REPORT OF THE INTERSESSIONAL MEETING OF THE BILLFISHES SPECIES GROUP *(Online, 8 - 12 March 2021)*

"The results, conclusions and recommendations contained in this Report only reflect the view of the Billfish Species Group. Therefore, these should be considered preliminary until the SCRS adopts them at its annual Plenary meeting and the Commission revise 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

The meeting was held online due to the current pandemic situation. Dr. Fambaye Ngom Sow (Senegal), the Billfish Species Group ("the Group") rapporteur and the Chair of the meeting, opened the meeting and welcomed participants. Mr. Camile JP Manel (ICCAT Executive Secretary) welcomed the participants and thanked the efforts made by all participants to remotely attend the meeting. He also thanked Dr. F Arocha, P. Kebe and A. Gentile for attending the meeting as invited experts and providing his expertise to the Group.

The Secretariat provided information on how to use the online platform for the meeting (Microsoft Teams). The Chair reviewed the Agenda, which was adopted with a few changes (**Appendix 1**).

The List of Participants is included in **Appendix 2**. The List of Documents and Presentations provided to the meeting is attached as **Appendix 3**. The abstracts of all SCRS documents and presentations provided at the meeting are included in **Appendix 4**. The following served as rapporteurs:

Sections	*Rapporteur*
Items 1, 9	M. Ortiz
Item 2	C. Palma, C. Mayor, J. Garcia
Item 3	M. Schirripa, K. Gillespie
Item 4	K. Ramirez, F. Sow, D. Rosa, C. Brown
Item 5	F. Arocha, P. Kebe, M. Ortiz
Item 6	R. Coelho, M. Neves dos Santos
Item 7	R. Coelho, M. Ortiz
Item 8	G. Gulland

2. Review of Task 1, Task 2 and tagging information available on billfish species

The ICCAT Secretariat presented to the Group the most up-to-date statistical and biological information on billfishes. This includes the Task 1 nominal catches (T1NC), the Task 2 catch and effort (T2CE), the Task 2 size frequencies (T2SZ), the conventional tagging and the derived estimations made by the Secretariat known as CATDIS (overall catch distributions of T1NC by trimester and in a 5x5 spatial grid). For billfish species, derived estimations of catch-at-size matrices (T2CS: estimated by CPCs on a yearly basis; CAS: overall matrices of all flag estimated by the Secretariat using available T2CS series) also known as size composition of the catches in number (equivalent to the T1NC in weight) are not mandatory for billfish species and were only sporadically estimated by a few CPCs.

According to the SCRS, the billfish species are categorized in two groups:

a) Major billfishes: blue marlin (BUM: *Makaira nigricans*), white marlin (WHM: *Kajikia albida*), sailfish (SAI: *Istiophorus albicans*) and spearfish (SPF: *Tetrapturus pfluegeri*);

b) Other billfishes: black marlin (BLM: *Makaira indica*), Mediterranean spearfish (MSP: *Tetrapturus belone*), roundscale spearfish (RSP: *Tetrapturus georgii*), stripped marlin (MLS: *Tetrapturus audax*), shortbill spearfish (SSP: *Tetrapturus angustirostris*), and billfishes unclassified (BIL: Istiophoridae).

This section of the report reviews the available statistics for all those species.

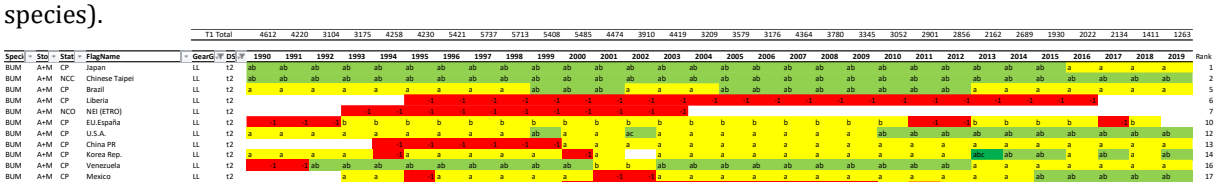
Task 1 nominal catches (T1NC)

The most complete SCRS estimates of the yearly catches (T1NC) of billfish species are presented in **Table 1**. As requested by the Group, those catches (landings and dead discards) by species, stock and year, were also separated in two main regions, Atlantic (AT) and Mediterranean Sea (MD), to show the level of reporting in the Mediterranean Sea of some species. **Figure 1** shows the accumulated catches by species and year. For the last two decades three species (BUM, SAI and WHM) represent more than 95% of the total catches of billfish species. The Group observed that the Mediterranean Sea catches of some billfish species are incomplete due to the lack of reporting to ICCAT. The Group reiterated that, reporting those billfish Mediterranean Sea catches (co-target or by-catch activity) to ICCAT are also mandatory. Efforts should be made by the CPCs fishing in the Mediterranean Sea to recover the historical catch series of billfish species, at least for the last decades. The existing domestic observer programmes now in place for bluefin, swordfish and albacore in de Mediterranean, could be a source of information to infer those annual billfish catch estimates.

The dead discards of the major billfish species still highly incomplete (**Table 2**) representing on average less than 2% of the total catches reported. Only a few ICCAT CPCs have reported dead discards estimates for the last decade. The live releases estimates reported are also poorly represented (**Table 3**) in the ICCAT statistics of billfishes. Only a few CPCs have reported these estimates. Depending on the gear, the associated post-release mortality of some billfish species released alive tend to be considerably high for juveniles. The Group reiterated the importance of reporting consistently both dead and alive discards of billfish species to ICCAT.

Task 2 catch & effort (T2CE)

The T2CE detailed catalogue (metadata on catch-and-effort datasets) having billfish species reported on the species catch composition, indicate that many of the existing series are lacking some billfish species (both landed and discarded) in their catch composition. A summarised version of the T2CE detailed catalogue can be queried (example shown below for BUM and major longline fleets, using filter: DSet=t2, where all T2CE datasets are bookmarked as "a") per species and stock. At the SCRS request, these catalogues were published for the first time in 2020 on the ICCAT website (SCRS catalogues on major tuna and tuna-like species).



Speci	Sto	Stat	FlagName	GearG	DS	T1 Total	4612	4220	3104	3175	4258	4230	5421	5737	5713	5408	5485	4474	3910	4419	3209	3579	3176	4364	3780	3345	3052	2901	2856	2162	2689	1930	2022	2134	1411	1263	Rank
BUM	A+M	CP	Japan	LL	t2		1990	1991	1992	1993	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	
BUM	A+M	NCC	Chinese Taipei	LL	t2		ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	2
BUM	A+M	CP	Brazil	LL	t2		a	a	a	a	a	a	a	a	a	ab	ab	ab	a	a	a	ab	ab	ab	ab	ab	ab	ab	a	a	a	a	a	a	a		5
BUM	A+M	CP	Liberia	LL	t2							-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1			6
BUM	A+M	NCO	NEI (ETRO)	LL	t2					-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1																	7
BUM	A+M	CP	EU.España	LL	t2		-1	-1	-1	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	-1	-1	b	b	b	b	-1	b		10
BUM	A+M	CP	U.S.A.	LL	t2		a	a	a	a	a	a	a	a	a	ab	a	a	ac	a	a	a	a	a	a	a	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	12
BUM	A+M	CP	China PR	LL	t2						-1	-1	-1	-1	-1	-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	13
BUM	A+M	CP	Korea Rep.	LL	t2		a	a	a	a		-1	a	a	a	a	a	a		a	a	a	a	a	a	a	a	a	a	abc	ab	ab	a	ab	a	ab	14
BUM	A+M	CP	Venezuela	LL	t2		-1	-1	ab	ab	ab	ab	ab	ab	ab	ab	ab	b	b	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	a	a	a	a	a	a	a	16
BUM	A+M	CP	Mexico	LL	t2					a	a		-1	a	a	a	a	a	-1	-1	a	a	a	a	a	a	a	a	a	a	a	a	ab	ab	ab	ab	ab	17

This trend (not equal for all billfish species) can be observed looking at the overall scores of BUM, WHM, SAI, and SPF in the SCRS scorecard (**Figure 2**). For example, for BUM the score decreases when looking at the last 30 years, last 20 years, and last 10 years (4.08, 3.90 and 3.67, respectively) indicating that the overall Task 2 datasets coverage (of T1NC) decreased globally from about 40% looking at the last 30 years, to 37% while considering only the last decade. Only scores above 5 (Task 2 datasets coverage across all fleets of about 50% or more) can be considered to have sufficient T2CE and T2SZ information and therefore be used as an indicator to evaluate the adoption of more complex stock assessment models.

In addition, as observed in the past, the T2CE metadata also show the absence or high heterogeneity of effort measures reported by gear (**Table 4**) for the last three decades and major billfish species. For T2CE, various datasets presented in **Table 5** require a revision by the respective CPCs, in order to be in conformity with the existing SCRS standards for T2CE.

Task 2 size samples (T2SZ)

The largest portion of billfish species size frequencies (T2SZ) are associated to BUM, WHM and SAI. The T2SZ/CS detailed catalogues with metadata on billfish species, presented by the Secretariat to the Group, are also available on the ICCAT website (SCRS detailed catalogues on T2SZ and T2CS for all species). As for T2CE, this information is also summarised in the SCRS catalogues mentioned above for T2CE (DSet= t2, where T2SZ is identified by "b" and T2CS is identified by "c"). As seen in the past, the heterogeneity of size/weight frequencies types (**Table 6**) and the respective size/weight class bins is high in any of the billfish species.

The T2SZ datasets tagged for revision by the ICCAT CPCs (not in conformity with the existing SCRS standards) are presented in **Table 7**.

Derived estimations

The Secretariat updates every year the CATDIS (catch distribution of T1NC by trimester and 5x5 squares) for 9 of the 13 ICCAT major tunas, tuna-like and shark species. These estimations are the major source of information available to produce geographical catch distribution maps. The latest update (published on the web: datasets & Statistical bulletin Vol. 46) cover the period 1950-2018. For billfishes only BUL, WHM and SAI are covered (lacking SPF due to the limitations on the T2CE data). **Figures 3, 4**, and **5** show the overall (all years) geographical maps of the catches for BUM, WHM and SAI, respectively.

Conventional tagging

The Secretariat has presented to the Group the conventional tagging datasets for billfish species (mostly BUM, WHM, SAI), with the corresponding apparent movements (release and recovery points) shown respectively in **Figures 6**, **7** and **8**. Other types of conventional tagging maps can be found on the ICCAT website (Section 5 of Statistical bulletin Vol. 46).

The Secretariat proposed to do a conventional tagging dynamic dashboard (navigation and filtering capabilities) for billfish species, on the same line as the ones implemented for the tropical tunas (under the AOTTP programme). The time frame proposed to develop a preliminary version was September 2021. After some deliberation (affirmative responses to questions related to the similarities with the AOTTP tagging dashboard) the Group considered this an important tool and agreed with its development and time frame proposed.

3. Advances on CPUE standardization for billfishes

3.1 Review and consideration of electronic components that may have affected catchability in sport and recreational fisheries overtime

The Group was made aware of a study being conducted on the US recreational billfish tournament fishery, with a discussion of the methods being used to document and quantify some of the changes that have occurred in the USA Recreational Billfish Fishery. This study is intended to address observed conflicts between the commercial and recreational CPUE time series that are used in the various billfish stock assessments.

Commercial advertisements from a collection of historic trade magazines were examined in an effort to capture the vessel characteristics that may have contributed to an increase in catchability. The basic categories that were searched for in each issue of the magazine were: (1) navigation aids, (2) new vessel size, and (3) used and new vessel size. Observations of advertisements that represent the general conservation attitude were also noted as a means to portray any changes in the general attitude of the fishery participants, with respect to retention *versus* release of the catch. Roughly 35% of the issues of the magazines published during their history have been reviewed so far. An initial inspection of the data revealed that there were 134 ads to be related to navigation aids. Global Positioning System was the most common navigation aid ad with 43 different ads being noted. There were 827 lengths recorded from manufacturer ads for new vessels. There were 6663 lengths recorded from brokerage ads for used and new vessels offered for sale from those businesses. The Group did not express any concerns regarding the study design. This study has the goal of presenting results to the *2021 Meeting of the Working Group on Stock Assessment Methods* (WGSAM) and will be reviewed by the Group later on.

3.2 Exploration of billfish Joint CPUE analysis with fine scale operational data from longline fleets

The Group noted that joint CPUE indices have been generated for a number of ICCAT stocks (e.g. swordfish and two tropical tunas) for the past several stock assessment cycles, however this list excludes billfishes. There was discussion on whether joint indices for billfish, similar to those in other stocks, would be useful for work of the SCRS. The Secretariat clarified that this effort would require collaboration and additional data inputs from several CPCs. For example, set level longline data, which is not currently maintained by the Secretariat, would need to be provided.

The Group discussed the merits of generating these indices strictly using data from National Observer programs *versus* analyses that combine observed and non-observed effort. It was noted that observed datasets are significantly smaller and tend to have less spatial-temporal coverage, especially after undergoing national confidentiality restrictions. Despite these limitations, observer sources can provide data with less bias, particularly for species like marlins and spearfish which are often by-catch species. A number of national scientists from the Group agreed to collaborate on an evaluation of data sources, quality, and the fleet characteristics to evaluate whether it is appropriate to combine data. In some cases this will require data recovery exercises. It was noted that the Group should consider the stock boundaries and spatial patterning among billfish species and how this might affect splitting of already limited observer data into spatial zones (e.g. Gulf of Mexico, North Africa, Gulf of Guinea, etc.).

The Group then discussed responsibilities and timelines for the exercise. It was noted that other ICCAT Species Groups take a variety of approaches for generating these indices. In some cases joint indices are created by national scientists, while in others the Secretariat (e.g. swordfish) or an outside contractor (e.g. tropical tunas) were tasked with leading index creation. The Secretariat noted that data confidentiality is an important consideration when selecting the analyst(s) responsible for this task, as some CPCs may need to consider data sharing agreements. The Secretariat further clarified that timelines for creating joint indices should coincide with the Commission's stock assessment calendar and that the Group's workplan and budget requests should reflect this. A sailfish assessment is tentatively scheduled for 2022 and if a joint index is needed, the Group would need to begin work on this immediately. It was, however, noted that sailfish tend to be captured in more coastal fisheries and the data sources may be appropriate for creating joint indices for regional areas (for example Gulf of Mexico, West-south Atlantic, West Africa but not limited to) from the more common gear types but this warrants further consideration. Blue and white marlin, on the other are often caught by the more ubiquitous longline gear and are likely better candidates for this exercise. Blue and white marlin are scheduled for assessment in 2024 and 2025, respectively, and the Group agreed that work planning should begin in 2021 and 2022 with the goal of completing the indices by each species' assessment year, should the exercise be deemed appropriate.

3.3 Comparison and review of observer versus logbook CPUE indices by national fleets

No new SCRS documents were received on this topic and specially from National Observe Programs. The Chair encouraged national scientists to continue their work on CPUE index development. It was noted that the USA had previously provided analyses on the issue of observer *versus* logbook CPUE indices (Karnauskas *et al.* 2013). These analyses, based on US data, indicated that observer and logbook data may result in either similar or conflicting CPUE trends, however, the CVs for analyses based on observer data were often larger because of smaller sample sizes. The Group was cautioned that agreement in CPUE patterns between the two data sources is not always the case, as conflicting signals were noted between observer and logbook indices in the 2012 white marlin assessment. In this case, observer data was given precedence over logbooks. It was further noted that for by-catch species (such as billfish in the US fleets), observer data can often better characterize by-catch and discards. The Chair concluded the discussion by encouraging national scientists to continue considering the issue of observer *versus* logbook comparability, especially given recent Commission recommendations (e.g. Rec. 19-05) on representativeness of logbook data.

4. Review of the ongoing activities within Enhanced Programme for Billfish Research (EPBR) and new relevant scientific information on billfishes

The EPBR continued its activities in 2020, although with restrictions due to the COVID-19 pandemic situation. The Secretariat coordinates the transfer of funds, information, and data. The overall programme coordinator and eastern Atlantic coordinator during 2020 was Dr. Fambaye Ngom Sow (Senegal), whereas Ms. Karina Ramírez López (Mexico) was the coordinator for the western Atlantic. The original plan (1986) for EPBR included the following objectives: (1) to provide more detailed catch and effort statistics, particularly for size frequency data; (2) to initiate the ICCAT tagging programme for billfish; and (3) to assist in collecting data for age and growth studies. These objectives have been expanded to evaluate adult billfish habitat use, study billfish spawning patterns and billfish population genetics, as these are essential aspects to improve billfish assessments. The original plan was revised by the Group, to overcome the data gap issues, in particular artisanal fisheries of developing CPCs, taking into account the findings of these regional reviews. The previously available specific funding for EPBR has now been combined with the general research fund (ICCAT Science Envelope). Project funding is now being allotted on a more competitive basis with other Species Groups. The US Data Fund have been supporting the EPBR activities.

4.1 Age and Growth Study

In July 2020 a new contract was awarded to Centre de Recherches Océanographiques de Dakar/Thiaroye (ISRA/CRODT, Senegal) to continue the activities of the previous contract for a 12 month period (until 30 June 2021, with a possible extension until 31 December 2021). The EPBR now also engages EU research teams (from Portugal and Spain), which have significantly enhanced the collection of samples onboard industrial vessels operating in the same area and support the analysis of data on length and age for estimating the growth parameters of the main billfish species that occur in the eastern Atlantic (*Makaira nigricans*, BUM; *Kajikia albida*, WHM; and *Istiophorus albicans*, SAI).

Presentation SCRS/2021/P001 showed a detailed description of the work that has been conducted on the collection of samples of three billfishes (BUM, WHM and SAI) in the eastern Atlantic. It has been noted that in 2020, only CRO (Côte d'Ivoire) and CRODT (Senegal) were able to continue the collection of samples during the pandemic COVID-19. A total of 456 samples has been collected by species (268 for SAI, 126 for BUM and 62 for WHM) and by Institutes since July 2019, from both artisanal and industrial fleets. Anal spines and otoliths have been also collected. Anal Spines have been processed and the analysis is ongoing. The otoliths samples (152: 46 BUM, 41 WHM and 65 SAI) will be sent to the Fish Ageing Services in Australia for age reading.

4.2 Reproduction of blue marlin in the Gulf of Mexico

Following the SCRS request, in Autumn 2019 through the ICCAT Science Envelope, a contract was proposed to the Dirección General Adjunta de Investigación Pesquera en el Atlántico, Centro Regional de Investigación Acuícola y Pesquera en Veracruz, Instituto Nacional de Pesca y Acuacultura of Mexico (INAPESCA) to develop a Reproductive Biology study on Atlantic blue marlin in the Gulf of Mexico. Unfortunately, despite the efforts made by the Secretariat, the signing of the contract has been delayed due to Mexican regulations and administration. Accordingly, the Secretariat is currently evaluating together with the western coordinator of the EPBR, an alternative letter of agreement between INAPESCA (Mexico) and ICCAT to implement this study as soon as possible.

4.3 Genetics: Status of the White marlin/roundscale spearfish genetic samples

A USA scientist provided an update on the project to identify the proportional distribution of white marlin and roundscale spearfish in the Atlantic Ocean through the genetic analysis of dry-mucus samples. The Nova Southeastern University (NSU) scientist who had conducted the initial genetic analyses was contacted and indicated that his laboratory was still set up to carry out such analyses. However, the NSU scientist expressed the view that, to properly carry out the study would require a minimum of 500 samples, and preferably a 1000+ samples collected over a year's time throughout the Atlantic. The NSU scientist also reported that, although his recollection is not certain, around 2016 or 2017 he received some samples originally from EU-Portugal that were contaminated with fungus and were destroyed.

The Group discussed the ramifications of this information. A target of 500-1000+ samples would greatly exceed the number of samples collected up to date. It is clear that achievement of this level of sampling would require a much larger and dedicated effort. The Group discussed whether or not such a goal was feasible. It was suggested that the Group explore whether or not such a sample size was necessary, based on similar published research, or if the time frame could be extended beyond a year.

There was also concern that the fungus contamination was an indication that mucus specimens might not be the best type of material to collect and/or the handling and storage procedures needed to be modified.

4.4 Workshop on Age Reading

The workshop objectives and agenda were discussed. It was noted that a presential meeting would be preferable for this kind of technical workshops, however due to the pandemic situation this would probably only be possible in 2022. It was discussed that a first workshop should be conducted to standardize protocols and start to consider reading guidelines, and a second workshop could focus on building a reference set for both spines and otoliths. In order not to further delay the work, it was agreed to have an online workshop from the 25-29 October 2021. If by this date the pandemic situation allows, the format of the meeting can be changed to presential.

The second workshop will most likely take place in 2022, preferably in a face-to-face meeting. This will also provide enough time for both spines and otoliths to be processed, so that both structures can be compared at the workshop. This second workshop should be included in the Groups workplan and if necessary, a request for funding should be decided upon on the Species meeting by September.

It was noted that some issues as sample selection for age readings, age validation and comparison of different structures, e.g. collection of dorsal fin spines for comparison with anal fin spines, should be considered for discussion in the workshop. It was noted that the participants list for the initial planning of the workshop was for CPCs that had requested funding for participation. Some CPCs, that are not part of the EPBR consortium, have shown interest in participating by sharing both their knowledge and available samples collected by these particular CPCs. As the workshop is going to be online, no funding is being requested and all interested CPCs can participate.

It was noted that several people worldwide could be invited to participate in this workshop as experts, it was decided that the Chair and the Secretariat will contact experts for their availability and requirements to participate in the meeting. The final adopted Terms of reference for the workshop, with the objectives and agenda is shown in **Appendix 5**.

5. Workplan including the activities within the EPBR and other activities for 2021

5.1 Workshop on small scale fisheries (artisanal) Caribbean and West Africa Regions

The draft Terms of Reference for the Workshops on Small Scale (called artisanal) Fisheries were presented by the WG Chair. It was clarified to the Group that the workshops were intended to improve the statistical data collection as well as reporting the data to ICCAT. Consequently, the title was changed to reflect the intention of the workshops.

The Group agreed to have two workshops, one in the eastern Atlantic area (Dakar or Abidjan) in February 2022 and the second one in Caribbean Region, probably in Miami during 2023.

Concerns were raised as to the apparent limitation of ICCAT species caught by small scale fisheries (artisanal) that were to be included in these workshops (i.e., billfish species). It was clarified that the ICCAT documents prepared to characterize these fisheries recommended to include all ICCAT species caught by these fisheries, which included billfish, sharks, and small tunas that are the main targeted ICCAT species by these fisheries in both regions. The Group suggested and agreed that the co-convener of the Sub-Committee on Ecosystems (By-catch component) should be included as part of the Steering Committee to contribute to this effort and provide guidance on potential by-catch species of interest to ICCAT, in addition to the Rapporteurs of the other Species Groups of interest (i.e., Billfish, Sharks and Small Tunas).

The Group discussed the members of the Steering Committee (SC). It was agreed that the SCRS Chair and or vice-Chair (or designee), the Rapporteurs of Billfish, Sharks and Small tunas Species groups, the Conveners of the Sub-committee on Statistics and Ecosystems (By-catch component), the ICCAT Secretariat, an USA representative and additional representatives of potential funding entities as appropriate, and the authors of the ICCAT documents on the small scale fisheries (artisanal) requested by the SCRS (i.e. Papa Kebe and Freddy Arocha) should be part of the SC.

The Group discussed whether the participation was limited to ICCAT Statistical Correspondents. The discussions revealed that in small scale fisheries (artisanal) the flow of information towards the ICCAT statistical correspondent is limited, and it is likely that the information is mostly handled by localized fisheries offices or by research institutions (e.g., Universities, Research Institutes, and recreational fisheries club) that do not necessarily communicate with ICCAT statistical correspondents.

The Group recommended that all participants attending this workshop with ICCAT financial assistance should present a scientific paper or fill a form elaborated by the Secretariat describing their artisanal fisheries with historical data to fill gaps noted in the ICCAT data series. It was also noted that in the Caribbean, there are several countries, including Non-contracting parties, identified as having an important catch of ICCAT species and yet data were not reported to ICCAT. The Secretariat explained that IFREMER (EU-France) is now compiling all the missing information from French territories and data will be submitted

to ICCAT Secretariat soon. Thus, it was deemed important to expand the participation of scientists with experience and data in small scale fisheries (artisanal) to the workshops so that the improvement in statistical data collection reporting to ICCAT can be successfully achieved.

It was noted that in the Caribbean region, potential participating countries are not ICCAT members, and it would require cooperation with WECAFC to help bring some of these countries to the workshop. The Secretariat informed to the Group that cooperation agreements between ICCAT and WECAFC were in the process of approval, once minor administrative issues be resolved and approved by the Commission. In the meantime, cooperation any with WECAFC will involve cooperation with FAO in the success of the workshop in the Caribbean.

The Group recognized that the workshops needed to be in-person. To potentially achieve this, the workshops needed to be postponed to 2022 (for East Atlantic) and 2023 (for the western Atlantic). However, in preparation for the in-person meetings, preparatory and advanced work can be conducted by email and through online meetings. Therefore, the Steering Committee (SC) will have the task to prepare the activities that will be conducted by email and online, as well as the selection of participating countries, and any other issue the SC considers important for the success of the workshops (e.g., inviting to participate UEMOA organization who historically have provided important support to improve fisheries data collection in West Africa).

Inclusion of additional countries to participate in the workshops from both regions were discussed. Several West African countries were included as potential participants, as well as other suggestions were made for the Caribbean; one of them being Martinique and Guadalupe (EU-France). The Terms of Reference for the workshops are in **Appendix 6**.

5.2 Application development for data collection for artisanal fisheries: Presentation of the tools

Following the recommendations from previous meetings of the Billfish Species Group, the Secretariat in coordination with the Group Chair has investigated the availability of tools that could facilitate the collection of billfish fisheries data particularly from small scale or artisanal fisheries, where usually national fisheries monitoring and sampling programs can not cover. During the *2018 Blue marlin stock assessment meeting* (Anon. 2018), an initiative was presented to develop a cell-phone application for the collection of fisheries catch and location data that can be send to a central data collection via email or WiFi (HUB). One advantage is that the data collection process can be done off-line, and data can be uploaded to HUB later. This application is now part of the FAO SmartForms initiative on mobile data collection.

The expert from FAO presented a summary of the application and potential use as tool for on-field data collection (SCRS/P/2021/003). Briefly, the tool allows the development of configurable forms to collect specific data that combined with the mobile App can collect and review fishery data and send to a HUB for data management. SmartForms can collect information from authorized users accessing selected forms, on single observation type of catch, save and export to the Data Hub. The forms are envisaged to be designed by FAO and international standards, adaptable to local standards, to promote harmonization in data collection. Currently the SmartForms uses the FAO HUB, but it can be configured to other HUBs, like the ICCAT Secretariat or CPCs based. The system is envisaged to be released as open-source and FAO offers a co-develop in a collaborative project with interested parties. SmartForms intercepts that segment of the data collection on-board/landing sites which requires selected key data capturing via simple forms easily accessible in mobile devices.

The Group inquired on the cost-related estimates for the development of this App to the data collection of billfish artisanal fisheries. It was indicated that cost depends on the services required, if for example the Secretariat functions as a central HUB, cost will be installation and maintenance of such service, while the hosting in FAO will require FAO approval and cost compensation within a collaborative project.

A second presentation done by the Secretariat, described a proposal for an in-house development of a mobile APP, that in similar fashion can collect fisheries data in remote location and send the data to a central data collection (HUB) (SCRS/P/2021/004). This proposal puts emphasis in the role of the CPCs that should host the HUBs and have responsibilities for management, distribution and data quality control of the data received, and then they can integrate the data received within the normal Task 1 and 2 CPCs obligations. The proposal workplan schedules for a two-year development and test evaluation with cooperating CPCs, after which the Billfish Group will review and make recommendations based on the project results.

It was noted that in some countries in West Africa, they already have similar approach for fisheries data collection programs particularly for small tunas and they showed to be beneficial and successful. After the discussion, the Group considered that at this stage it is more important to have from CPCs an inventory of their small-scale artisanal fisheries in order to properly evaluate a suitable form and the resources needed to implement an effective data collection for these fisheries. It was noted that CPCs should consider the technical and capacity resources for managing the local Hubs for collecting, integrating, and validating the data as they required some expertise knowledge. It was stressed by the Group that the quality control, verification, and validation of the data collected is responsibility of each CPC, which at the end will be the one's submitting the information under the ICCAT fisheries data requirements. It was noted that the forms for collection of data should take into account the target user to make them effective.

The Group noted that similar tools are under development in several fora, and some cooperation or collaboration could be needed to avoid duplication of effort. Finally, it was noted that Rec. 19-05 (para. 16) already request CPCs to provide information about data collection programs for artisanal and small-scale fisheries.

6. Recommendations

Noting that the catches of billfish species are scarce and largely under-reported in the Mediterranean Sea, and taking into account that several CPCs had already implemented domestic observer programmes in BFT and SWO fisheries, the Group recommends the ICCAT CPCs with ICCAT fisheries in that area to duly provide their billfish catches (landings, dead discards and alive releases) for all species, including target, co-target and by-catch species.

The Group recommends initiating a Sub-group to address the Commission request (Rec. 19-05, para. 20) to develop recommendations on the Electronic Monitoring Systems (EMS), particularly on longline fisheries from the scientific perspective. The Sub-group will incorporate expertise from other Species Groups and Sub-committees. The Group agreed that tasks of the Sub-group will include collection and analysis of past studies (e.g. reports and documents) regarding results from comparisons between observers and EMS, in order to start describing current knowledge, possible knowledge gaps and needs for additional experimental trials, and review the draft EM guidelines produced by the IMM. The Sub-group should report back to the Group, before considering submitting its findings to the SC-STATS in September this year.

To start addressing the request from the Commission on Rec. 19-05, para. 21 (potential technical changes to the terminal gear and fishing practices that could reduce bycatch and bycatch mortality, etc.) the Group agreed initiating a Sub-Group to further work on this issue from the scientific perspective. The Sub-group should incorporate expertise from other species Working Groups and Sub-Committees. The Sub-Group will carry out activities throughout 2021 and should report back to the Group in September this year. The Sub-group should revise what has been done to date and provide suggestions on further needs for experimental studies based on the data gaps. It was recognized that it is particularly important the quantification of the trade-offs between the various species that are impacted differently by the terminal gear and fishing practices.

Given the misidentification of roundscale spearfishes as white marlin in the data, the Group reiterated its concern regarding uncertainty in white marlin stock assessment results and enforcement related problems and maintains its recommendation that research to address this problem should continue to be supported by the Commission. To address this issue a study is underway to use genetics from fishery dependent samples to identify and distinguish between these two species. However, problems with the capacity to collect samples and process the samples have impeded the progress of this study. As a supplement, or alternative, to the genetics study, the Group recommends that the morphological characteristics as described in the ICCAT Guide for the Identification of Atlantic Istiophorids (as well as any other characteristics approved by the Billfish SG), be used to identify the species onboard by observers. Should the genetic study continue, or other genetic markers made available, the results would be used to test the accuracy of the observers' onboard identification. If the observer accuracy is found sufficient, the ratio of observed white marlin to roundscale spearfish would then be monitored over time as an indicator of changes in the relative white marlin/roundscale population size and/or a means to assign Task 1 and 2 data by species. This would negate the need to monitor the distribution of the two species in the catch using genetics on an ongoing basis.

The Group also noted that according to ICCAT data catalog, several CPCs have not reported statistical data for Atlantic recreational fisheries, despite the allocated financial resources made by the Commission to African western CPCs. The Group recommend investigating the difficulties and needs encountered by CPCs involved, aiming to improve the data collection and reporting.

The Group recommended that the necessary funds for the implementation of each of the Regional workshops in West Africa and Caribbean for the improvement of statistical data collection and reporting, to be estimated intersessionally aiming for the endorsement of these funds by the 2021 SCRS Plenary for the 2022-2023 budget.

The Group recommended the increase use of electronic tag data on marlin species as well as on target species typically caught in conjunction with marlins in order to better understand the habitat use that could lead to advice on avoidance of areas/habitats for those species. Having such habitat information for both target and bycatch species could potentially inform strategies that reduce the bycatch of marlins while maintaining or increasing target catch.

The Group was made aware that several abundance indices with one of the longest time series for the three major billfish species (BUM, WHM, SAI) provided in the past to the stock assessments by Venezuela have been missing in recent stock assessments (the 2018 Blue Marlin Stock Assessment meeting (Anon. 2018) and the 2019 White Marlin Stock Assessment meeting (Anon. 2019), respectively). Information provided by Venezuelan scientists indicated that Longline Observer Programs were limited after 2017 and catch and effort port sampling from the Artisanal GN Billfish-target fishery stopped after 2014. Recognizing that these abundance indices are very important to the upcoming stock assessments, the Group strongly recommends that Venezuelan scientists make efforts to update the artisanal time series and update both abundance indices (artisanal gill nets and longlines) for the next billfish assessments.

7. Responses to the Commission (Rec. 19-05, para 16, 17 and 21)

7.1 Methods for estimation of billfish discards

Scientists from Canada presented to the Group statistical methodologies to estimate dead and live discards for blue marlin and white marlin/roundscale spearfish in the national fisheries as a response to the ICCAT Rec. 19-05, para. 16 (SCRS/2021/015).

Three candidate statistical methods to estimate dead and live discards of blue and white marlins are being tested and evaluated. Despite the low interaction rates with billfish, some or all of the techniques may be appropriate for use in estimating discarding of marlins in Canadian ICCAT fisheries.

The Group was very supportive of the work. The Group questioned the difference between the proposed new estimation methods and the current method used by Canada. The authors clarified that currently what is reported comes directly from the observed trips and it is not raised to the total catch. The Group also questioned on how the future decision will be made given that there are 3 methods proposed. The authors clarified the objective now is mostly to advance with those methodologies, and then a comparison will be made between them. Once the final conclusion is made, it can be used for future extrapolations to report Task 1 data.

The Group commented that the ratio estimator depends on the resolution of the data, and on data characteristics as if there are zeros, etc. It further noted that on the other hand the modeling approaches might handle such characteristics better. It was finally commented that the variability associated with each estimation method is also very important to be analyzed. The Group questioned if the number of observed trips would be sufficient for the estimations, as it seems to be problematic with just a few covered trips in some years. The authors agreed it could be a problem especially as this is a bycatch species with many zero catches in several trips. They will explore all these issues in the analysis that will be performed. The Group also noted that over time and as regulations have changed, the discarding patterns may have also changed, for example by increasing discards as TACs and quotas have been introduced.

A USA scientist presented two background documents (Brown 2001, Beerkircher *et al.,* 2009) which provided information on the USA longline fishery, as well as its logbook and observer programs, and detailed the methodology followed to estimate discards. Discard rates per set are calculated by quarter and area (domestic area definitions) using a delta-lognormal GLM approach that considers the proportion positive and discard rates (on positive sets) obtained through observer data, multiplied by the effort (in sets) reported through the logbooks (a census of effort). If a year/quarter/area cell had less than 30 observations (observed sets), then pooling of observations across adjacent cells. This could involve including data from the year before and after as representative of the current cell, or across quarter or area. For the example approach, pooling was conducted across years because a separate GLM analysis had demonstrated that year was less significant in explaining differences in bycatch rates than were quarter and area factors (and therefore pooling across years was more appropriate).

The Beerkircher *et al.,* 2009 paper included figures illustrating the relationship between frequency of occurrence (of a by-catch species), sampling coverage, and the CVs of discard estimates using this methodology. The Group questioned what the frequency of occurrence of marlins in these datasets was. It was suggested that the tentative value may be in the 10-12% range, and the Group noted that with such low values, considering sampling frequencies which may be on the order of 10%, would likely result in estimated values of catches and dead discards with relative high uncertainty. Therefore, it would be important to always provide the variability associated with the estimates. The Group then noted that using statistical models could be a good approach to overcome some of those issues. However, it should be considered appropriate error distributions for such low frequency bycatch cases, rather than the delta-lognormal approach that is being used in this case.

The Group noted that in general there are very few papers and information provided from CPC on the methods for estimating discards from ICCAT fisheries of by-catch species such billfish. In this specific section there was only one paper presented plus some additional background information. It is important for the SCRS to understand how many CPCs have a system in place to estimate dead discards of marlins. Given the limited information provided at the meeting, it could be interpreted that most CPCs don't have a system to estimate discards. After reviewing the methodologies currently used by other CPCs and the estimation methods now proposed, the SCRS will then provide suggestions on methods for future use to those CPCs that still don't have systems implemented.

With regards to the artisanal fisheries, it was pointed that there are no discards as all billfish specimens are retained and landed. As such in those cases the landings represent the total catch.

Rec. 19-05 - Paragraph 21

A USA scientist gave a presentation showing differences in average depth trends through night/day cycles between randomly selected individual BUM, WHM, SAI, YFT, BFT and SWO. These average depth trends were derived using data recorded on recovered Pop-up Satellite Archival Tags. Such trends can also be derived from binned data transmitted through Argos satellites, albeit at somewhat reduced resolution. Examples were also shown of the day and night habitat envelopes by way of graphs color-coding each 10% level of time spent at depth-temperature combinations. These examples illustrated substantial differences in the depth-temperature conditions that example YFT and BFT preferred, including different behavioral response between the example YFT and BFT individuals comparing night and daytime habitat. This presentation illustrated the potential utility of deploying electronic tags on both target and bycatch species. Information on different habitat preferences across day/night and by season/area can inform the consideration of ways to mitigate bycatch, such as through gear configuration, timing of deployment/retrieval, and seasonal redistribution of effort.

The Group noted that electronic tags provide important information on habitat use, that could potentially be used for avoiding by-catch of some species. As such, the Group was supportive and recommended to continue using electronic tags on these marlin species (as well as target species to illustrate contrast) in order to better understand the habitat use that could lead to advice on avoidance areas/habitats for those species.

The Group noted that previous recommendations from the SCRS have been put forward supporting the use of circle hooks to reduce at-haulback mortality of marlins. The Group also noted that for other by-catch species the implications were discussed and are reflected in the reports from the Sharks Species Group and of the Sub-committee on Ecosystems.

The Group also noted that the request from Rec. 19-05 paragraph 21 on the development of studies on circle hooks is in the agenda of the SC-ECO (By-catch component). The Group recognized the importance of this effort and especially on the quantification of the trade-offs between the various species groups that are impacted differently by circle hooks and other potential terminal gear modifications. The Group agreed to create a Sub-group to address this specific request, which is included and detailed as a Recommendation from this meeting (see section 6).

8. Other Matters

8.1 Electronic Monitoring

The Group was provided with a presentation of (SCRS/P/2021/002) covering electronic monitoring (EM) of longline fisheries in the ICCAT Convention Area (Wozniak *et al.*, 2020). The paper had already been presented to the Tropical tuna Species Group, but the authors highlighted its relevance to billfishes. In 2019, the Commission requested SCRS to provide advice in 2021 on minimum standards for EM of LL fisheries interacting with billfishes. The presentation provided an overview of similar EM initiatives at other major tuna RFMOs and highlighted the key operational and technical requirements, such as clear objectives, minimum standards, and data review. In addition, the presentation reiterated the need to continue the momentum on EM development due to the current pandemic-related observer limitations. The authors recommended that the Group form a Sub-group to begin developing advice on EM of longline fisheries interacting with billfishes for presentation at the September Species Group meetings.

The Commission is seeking SCRS advice on minimum standards for EM systems (Rec. 19-05, para. 20). The Group agreed that EM expertise from other Species Groups should be consulted, particularly since the tropical tuna Species Group developed minimum standards for EM of purse seine vessels targeting tropical tunas. Those purse seine standards have already been endorsed by the SCRS and forwarded to the Commission. The SCRS Vice-Chair informed the Group that SCRS leadership has already met with leadership from the Integrated Monitoring Measures (IMM) Working Group to jointly discuss the way forward to respond to this request from the Commission. It was suggested that the Sub-Committee on Statistics may be the most appropriate SCRS subsidiary body to make this recommendation for consideration of the SCRS.

The Group considered the need to compare the data collected from human observers and EM on the same set, in different oceanographic conditions, targeting different species, etc. It was noted that trials have been conducted in some fisheries around the world – including EU-Spain and Ghana purse seine and the EU and USA longline – and that results of those studies could provide information on the comparison between human observer and EM data collection. It was further noted that the purpose of EM in such cases may be focused on ensuring compliance, and therefore are not expected to collect the same data as scientific observer programs. The Group stressed that an EM program should not replace, but instead complement, the human scientific observer programs.

The Group agreed to initiate a Sub-group to further work on this issue from the scientific perspective. The Sub-group will incorporate expertise from other Species Groups and Sub-committees. The Group agreed that tasks of the Sub-group will include collection and analysis of past studies on the effectiveness of EM and review of draft EM guidelines produced by the IMM.

9. Adoption of the report and closure

The report was adopted during the meeting. The Chairs of the SCRS, The Billfish Species Group rapporteur and the Secretariat thanked all the participants for their efforts to work effectively and efficiently throughout the meeting. The meeting was adjourned.

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Appendix 1

Adopted Agenda

1. Opening, adoption of Agenda and meeting arrangements.
2. Review of Task 1, Task 2 and tagging information available on billfish species.
3. Advances on CPUE standardization for billfishes
    3.1. Review and consideration of electronic components that may have affect catchability in sport and recreational fisheries overtime.
    3.2. Exploration of billfish Joint CPUE analysis with fine scale operational data from longline fleets.
    3.3. Comparison and review of observer vs. logbook CPUE indices by national fleets.
4. Review of the ongoing activities within Enhanced Programme for Billfish Research (EPBR) and new relevant scientific information on billfishes.
    4.1. Age and Growth study
    4.2. Reproduction of blue marlin in the Gulf of Mexico
    4.3. Genetics: Status of the white marlin/roundscale spearfish genetic samples
    4.4. Workshop Age Reading
5. Workplan including the activities within the EPBR and other activities for 2021.
    5.1. Workshop on small scale fisheries (Artisanal)
    5.2. Application development for data collection for artisanal fisheries: Presentation of the tools.
6. Recommendations
7. Responses to the Commission (Rec. 19-05, parag. 16, 17 and 21)
    7.1. Methods for estimation of billfish catch and discards
8. Other matters
    8.1. Electronic Monitoring.
9. Adoption of the report and closure.

Appendix 2

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Appendix 3

List of SCRS Papers and Presentations

Number	**Title**	**Authors**
SCRS/2021/015	Description of Canada's proposed blue marlin, white marlin/roundscale spearfish discard estimation analyses	Gillespie K.
SCRS/P/2021/001	Short-Term contract for ICCAT to continue the collection of Biological samples for the study of growth of Billfish in the Eastern Atlantic	Centre de Recherches Oceanographiques de Dakar/Thiaroye (ISRA/CRODT)
SCRS/P/2021/002	Towards the development of an Electronic Monitoring Programs for ICCAT longline fisheries	Wozniak E., Gibbon J., Michelin M., Galland G.
SCRS/P/2021/003	SmartForms a FAO initiative on mobile data collection	Taconet M., Gentile A., Laurent Y
SCRS/P/2021/004	Propose model for Artisanal sampling phone app	Ortiz M., Garcia J., Palma C., Mayor C

Appendix 4

SCRS Document and Presentations Abstracts as provided by the authors

SCRS/2021/015. ICCAT Recommendation 19-05 (para. 16) requires that CPCs present to the SCRS a statistical methodology to estimate dead and live discards for blue marlin and white marlin/roundscale spearfish. We present three candidate statistical methods to estimate dead and live discards of blue and white marlins. Despite low interaction rates, some or all of the techniques may be appropriate for use in estimating discarding of marlins in Canadian ICCAT fisheries.

SCRS/P/2021/001 provided detailed description of the work that has been conducted within a contract signed between ICCAT and a Consortium led by CRODT on the collection of samples of three billfishes (Blue Marlin, White Marlin and Sailfish) in the eastern Atlantic. In 2020, only CRO (Côte d'Ivoire) and CRODT (Senegal) were able to continue the collection of samples due the pandemic COVID-19. A total of 456 samples has been collected so far (SAI 268, BUM 126 and WHM 62) from artisanal and industrial fleets. Fins rays and otoliths have been collected. Anal Spines (392) have been processed and the otoliths samples (152) will be sent to the Fish Ageing Services in Australia. Regarding the genetic samples, a total of 46 samples has been collected since 2018.

SCRS/P/2021/002. ICCAT Recommendations 19-02 and 19-05 direct the SCRS and IMM to develop and recommend longline electronic monitoring (EM) standards for the 2021 Commission Meeting. Many trials have shown that EM is a powerful driver for better fisheries management and a complement to human observer programs. To fully harness the benefits of EM, ICCAT should develop a comprehensive program that includes key operational and technical elements. Clear objectives, minimum standards, and data review are some of the areas that the SCRS must consider as it reviews and contributes to ICCAT's EM program. Development of EM programs is progressing at other RFMOs around the world, and the COVID-19 pandemic has underscored the need for ICCAT to advance EM to be prepared for future circumstances that might limit onboard observation. Finally, increased observer coverage requirements for longline fisheries will take effect in 2022, so the design and adoption of recommendations for elements of an EM program, including minimum standards, should be prioritized by the SCRS at this time.

Appendix 5

ICCAT Billfish Workshop on Age Reading

Background and objectives

The Billfish Species Group initiated in 2018 in the framework of Enhanced Programme for Billfish Research (EPBR), a biological sample collection programme on hard parts (spines & otoliths) for three of the four main Billfish Species (blue marlin, white marlin and sailfish), captured in the Eastern Atlantic, because no previous billfish aging studies have been conducted in this region. This workshop aims to improve knowledge of age and growth rates for the Atlantic billfish main species.

The major objectives are:

i) Enhance current expertise in the Eastern Atlantic,
ii) Standardize processing and reading protocols between laboratories (Eastern & Western Atlantic).

To achieve these goals of the workshop, the respective task coordinators on ageing are urged to have some samples already processed in order to make them available to the group by the time of the workshop.

Agenda (tentative)

1. Opening
2. Adoption of agenda
3. Nomination of the rapporteurs
4. Overview of sampling protocols and data collection database
5. Revision/update of protocols for ageing samples processing and
6. Initial guidelines for age reading including:
    a. Discussions on age verification and validation
    b. methods to correct for spine vascularization.
7. Workshop report and adoption
8. Closure

Location / Coordination

Centre de Recherches Océanologiques d'Abidjan, Côte d'Ivoire

Date

October 25 - 29, 2021 Online format

Participants

Brazil, Côte d'Ivoire, Gabon, Portugal, Spain, Senegal and ALL interested CPCs

Scientific Experts

The Chair in coordination with the Secretariat will contact experts worldwide for their participation and requirements.

Appendix 6

Regional workshops in West Africa and Caribbean for the improvement of statistical data collection and reporting on Small Scale (Artisanal) Fisheries

Terms of Reference

1. Background and objective

Important billfish catches occur in the tropical and subtropical central Atlantic by both CPC and non-CPC fisheries, mainly in the Caribbean Sea and off West Africa. Since the 1980s EPBR included activities toward improving the basic fishery data (e.g., catch, effort, size measurement). The SCRS and the Commission recognized the importance of socio-economic benefits associated with artisanal fisheries in several ICCAT CPCs.

In 2015 and 2018 a comprehensive study of strategic investments related to artisanal fisheries data collection in the Western African regions, and the Latin America/Caribbean Region was awarded (Kebe, 2015 and Arocha, 2018). The results of these studies confirmed that tuna and tuna like species (e.g., billfishes.) are regularly caught in artisanal fisheries, although the magnitude of catches is still difficult to estimate due several reasons, mostly related to the lack of comprehensive sampling and monitoring of these fleets.

However, it has been also recognized the limited information available on artisanal fisheries statistics, total catch, fishing effort and basic biological sampling of these fisheries in ICCAT's data base. Despite efforts since the 1980s, data collection gaps in mostly artisanal fisheries continue to exist and in some cases expand due to the use of moored FADs by several artisanal fisheries in the Caribbean.

In order to deal with the data collection gaps, the Commission approved for 2020 to fund one workshop on small scale fisheries statistics of developing CPCs, with focus in the West African and Caribbean marine artisanal fisheries in order to improve knowledge, monitoring and statistics reporting of ICCAT species.

The general objective is to improve the monitoring and reporting of artisanal billfish statistics in these regions. To achieve this objective, preliminary work must be carried out by each participant prior to the workshop. It is expected that each participant produces and submits an SCRS document(s) describing the country's statistical system of fishery data collection for highly migratory species pertaining artisanal fisheries, sampling protocols, and its handicaps, problems and needs to enhance data collection and reporting. The SCRS Document(s) along with data should be a pre-requisite for attendance.

2. Expected outcome

- Improve the monitoring and the reporting of artisanal fisheries targeting tuna and tuna-like species.
- Fill the gap in key CPC artisanal ICCAT species data reported to the ICCAT Secretariat.
- Finally, improve the quality of the catalogue of billfish species in the ICCAT data base.

3. Workshop topics

Workshops will cover the following topics:

i. Species Data collection (Species Identification, type of data, frequency of sampling)
ii. Data collectors at key landing sites (Key communities, number of people involved, experience/ knowledge of data collectors)
iii. Data reporting to ICCAT (ICCAT forms or other ways to get the collected data to the Statistical correspondent on a regular and continued timely way).
iv. Training on Data reporting to ICCAT (how to fill forms) or if very limited capacity, how to report to ICCAT in a excel spread sheet facilitated by ICCAT.
v. Biological sampling collection and data recording.

4. Potential Participants to be invited

In order to have successful workshops:

- **Scientific Officers as well as scientific experts** (Universities/Research Institutions) from Contracting parties that have data at hand is key. The workshop should be hands on or a true working workshop. In which the participants bring their data to be worked on by each correspondent.
- **ICCAT statistical staff**, (For input and advise on the issue)
- **WECAFC** for the Western Caribbean regions to facilitate or lease with non-CPC that may be considered as parties of interest at the workshop. (Contracting and non-Contracting parties)
- **Presential workshop**

Also, it would be useful to cross expertise between areas, that is, invite **one well experienced Statistical correspondent from one area (East Atlantic) to the Workshop on the West Atlantic,** and vice versa.

5. Steering Committee

SCRS Chair and or vice-Chair (or designee)
Chairs Billfish, Ecosystem and Bycatch, Sharks, Small tunas, SubComSTATs
ICCAT Statistical Staff
USA representative \ additional representatives of potential funding entities as appropriate.
Facilitators Scientific Experts (Freddy Arocha, Papa Kebe)

6. Location

- West Africa region: Senegal and/or Côte d'Ivoire
- Caribbean region: Miami, U.S.A. (potential location)

7. Date

West Africa region Workshop: February 2022
Caribbean region Workshop: April 2023

8. List of potential countries

West Africa region Workshop[1]	**Caribbean region Workshop**
Cap Verde	EU Caribbean Regional Territories
Côte d'Ivoire	Barbados
Ghana	Grenada
Sao Tome & Principe	Venezuela
Senegal	Trinidad and Tobago
Liberia	Guyana
Republique de Guinée (Conakry)	Suriname
Sierra Leone	Dominican Republic
Angola	Haiti
Mauritania	Cuba
Gabon	

[1] The western African organization (UEMOA), who initiated in 2007 an important project to improve fisheries data collection and reporting has built a metadata data base, could be invited to share his experience and information with ICCAT.

Table 1. Task 1 Nominal Catch Billfish including landings and dead discards by species, stock unit, year 1956-2019, and main regions; Atlantic (AT) and Mediterranean Sea (MD).

	Species group/species/stock/region																					
	Major billfish species										Other billfish species											
	BUM (Makaira nigricans)		SAI (Istiophorus albicans)			SPF (Tetrapturus pfluegeri)			WHM (Kajikia albida)		BIL unclass. (Istiophoridae)		BLM (Makaira indica)	MLS (Tetrapturus audax)	MSP (Tetrapturus belone)		RSP (Tetrapturus georgii)	SSP (Tetrapturus angustirostr				
	A+M		ATE		ATW	ATE		ATW	A+M		A+M		A+M	A+M	A+M		A+M	A+M				
Year	AT	MD	AT	MD	AT	AT	MD	AT	AT	MD	AT	MD	AT	AT	AT	MD	AT	AT				
1956	39				1			0	19													
1957	764		71		24	19		4	160													
1958	772		32		66	7		13	161													
1959	841		4		5	8		11	112													
1960	2815		50		176	41		59	313													
1961	4083		173		350	131		36	830													
1962	7308		218		364	241		80	2064													
1963	9038		230		354	282		135	2614													
1964	8011		264		533	281		412	3735													
1965	6156		797		979	592		557	4906													
1966	3863		540		649	828		422	3513													
1967	2246		848		693	348		308	1427													
1968	2527		920		871	437		409	2049													
1969	3106		962		752	308		342	2272													
1970	2886		628		1258	338		572	2147													
1971	3398		916		1243	354		360	2266													
1972	2414		870		804	737		241	2289													
1973	3226		670		649	430		130	1868													
1974	3095		3573		753	246		120	1775													
1975	3271		5278		732	219		60	1761													
1976	2419		5398		852	453		147	1839													
1977	2181		1457		900	337		32	1150													
1978	1642		2529		779	272		16	975													
1979	1527		3230		867	261		36	1039													
1980	1848		2069		841	300		66	976													
1981	2032		2082		968	365		88	1241		116											
1982	2708		2796		1042	406		76	1100													
1983	2142		3706		1186	351		46	1780				1									
1984	2888		2445		1151	269		70	1213				6									
1985	3403		2269		1004	287		89	1730				2									
1986	2104		2065		1252	293		123	1689				16									
1987	2290		2553		1193	284		100	1612		5		0									
1988	2881		2109		1143	295		236	1472		1					0						
1989	4339		1710		1052	310		108	1923		1		26			0						
1990	4612		2315		1235	417		64	1739		1		2			0						
1991	4220		1474		1226	131		83	1743				5			1						
1992	3104		1776		1463	255		19	1557							0						
1993	3175		1814		1414	419		120	1681		27		4			0						
1994	4258		1171		1121	198		122	2202				34			0						
1995	4230		1231		1214	207		33	1880				117			1						
1996	5421		1880		1143	128		37	1679				70			1						
1997	5737		1347		1257	194		7	1513				151		0	1						
1998	5713		1363		1615	192		74	1945				177		0	2						
1999	5408		1342	0	1580	257		50	1786	0			147			3						0
2000	5485		1980		1996	181		97	1534	1	37		49			5						
2001	4474		2805	0	1797	81		107	1078	0		25	53			3						
2002	3910		2350	1	2060	84		95	1012	0	2		17			54						
2003	4419		2639		1498	54		79	845		9		54		0	104						2
2004	3209		2612	0	1727	51		137	841	0	32		12			88						
2005	3578	1	2220	0	1839	68		101	768	0	104		16	9		50						
2006	3176		1916		1939	84		256	612				28	20		2						
2007	4364		2577		1561	66		102	748		9		24	22		5						
2008	3780		2229		1733	60		106	710	0	13		21	1		269	4					
2009	3345		2129		1624	78		62	753	0	26	1	440	59		391	2		7			
2010	3052		1853	0	1229	128		117	504	0	29		14			150	2					
2011	2901		1553		1335	73		80	530		122		46	7		92						
2012	2856	0	1591		1275	170		58	464	0	107		29	75		37	1		3			
2013	2162	0	1339	0	985	95		352	640	0	6		11	8		45	8		5			
2014	2689	0	1163	0	859	16		36	436	0	1		14	14		118	16		1			
2015	1986	0	1246		917	18		62	516		3		3	26	0	19	12		45			
2016	2075	0	1421		1351	15		62	458		52		2	14		11	22		43			
2017	2188		1648		1245	29		321	431	0	107		4	19		10	36		53			
2018	1427	0	935		1519	36		138	257		70		0	19		23	11		56			
2019	1463	0	2008		1258	60	0	58	240	0	7	18	5	27		49	12		44			

Table 2. Task 1 Dead discards reported billfish by species, gear type, and flag 1987 – 2019.

Species	GearGrp	Flag	1987	1988	1989	1990	1991	1992	1993	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
BUM	LL	Brazil																				2	0	0											
		Canada																															0	0	
		Chinese Taipei																									0	32			24	27	26	16	22
		Japan																																5	8
		Korea Rep																									5			1	1				
		Mexico																				0	0	0	0	0	0	0	0		0	0	0	0	0
		UK-Bermuda																																	0
		USA	138	124	191	159	142	146	127	111	153	197	139	51	83	60	22	37	19	34	24	36	42	37	40	19	50	38	55	53	81	25	47	22	31
	PS	Curaçao																															4		
		EU-España																							18	0		1	4	3	5	7	6		
		EU-France																												0	0	6	11	12	9
		Guatemala																															2	2	
		Panama																															2	2	
		USA															2																		
	UN	USA												1		0		11	0	1	1	0	0	1	2	0		1							
BUM Total			**138**	**124**	**191**	**159**	**142**	**146**	**127**	**111**	**153**	**197**	**139**	**52**	**83**	**60**	**25**	**49**	**19**	**35**	**25**	**39**	**43**	**38**	**61**	**20**	**56**	**73**	**59**	**57**	**111**	**65**	**99**	**61**	**70**
SAI	LL	Brazil																				1	0	0											
		Chinese Taipei																									0	6			6	1	4	3	5
		Korea Rep																									0			0					
		Mexico																				0	0	0	0	0	0	0	0	0	0	0	0	0	0
		USA	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7	3	5	7	9	10	4	10	18	11	11	6	7	6	6	5
	PS	Curaçao																															0		
		El Salvador																															0		
		EU-España																															0		
		EU-France																													0		3	1	2
		Guatemala																															0		
		Panama																															0		
		USA															0																		
	UN	USA												0				0	0	0	0	0	0	0	1	0	0	0							
SAI Total			**42**	**57**	**57**	**62**	**64**	**36**	**63**	**28**	**29**	**69**	**57**	**27**	**72**	**45**	**11**	**7**	**5**	**7**	**4**	**6**	**8**	**10**	**10**	**5**	**11**	**25**	**12**	**11**	**13**	**8**	**14**	**11**	**12**
SPF	LL	Chinese Taipei																									0	0			2	1	1	1	8
		Japan																																12	9
		UK-Bermuda																																	0
		USA									6	1																							
	PS	EU-France																													0				
SPF Total											**6**	**1**															**0**	**0**			**2**	**1**	**1**	**13**	**17**
WHM	LL	Brazil																				2	19	1											
		Canada																														0	0	0	0
		Chinese Taipei																									0	2			2	2	2	1	3
		Japan																																2	1
		Korea Rep																								2	2								
		Mexico							0							0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
		NEI (BIL)							1	1	1					1	0	0	0	0	0	1	10	11	11	2	2	2	1	0	0	4	6	3	
		UK-Bermuda																											0						
		USA	62	60	107	81	90	88	66	42	100	65	70	32	57	41	17	29	17	27	17	9	8	9	13	8	23	20	10	11	8	3	5	2	4
		Venezuela																																26	54
	PS	EU-France																																0	
		USA															1																		
	UN	USA												1	0			4	0	0	0	0	0	0	2	0		1							
WHM Total			**62**	**60**	**107**	**81**	**90**	**88**	**67**	**43**	**101**	**65**	**70**	**33**	**58**	**41**	**18**	**33**	**17**	**28**	**18**	**12**	**36**	**21**	**26**	**12**	**27**	**25**	**11**	**11**	**10**	**9**	**12**	**34**	**62**

Table 3. Task 1 Live releases reported billfish by species, gear type, and flag 2000 – 2019.

Species	GearGrp	Flag	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BUM	LL	Brazil							47	58	19											
		Canada																		0	1	0
		Mexico							0	1	1	1	1	1	1	0	0	1	1	1	1	1
		South Africa															0					
		UK-Bermuda																				1
		USA										58	30	108	110	138	93	142	72	94	63	67
	PS	Curaçao																		0		
		EU-España										1		2		1		1	0	0		
		EU-France																1		0	1	0
		Guatemala																		0		
		Panama																		0		
	RR	Brazil							0													
		UK-Bermuda																		27	55	12
		UK-Turks and Caicos					2															
	UN	USA											0		5							
BUM Total							**2**		**47**	**59**	**20**	**60**	**31**	**111**	**116**	**139**	**94**	**144**	**73**	**123**	**120**	**81**
SAI	LL	Brazil							11	5	2											
		Mexico							0	0	0	0	0	0	0	0	0	0	0	0	0	0
		USA															11		12	16	8	3
	PS	EU-France																0				0
	RR	Brazil							2													
SAI Total									**13**	**5**	**2**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**12**	**16**	**8**	**3**
SPF	LL	Mexico																0	0	0	0	
		UK-Bermuda																				0
	RR	UK-Bermuda																			0	
SPF Total																		**0**	**0**	**0**	**0**	**0**
WHM	LL	Brazil							15	24	6											
		Canada																	0	0	1	3
		Korea Rep											0									
		Mexico	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK-Bermuda															0					0
		USA											15	36	15	3	6	1	3		1	0
	RR	Brazil							0													
		UK-Bermuda																		1	2	1
	TW	Canada																	0		0	
	UN	USA										6	0		4							
WHM Total			**0**	**0**	**1**	**0**	**0**	**0**	**15**	**25**	**6**	**6**	**15**	**36**	**18**	**3**	**6**	**1**	**4**	**2**	**4**	**3**

Table 4. Task 2 Catch-Effort summary of different effort measures reported by main gear type for the billfish species.

		BUM				SAI				SPF				WHM			
GearGrpCode	EffortUnit	DR	GG	LW	NR	DR	GG	LW	NR	DR	GG	LW	NR	GG	LW	NR	
BB	D.AT SEA			1571				1036							206		
	D.FISH			410													
	LINE.DAYS		23577	250													
	NO.POLES			93													
	NO.TRIPS			4700													
	-none-			13310													
GN	D.AT SEA				1382				3071								15
	D.FISH			37779				106490							487		
	NO.BOATS			168601				866734							5338		
	NO.SETS				1				7				90				26
	NO.TRIPS			10742493	13782			8381032	33371			191			268395		
	-none-			1405519				603616							106752		
HL	D.FISH							43									
	D.FISH.G			4464													
	NO.HOOKS			20													
	NO.TRIPS			496135	0			327186	0								
	-none-			6600													
HP	D.FISH														300		
	FISH.HOUR			272											797		
	-none-														1452		
LL	D.FISH		417	378481				547667				69899			72169		
	D.FISH.G			23924													
	NO.HOOKS	42036	195575	20051941	283441	3125	568771	10759236	130499	230	71275	804308	55826	185062	9468665	211489	
	NO.SETS			13500				18500							8200		
	NO.TRIPS			27338				7979							9345		
	-none-		116667	786604	7051		283609	1309324				114397		7685	236677	1525	
	SUC.SETS			3000				1700							1700		
PS	D.AT SEA			4235													
	D.FISH			847				310				3238					
	NO.BOATS			6735				150									
	NO.SETS			39346				33851							23		
	SUC.SETS			17													
RR	D.AT SEA			1246				46									
	D.FISH			4687				121									
	FISH.HOUR				8874				11112				20		90	20425	
	NO.BOATS			21500											1300		
	NO.HOOKS				60											660	
	NO.SETS			757													
	-none-			2375											194		
SP	D.AT SEA			29													
	NO.TRIPS			87505				17696									
TL	-none-														363		
TP	D.FISH														56		
	NO.TRIPS			110													
	-none-			1731											4700		
TR	FISH.HOUR			1180				70									
	NO.BOATS			21820				610									
	NO.TRIPS			99451				266534									
	-none-			2500				390							57		
TW	D.FISH							912							118		
	FISH.HOUR														452		
	LINE.DAYS							117									
	NO.BOATS							330									
	NO.SETS																2
	-none-														8		
UN	D.FISH			6441				100623				125234			4723		
	NO.HOOKS			1846													
	NO.SETS														10000	365	
	NO.TRIPS			1874933				53638									
	-none-			84983	27			92625							127318	909	

Table 5. Task 2 Catch-effort summary of dataset for revision by main gear type, flag, and fleet for 2001-2014.

GearGrp Code	FlagName	FleetCode	TimeStrata	GeoStrata	CatchTypeCode	EffortUnit	2001	2002	2008	2009	2010	2011	2012	2013	2014
GN	Benin	BEN	yy	1x1	**L**	NO.BOATS									
HL	Senegal	SEN-SN-Recr	yy	1x1	**L**	NO.TRIPS									
LL	Brazil	BRA	yy	1x1	**L**	-none-									
				5x5	**L**	NO.HOOKS					437				
	China PR	CHN	yy	5x5	**L**	NO.HOOKS									
	Mexico	MEX	qq	5x5	**L**	NO.HOOKS	5833	2903							
	Venezuela	VEN	yy	1x1	**L**	NO.HOOKS		50118							
RR	UK-Bermud	UK.BMU	yy	1x1	**L**	NO.BOATS									
				5x5	**L**	NO.BOATS									
	USA	USA	yy	1x1	**L**	FISH.HOUR									
		USA-US-Recr	yy	1x1	**L**	FISH.HOUR									
TW	Ukraine	UKR	yy	10x10	**L**	-none-									
UN	EU-France	EU.FRA-FR-GF	yy	1x1	**L**	NO.TRIPS			289		102000	100000	93000	67000	86462
		EU.FRA-FR-M	yy	1x1	**L**	NO.TRIPS				288000	221000	279000	237000	145000	306079
	Senegal	SEN	yy	1x1	**L**	NO.TRIPS									
						-none-									

Table 6. Task 2 Size/wgt information on major billfish species 1990-2019. Values represent number of fish by species and measurement type reported.

Sum of NrFish			YearC																															
SpeciesCode	**FreqTypeCode**	**SzInterval unit**	**1990**	**1991**	**1992**	**1993**	**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**
BUM	CLJFL	1 cm	1	133	2	303	135	2	90	120	86	177	1																					
	CPFFL	1 cm																						10				54	7	18				
	LD1-SFL	1 cm	1	73	293	277	770	617	486	315	1727	2396		749																				
	LJFL	1 cm	715	477	486	524	1239	1235	1356	1289	2336	3323	1879	1123	969	1219	2304	1866	3744	3042	2339	2207	1148	1302	881	660	537	2417	2168	1888	1670	1349
		2 cm																5372	3337	778	113	103	188	555	8									
		5 cm	830	514	663	854	1922	3237	4531	3211	1915	2780	1811	1704	2648	2292	2259	1611	993	1714	250	507		197		74	918	16	392	427	14	316
		10 cm																									37							
	OPKELL	1 cm											68	343																				
		2 cm										45																						
	SFL	1 cm																																76
	WGT	1 kg	164	133	19	32		135	72														2											
		5 kg				32		29													170	66	176	129	116	41	18							
		10 kg													257																			
	EYF	1 cm						425	703		450	691										331	289	141	31	3	23	32					
		5 cm	712	402	125	128	185	289														79	317	50	60	37	41						
BUM Total			2423	1732	1588	2150	4251	5969	7238	4935	6514	9412	3759	3919	3874	3511	4563	8849	8074	5534	2872	3293	2120	2384	1096	815	1574	2519	2567	2333	1684	1741
SAI	LD1	5 cm																			324													
	LJFL	1 cm	27	677	1565	2550	2446	2140	2522	1929	5982	6308	11297	5309	3158	3085	5597	5435	7732	6129	2788	3989	5324	7109	12144	7652	1551	2629	3456	3818	2103	1926
		2 cm			1													4623	1510	381	125	111	199	346	22									7
		5 cm	4374	2990	5452	3252	4376	4912	7461	6484	2521	8343	3460	2630	6696	7083	2605	661	367	3108	90	424		914	1236	417	4276	15	3121	1045	29	150
		10 cm																									50							
	OPKELL	1 cm											20	269																				
		2 cm										27																						
	SFL	2 cm																																4144
	WGT	1 kg																				1												
	EYF	1 cm									27	28										211	13	344	10		1							
		5 cm	3	11	1			2											99			11		24	92	48	5							
SAI Total			4404	3678	7019	5802	6822	7054	9983	8413	8530	14706	14777	8208	9854	10168	8202	10719	9708	9618	3327	4747	5536	8737	13504	8117	5883	2644	6577	4863	2132	6227
SPF	CLKL	1 cm			9	10	15	1																										
	LJFL	1 cm			1	10	12		84	118	102	185	182	194	19	101		73	35	1	241	8	25	108	406	10	15	3	2	1	22	17
		2 cm					11	50	22	3	11	18		66						439		11											
		5 cm																								21	6			1	3			
	WGT	1 kg					49	110	29	15	42	116	265	466	383							1	1											
		5 kg				9																												
	EYF	1 cm									12	85										103	90	3	1	22	4	4					
		5 cm	14		8		10	64														176		47	35								
SPF Total			14		18	29	97	225	135	136	167	404	447	726	402	101		73	35	440	241	299	116	158	442	53	25	7	2	2	25	17
WHM	CLKL	1 cm		43																														
	CPFFL	1 cm																										12	3	3				
	LJFL	1 cm	100	261	303	586	1339	1507	870	687	1468	1510	1327	1087	1743	1638	2640	2371	2155	2109	1571	2433	1807	2300	3036	2248	1819	2123	1685	1242	1364	585
		2 cm																8699	3478	809	407	55	209	771	24									3
		5 cm	315	412	286	397	581	995	1575	637	242	677	320	394	917	890	588	926	865	531	258	216	15	1	56	149	167	4		79	11	
	OPKELL	1 cm											46	430	316																			
		2 cm										50																						
	SFL	1 cm																																28
	WGT	1 kg	63	53	2	2		5	10	2		88	150	58		53	65	159	111	57	19	27	1	13										
	WGT-SFL	1 cm												49		53	55	152	1	56		27												
	EYF	1 cm						43														59	30	21	5	8		1						
		5 cm																				39				3								
WHM Total			478	769	591	985	1920	2550	2455	1326	1710	2325	1843	2018	2976	2634	3348	12307	6610	3562	2255	2856	2062	3106	3121	2408	1986	2140	1688	1324	1375	616

Table 7. Task 2 Size information. Summary of size datasets for revision for main billfish species by species, flag, gear and year 1990-2014.

SpeciesCode	FlagName	GearGrpC	TimeSt	GeoSt	FreqTypeC	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
BUM	Chinese Taip	LL	qq	ICCAT	LJFL	412	55	312	313	988	2252	3520	2036	1079	923	389	600	1631	1345	1065	1262									
	Côte d'Ivoire	GN	yy	5x5	LJFL																	1349								
	EU-España	LL	qq	5x5	LJFL																								6	66
	EU-France	UN	qq	1x1	WGT																				66	176	129	116	41	18
			yy	5x5	WGT																			170						
	Japan	LL	qq	10x10	LJFL									5	1			3				3								
					EYF				10	3	38	112		5	1															
				10x20	LJFL									445	690	428	164	285	333	352	423	154	175	166						
					WGT				32		29															2				
					EYF	712	402	125	118	182	676	591		445	690										410	606				
	USA	LL	qq	ICCAT	LJFL										50											33		53	83	50
SAI	Côte d'Ivoire	GN	yy	5x5	LJFL																	2601								
	EU-España	LL	qq	5x5	LJFL																				8		2			4
	Japan	LL	qq	10x20	LJFL									27	28	69	1	19	5	108	37	17	1	59		13				
					WGT																				1					
					EYF	3	11	1			2			27	28										222	13				
	USA	LL	qq	ICCAT	LJFL										105											35		123	100	65
SPF	EU-España	LL	qq	5x5	LJFL																								21	6
	EU-Italy	GN	yy	1x1	LJFL					11	50	22	3	11	18		66													
					WGT					49	110	29	15	42	67	99	106													
		HP	yy	1x1	WGT										49	166	360	226												
	Japan	LL	qq	10x20	LJFL									12	85	45	3	2					1	241						
					WGT				9																1	1				
					EYF	14		8		10	64			12	85										279	90				
WHM	Chinese Taip	LL	qq	ICCAT	LJFL	315	412	286	385	525	908	1534	585	202	451	129	291	860	720	360	722									
	Côte d'Ivoire	GN	yy	5x5	LJFL																	18								
	Ghana	GN	yy	5x5	LJFL										106															
	Japan	LL	qq	10x10	LJFL										9			2				1								
					EYF						1																				
				10x20	LJFL									211	91	30	13	14	8	14	14	10	22	24						
					WGT																					1				
					EYF						42														98	30				
	USA	LL	qq	5x5	LJFL												30	54	44	73	95	21	25	53	106	41				
				ICCAT	LJFL										98													101	48	56

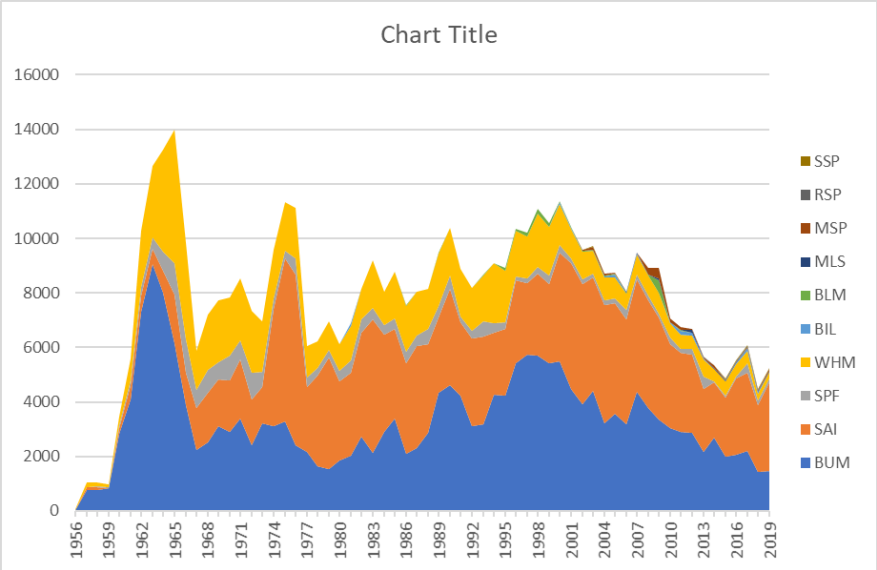

Figure 1. Annual trend catches of billfish by species 1956-2019 (Task 1 NC).

SCORECARD on Task 1/2 availability for the main ICCAT fisheries (final year: 2019)

				SCORES (by time series)			N. flag fisheries ranked			Change (%)
Fishery ID	Species grou	Species	Species/stoc	10 years (2010-19)	20 years (2000-19)	30 years (1990-19)	10 years (2010-19)	20 years (2000-19)	30 years (1990-19)	agains't 1990-18 (30
1	Temperate tunas	ALB	ALB-N stock	7.32	7.38	7.07	11	14	12	-1%
2			ALB-S stock	6.09	5.98	5.65	9	10	10	2%
3			ALB-M stock	6.78	3.78	2.52	6	9	11	12%
4		BFT	BFT-E stock	8.72	7.13	5.98	8	8	10	2%
5			BFT-E stock	5.85	4.46	3.38	17	21	28	2%
6			BFT-W stock	9.68	8.88	8.68	7	8	9	1%
7	Tropical tunas	BET	BET-A stock	7.65	7.21	6.40	27	28	29	-1%
8		YFT	YFT-E regior	7.96	7.46	6.52	16	20	23	0%
9			YFT-W regio	5.38	5.01	4.63	21	24	24	0%
10		SKJ	SKJ-E stock	7.89	7.77	6.88	15	16	18	0%
11			SKJ-W stock	4.44	4.67	4.09	3	3	4	-12%
12	SWO & billfish	SWO	SWO-N stoc	8.62	8.66	7.87	10	10	11	4%
13			SWO-S stoc	7.09	7.26	7.03	9	9	9	3%
14			SWO-M stoc	6.76	5.30	4.46	8	10	11	1%
15		BUM	BUM-A stoc	3.67	3.90	4.08	31	30	30	-1%
16		WHM	WHM-A stoc	5.80	5.37	5.31	15	18	17	-1%
17		SAI	SAI-E stock	3.34	3.60	3.04	11	13	14	1%
18			SAI-W stock	4.17	3.58	3.60	11	16	18	1%
19		SPF	SPF-E stock	4.75	5.23	2.81	3	4	3	29%
20			SPF-W stock	3.29	3.81	3.48	6	6	6	-1%
21	Major shark species	BSH	BSH-N regio	7.00	4.98	3.74	4	5	5	6%
22			BSH-S regio	6.82	5.81	4.18	7	6	6	6%
23		POR	POR-ANE sto	1.08	0.63	0.39	11	12	8	4%
24			POR-ANW s	3.18	2.86	2.73	8	6	4	3%
25			POR-ASE sto	2.67	1.13	0.70	2	3	4	2%
26			POR-ASW st	1.42	0.77	0.44	3	5	6	0%
27		SMA	SMA-N regio	5.95	4.55	3.02	7	7	6	9%
28			SMA-S regio	7.33	6.26	3.85	6	8	7	6%
29	Small tuna species	BLF	A+M	4.05	3.72	3.04	10	12	15	1%
30		BLT	A+M	2.78	1.51	0.94	18	20	22	17%
31		BON	ATL	3.07	2.68	2.17	22	28	35	13%
32			MED	1.51	1.26	0.74	8	8	8	-11%
33		BRS	A+M	2.50	1.38	0.92	1	3	3	0%
34		DOL	A+M	3.42	2.42	1.82	15	14	14	7%
35		FRI	ATL	5.73	5.36	4.44	21	23	28	3%
36		KGM	A+M	2.65	1.46	1.34	4	7	7	3%
37		LTA	ATL	5.23	4.66	3.76	21	25	32	4%
38			MED	1.12	0.88	0.57	12	15	18	22%
39		MAW	A+M	2.07	2.23	2.05	12	15	21	2%
40		SSM	A+M	0.00	0.00	0.50	3	3	4	-14%
41		WAH	A+M	2.14	2.24	1.71	20	28	36	1%

Figure 2. SCRS scorecard on Task 1/2 data availability for all the major ICCAT species by stock and region (SCRS/2019/045).

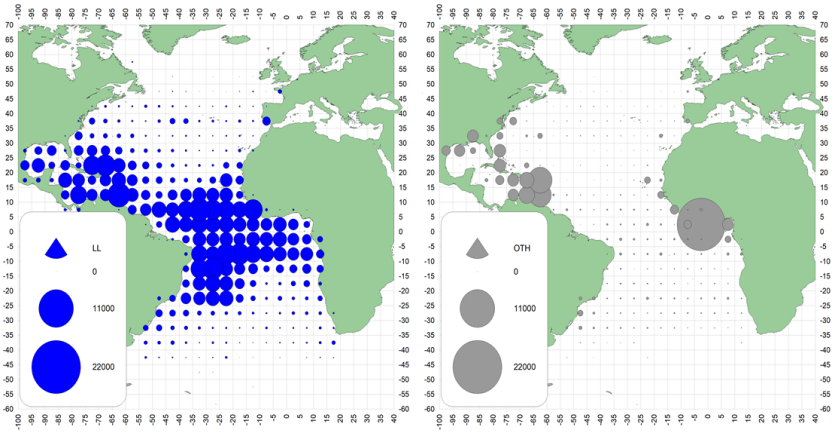

Figure 3. Geographical distribution of BUM catch (t) by major gears all years (1956-2019).

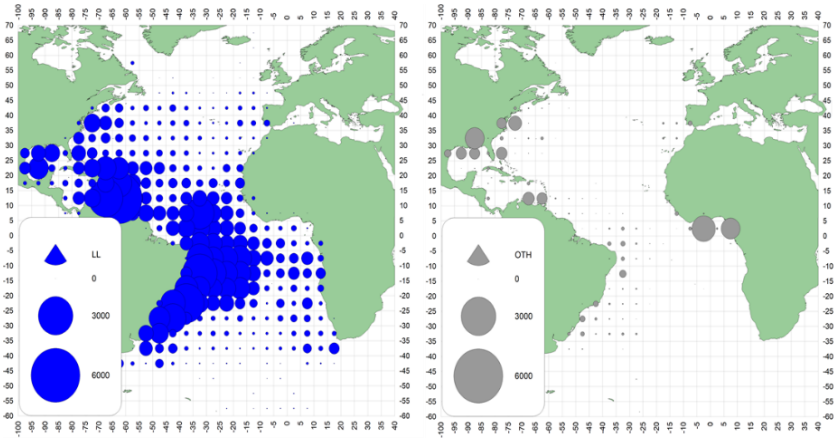

Figure 4. Geographical distribution of WHM catch (t) by major gears all years (1956-2019).

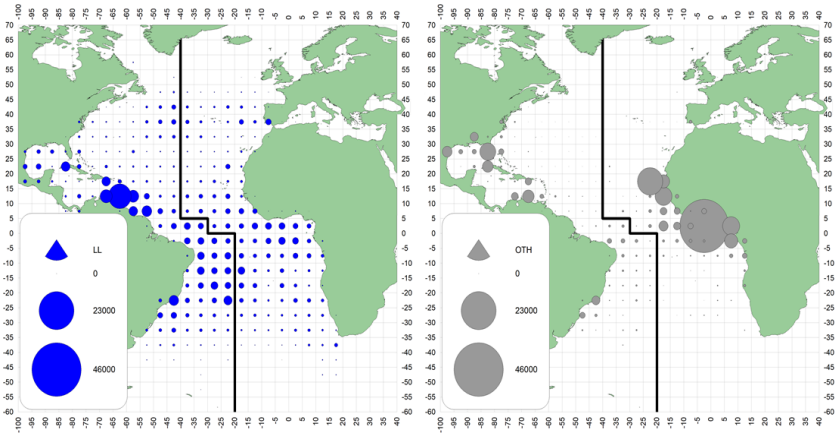

Figure 5. Geographical distribution of SAI catch (t) by major gears all years (1956-2019).

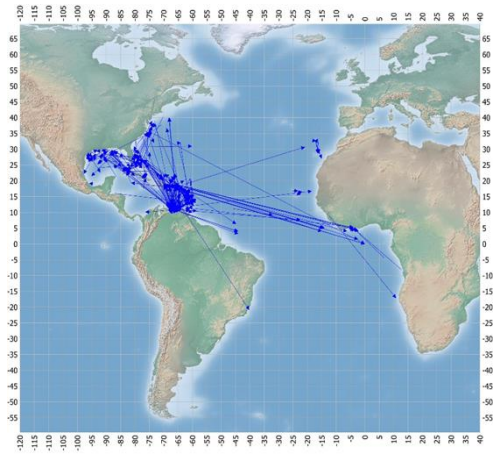

Figure 6. Location of releases and recoveries of tagged Blue marlin (BUM).

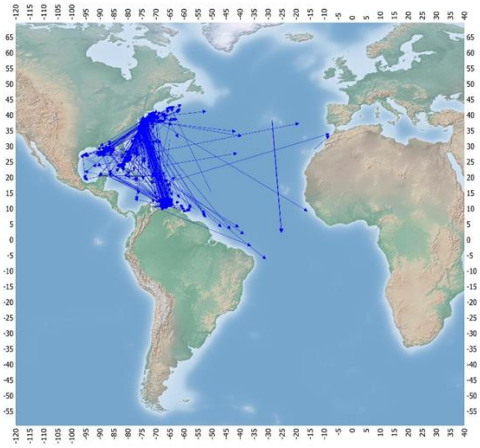

Figure 7. Location of releases and recoveries of tagged White marlin (WHM).

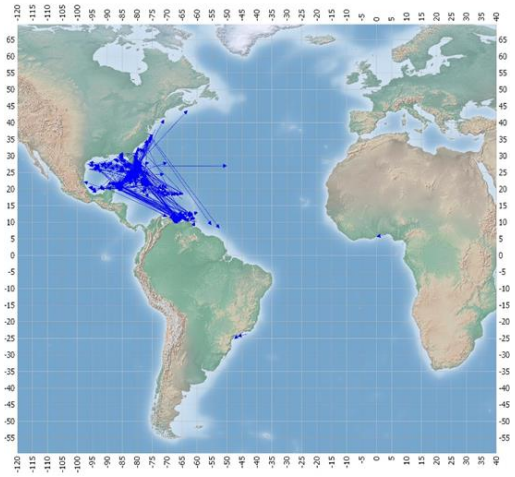

Figure 8 Location of releases and recoveries of tagged Sailfish (SAI).