estimates for shortfin mako were in agreement with previously published estimates for this population.

SCRS/2025/048 - The artisanal gillnet fishery off La Guaira operates in a world recognized billfish hotspot. It has been operating for several decades and targes billfishes. There are several species caught as bycatch in this fishery, among them is shortfin mako shark (*Isurus oxyrinchus*). Previous reports of this fishery for shortfin mako shark were presented until 2014. This document aims to update catch and effort data from 2015 to 2023.

SCRS/P/2025/010 - The presentation SCRS_P_2025_010 provides a comprehensive summary of the available literature regarding the relationship between the vertebral band pair deposition ratio and the age of shortfin mako sharks. It highlights the challenges of validating the vertebral band pair deposition ratio throughout the lifespan of these sharks. According to Kinney *et al.* (2016), from a time at or near sexual maturity, males *Isurus oxyrinchus*in the north-east Pacific Ocean exhibit a band-pair deposition rate of one band pair per year, while deposition rates for juveniles in the area have been validated at two band pairs per year. However, since males and females of shortfin mako sharks mature at different lengths, Kinney *et al.*'s methodology requires further testing on females. The growth rates of female shortfin mako sharks in the North Atlantic Ocean stock, as published under the vertebral banding hypothesis, are compared with those inferred from other growth methodologies, such as tag-recapture and monthly length modes, and the growth rate of a recaptured female after 13.5 years at liberty. It is noted that the projected growth curves derived from the interpretation of vertebral band pairs using the one annual band pair criterion are approximately half of the ratios obtained through other methods. The proposed growth curve for females based on tag-recapture data, according to Mejuto *et al.* (2021) (L_{INF}=350 cm SFL, k=0.124, and L_O=63 cm SFL), is considered the most plausible.

SCRS/P/2025/011 - No summary provided by authors.

SCRS/P/2025/012 - SCRS_P_2025_012 summarizes all available statistical information in ICCAT-DB for the Working Group on Sharks. It includes the Task 1 and Task 2 datasets on sharks, with a particular focus on SMA, as well as the tools provided for easy visualization of this information, updated as of March 10, 2025. Additionally, it highlights the key issues requiring the group's attention to facilitate decision-making.

SCRS/P/2025/013 - summarizes all available statistical tagging information in ICCAT-DB for the Working Group on sharks. It includes the conventional and electronic tagging datasets on shortfin mako (SMA), as well as the tools provided for easy visualization of this information, updated as of March 10, 2025.

SCRS/P/2025/014 - A review of the 2017 North Atlantic mako shark Stock Synthesis model with an emphasis on identifying major uncertainties within the last ICCAT mako shark stock assessment.