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**INTERNATIONAL COMMISSION  
for the  
CONSERVATION of ATLANTIC TUNAS**

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**2020 SCRS ADVICE TO THE  
COMMISSION**  
*English version*

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MADRID, SPAIN

2020

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**2020 SCRS ADVICE TO THE COMMISSION**  
(September 2020)

**1. General remarks by the SCRS Chair**

The COVID-19 pandemic has imposed a number of restrictions on the operational capability of the SCRS and its Sub-committees and Working Groups. It has also required that the SCRS focus its activities on priority activities for 2020, while preparing for moving forward in 2021 when things will hopefully be back to normal.

To provide scientific advice to the Commission the SCRS has proposed to concentrate on providing an updated Executive Summary for only those species which have undergone a stock assessment (Atlantic Albacore, Porbeagle, Mediterranean Swordfish and Bluefin Tuna) in 2020. In addition, the Sub-committees and Working Groups have been requested to develop workplans for 2021, define research recommendations, and to address Responses to the Commission to those for which sufficient information and time was available.

This document reflects the *SCRS 2020 advice to the Commission*, in a modified version of the usual SCRS report, and contains only the discussions and recommendations associated with the four priority activities listed above. All other advice to the Commission will remain consistent with the 2019 Report of the SCRS.

Once the text is finalized by each Species Group, it will be translated into the 3 official ICCAT languages and circulated among the CPC's Head Scientists for adoption by correspondence. While this process is not ideal it does provide an open and transparent mechanism to provide up to date scientific advice for specific stocks where available. It is anticipated that this process (the whole *SCRS 2020 advice to the Commission*) will be completed by 11/12 September, at the latest, with the complete report adopted by correspondence by the CPCs on 25 September 2020.

During the period of adoption by correspondence, I will closely work with the SCRS Vice-Chair and the Secretariat, to gather and include to the extent possible the CPCs' comments. Due to the limited time available, for the adoption by correspondence I would appreciate that the Head Scientists of ICCAT CPCs focus on the scientific content of the document, keeping any editorial suggestions they might have to a minimum, to ensure the 25 September deadline is met. Our aim is to give the Commission at least two weeks to read the SCRS advice report and be able to draft their management proposals before the deadline fixed by the Commission Chair.

Dr. Gary Melvin

**2. Admission of participants to the meetings and scientific documents and presentation**

Throughout 2020 representatives of 30 Contracting Parties were present at the SCRS meetings: Algeria, Barbados, Brazil, Cabo Verde, Canada, Côte d'Ivoire, Egypt, El Salvador, European Union, Gabon, Ghana, Guatemala, Honduras, Japan, Korea (Rep.), Mexico, Morocco, Nicaragua, Norway, Panama, Russian Federation, Senegal, Sierra Leone, South Africa, St. Vincent and Grenadines, Tunisia, United Kingdom (O.T.), United States, Uruguay and Venezuela. The List of Participants is attached as **Appendix 1**.

Representatives from the following Cooperating non-Contracting Parties, Entities, or Fishing Entities (Chinese Taipei, Colombia and Costa Rica), inter-governmental organizations (ACAP, Food and Agricultural Organization – FAO, Indian Ocean Tuna Commission – IOTC, UNEP/CMS), non-Contracting Parties (Jamaica) and non-governmental organizations (Associação de Ciências Marinhas e Cooperação – SCIAENA, Birdlife International – BI, Defenders of Wildlife, Ecology Action Centre – EAC, Federation of Maltese Aquaculture Producers – FMAP, International Seafood Sustainability Foundation – ISSF, Marine Stewardship Council – MSC, Monterey Bay Aquarium, Pew Charitable Trusts – PEW, The International Pole and Line Foundation – IPNLF, The Ocean Foundation, The Shark Trust and World Wild Fund – WWF) were admitted as observers and welcomed to the 2020 meetings of the SCRS (see **Appendix 1**).

Thorough 2020 125 scientific papers and 61 scientific presentations had been submitted at the different SCRS meetings. In 2015 a deadline of seven days before the beginning of the Species Groups meetings was established for submitting the full documents. In 2019 it was agreed to also apply the same deadline for the submission of presentations. The objective of this deadline is to facilitate the work of the rapporteurs in preparing the meeting. Taking into account the limited time that the Groups have to complete their work, adherence to deadlines greatly contributes to improving the work of the SCRS.

Besides the scientific documents, there are 12 reports of intersessional and regular Species Groups meetings. The List of SCRS Documents and Presentations is attached as **Appendix 2**. In addition, as of 22 September 2020, 32 Annual Reports from the Contracting Parties, and non-Contracting Cooperating Parties, Entities and Fishing Entities, were provided to the Secretariat, which are available in the original languages in the SCRS ownCloud folder ([here](#)).

### 3. Report of Secretariat activities in research and statistics

The Secretariat summarized its activities, data reported, publications, website updates, and other information contained in the 2020 Secretariat Report on Research and Statistics related to fisheries and biological data submitted for 2019, which included revisions to historical data. The activities and information included in this report refer to the period between 1 October 2019 and 3 September 2020 (the reporting period).

Regarding the activities conducted by the Secretariat in the most recent years, in addition to the normal activities on statistics, publications, data funds management and others, due to the impact of the pandemic on the SCRS activities the Secretariat dedicated a lot of additional work to the preparation of and attendance to SCRS meetings, as well as supporting the Commission and SCRS officers on planning the rescheduling of the meetings and manage all related correspondence work. Moreover, it participated extensively in stock assessment activities, and conducted extensive work related to coordination and management of external support to the SCRS data collection and research programmes and activities. The Secretariat's participation in these programmes mainly consisted in both administrative and scientific support, including the coordination of research proposals, calls for tenders, database management, fund administration, and oversaw auditory and accounting responsibilities, as well as IT support for each programme. As in the past, during 2020 the Secretariat actively participated in all data collection and research programmes components. Finally, the Secretariat highlighted the effort being made on the development of the ICCAT Integrated Online Management System (IOMS), a system designed to manage online all the ICCAT data requirements in the future. This is a long-term project intended to replace entirely the current ICCAT data reporting system. Two new senior software developer experts, were hired in 2019 to work full-time on the IOMS implementation.

A total of 59 ICCAT CPCs (53 Contracting Parties (CP), plus six Cooperating non-Contracting Parties, Entities, Fishing Entities (NCC)) have reporting obligations to ICCAT. For statistical purposes, this corresponds to a total of 77 flag related CPCs (51 CP + 1 CP [16 EU Member States] + 1 CP [4 UK Overseas Territories Member States] + 6 NCC) who have reported information to ICCAT in recent years. The term "flag CPC" was adopted here to refer to those 77 flags. The Secretariat reiterated to the CPCs the Commission's requirement of using the most recent standard electronic forms for data submission and complete all the information requested.

The Secretariat has continued the series of periodic publications developed throughout the history of ICCAT, which includes: 76 (completed issues 1,2 4 and 6; published issues 8 and 11) and volume 77 (already published issues 1 to 3) of the *ICCAT Collective Volume of Scientific Papers; Part II of the Biennial Period 2018-2019*, corresponding to Volume I (Commission meeting report) and Volume II (SCRS Plenary meeting report) was published, whereas Volume III (Annual Reports) and Volume IV (Secretariat reports) will be published during the last trimester of 2020. Volume 46 of the Statistical Bulletin will be published in an electronic version. The new edition will provide the catches and other statistics series for the period 1950 to 2018, and will be available in October 2020.

In June 2018, the Secretariat concluded the development and released the new ICCAT web site, which uses HTML5 technology and CSS3 style. With a new structure, the ICCAT web site can be accessible and can be used in a more user-friendly mode from different mobile devices, tablets and portable computers. Improvements have been made to the structure, databases, documents and pages with the aim of improving browsing and results in the global search engine, which will be made available on our web site as soon as possible.

In 2012, the SCRS approved a protocol to use the Data Fund and other ICCAT funds. This protocol defines a broad structure for use of the funds which includes improvement of statistics, training and support of SCRS work, including attendance at meetings. The protocol also includes the criteria to be followed for allocation of funds. In 2020 the funds managed by the Secretariat have been used in support of the following SCRS activities:

- Participation in SCRS meetings: arrangements were made for 5 scientists from Algeria, Brazil, Mauritania, Namibia and Tunisia to attend the swordfish Species Group meeting, which was subsequently cancelled and held online.
- Improvement of statistics: A training course has been planned on building the capacity of data collection in industrial tropical tuna fisheries in Gabon (date to be confirmed) and rebuilding the statistical and fisheries data collection system in Liberia has received financial support from the ICCAT - Japan Capacity-Building Assistance Project (JCAP-2).
- SCRS activities funded the following:
  - Short-term contract for collection of biological samples for growth study on billfish in the eastern Atlantic;
  - Short-term contract for collection of biological samples for studies on genetics, growth and maturity of Small Tunas - SMTYP;
  - Short-term contract for ICCAT swordfish biological samples collection for growth, reproduction and genetics studies;
  - Short-term contract for modelling approaches: support for the ICCAT North Atlantic swordfish from MSE process.
  - Short-term contract to improve the working framework for assessment of the North Atlantic albacore management strategy;
  - Electronic PSAT tagging of Atlantic and Mediterranean swordfish, Atlantic albacore and Atlantic pelagic sharks;
  - Study on the genetic structure of the shortfin mako shark stock based on mitochondrial analysis;
  - Workshop on sampling and biology of ICCAT small tunas (funding for 12 participants).

#### **4. Reports of intersessional SCRS meetings**

The reports of the intersessional meetings held in 2020 have been posted in the [ICCAT current meetings webpage](#).

##### ***4.1 SCRS Process and Protocol meeting***

The SCRS Process and Protocol meeting was held in Madrid, Spain, 20-22 February 2020. During the meeting a number of suggestions were made to help the process of updating the SCRS Strategic Plan, that was adopted in 2014 for the period 2015-2020. The potential use of online meetings/conferences and collaboration software as communication tools was discussed, and it was agreed that these tools can benefit the SCRS, serving as a complement for in-person meetings.

SCRS funding was also discussed and the Secretariat highlighted the importance of CPCs' voluntary contribution to the SCRS budget in recent years. The Group noted that efforts should be made to strike a better balance between funding availability and what is required to carry out the mandate of the SCRS. Therefore, the science budget should be secured primarily through the regular budget and not rely on voluntary contributions which currently are only provided by less than 10% of CPCs, though in-kind contributions are provided by many more CPCs but are difficult to estimate.

The Secretariat provided an overview of Secretariat tasks related to SCRS activities and put forward a proposal to limit the number of current intersessional meetings due to the current workload and available staff. The Group expressed its sympathy for the workload of the Secretariat but noted some concerns with the proposal for limiting the total number of meetings. It noted that more support should be sought from the Commission to increase human resources at the Secretariat. The Secretariat also presented a proposal on the “new” Task 3 related data and how it fits in the ICCAT current data dissemination policy, which the Group agreed to refer to *Biological sampling data*.

The Secretariat also presented a “Proposal for Amendment of the Rules and Procedures for the protection, access to, and dissemination of data compiled by ICCAT”, which is contained in Appendix 11 to the Report for Biennial Period 2018-2019, Part II (2019), Vol. 2), that should have been discussed at the 2019 SCRS plenary meeting. It was agreed the document would be circulated to the conveners/rapporteurs of the SCRS Working Groups and that a new draft incorporating all their inputs should be presented to the 2020 Meeting of the Sub-committee on Statistics for review and adoption by the SCRS at the 2020 plenary meeting. Other discussions included the Programs Steering Committees, new templates for the Species Executive Summaries and SCRS stock status summary table.

Finally, the Group put forward a number of recommendations related to: prioritization process for SCRS research; research funding; data issues; composition of data collection and research programs’ Steering Committees; and, Exemptions from reporting requirements SHK 7005 and BIL 5001.

The detailed report is available [here](#).

#### **4.2 Bluefin MSE Technical Group meeting**

The intersessional meeting of the Bluefin MSE Technical Group was held in Madrid, Spain, February 24-28, 2020. The Group discussed the interim grid of Operating Models (OMs) and associated robustness test based on the findings of the intersessional works by the BFT MSE Contractor since September 2019. Based on the OM grid presented by the Contractor, the Group agreed to change to the new mixing method (corresponding to achieving a certain proportion of western stock total biomass being in the East area on average over 1965-2016) and to include a new uncertainty axis corresponding to length-composition data log-likelihood weighting. In total, the Group recommended 96 OMs (3 Recruitment, 2 Biology, 2 Mixing, 4 SSB Scale and 2 Weights for log likelihood levels) for the interim grid. The list of robustness tests was updated for the newly proposed interim grid with the priority of the calculations, and the OMs for the exploratory tests were also specified. In addition, the Group provided index selection criteria for potential inclusion in Candidate Management Procedures (CMPs) and statistical methods to simulate these indices. Given the criteria, the Group suggested that all available indices were retained for potential use in CMPs, except Canadian Gulf of St. Lawrence CPUE and Canadian acoustic survey. Approaches to plausibility-weight OMs used in the other RFMOs (IWC and CCSBT) were presented and discussed. The Group recommended a “Hybrid approach” involving selected elements of IWC-like and CCSBT-like approaches could provide the greatest flexibility for dealing with the issues. All materials will be further discussed at the BFT intersessional meeting for their final approval and decision.

The detailed report was provided [here](#).

#### **4.3 First Intersessional Meeting of the Bluefin Species Group**

The first intersessional Bluefin tuna Species Group meeting was held online from 14 to 22 May 2020. Stock assessment model development and diagnostics were conducted based on the updated data following the workplan by SCRS 2019. The assessments follow as much as possible the concept of a “strict update” of the 2017 models used to provide the advice: VPA for the eastern BFT, and VPA and Stock Synthesis for the western BFT. The specifications of final base case models were agreed by accepting some modifications. The projection settings were agreed, and the final stock assessment and the projection results will be reviewed and finalized at the 2020 July BFT Species Group meeting.

The ongoing BFT MSE works on developments of Operating Models and Candidate Management Procedure were also discussed based on the 2020 February BFT MSE Technical Group meeting results. Several concerns related to the reference OM set, and the MSE process were raised and formed the basis for explorations to be conducted prior to the July meeting. The path forward developed represents an

aspirational proposal to conclude the MSE work in time for the adoption of an MP in the Autumn of 2021. However, the current pandemic has precluded the in-person meetings originally deemed necessary to complete tasks such as the adoption of the reference grid and the plausibility weighting. It was noted that the MSE process will probably experience a delay until several critical tasks can be completed.

The detailed report was provided [here](#).

#### ***4.4 Second Intersessional Meeting of the Bluefin Species Group***

The online second intersessional Bluefin tuna Species Group meeting was held from 20 to 28 July 2020. Stock assessments were conducted as updates to provide the advice: VPA for the eastern BFT, and VPA and Stock Synthesis for the western BFT, where the procedures in 2017 were followed as closely as possible, except for issues where the Group considered that modification was of absolute necessity.

Under the terms of reference for a strict update and the time available, the group could not conduct substantial evaluations to improve assessment models or to substantially improve data and index treatments from the 2017 assessment. As such, various reservations raised in 2017 remain. For the Eastern stock, uncertainty in the 2020 results increased compared to 2017, which once more brings into focus the need to investigate alternative assessment models to the VPA. For the West, the models exhibited greater stability, however concerns over conflicting signals in the indices, a long-standing issue for the West, remain.

The Group revised and updated the Atlantic Bluefin tuna Executive Summaries, workplan and MSE roadmap to be finalized during the Species Group meeting. Due to the limited time, discussions on the ongoing BFT MSE work have been postponed. While completion of the MSE remains the priority, the Group also recognizes that several issues related to indices, the existing stock assessment models and substantive responses to the commission such as growth in farms require focused research. To address these issues, the Group has commissioned additional subgroups. For 2021 the Group recommends meetings devoted primarily to MSE development, and to continue funding to support the essential work of GBYP, including funding of the MSE development process, biological studies and the full GBYP workplan. The Group was informed about an external review of the GBYP aerial survey agreed by the GBYP steering Committee and also will request an external review of MSE in 2021.

The detailed report is available [here](#).

#### ***4.5 Intersessional Meeting of the Swordfish Species Group***

In 2019 the SCRS elaborated a workplan for 2020 that included an intersessional meeting for the Swordfish Species Group, with the major focus on the progress of the swordfish biological and stock structure projects, and the development of the North Atlantic Swordfish MSE process. The SCRS also planned to conduct the next stock assessment for the Mediterranean stock in May 2020. Therefore, this meeting, which due the COVID-19 pandemic was held online between 16-20 March 2020, also addressed data preparatory issues related to Mediterranean swordfish in advance to the stock assessment meeting.

The Mediterranean swordfish (SWO-M) catch data were subject to large revisions. The gear discrimination for SWO-M was greatly improved by this Group in recent years, in particular the last three decades, based on the collaboration of the National scientists and the new information obtained under an ICCAT data recovery projects (including with partial catches EU-Italy of harpoon, gillnets and longline fisheries between 1972 and 1989). Accordingly, the Group was able to revise the majority of the catch series without gear on the early decades, by reallocating and/or splitting in one or more gears those “UNCL” catches.

Several documents were discussed during the meeting related to progress on the Atlantic and Mediterranean Swordfish Project, including aspects of stock structure, age and growth, reproduction and movements.

The work made in 2019 on the North Atlantic Swordfish MSE was reviewed, including the development of the SWOMSE R package, the Shiny App, the MSE Trial Specifications Document and the MSE Project Progress Sheet. The workplan for 2020 as also discussed and agreed including the implications of the new MSE roadmap adopted by the Commission. The 2020 workplan includes finalizing the OM uncertainty grid, OM Validation and Performance Metrics (including minimum performance limits and how to formulate performance measures).

Finally, several relevant issues for the Mediterranean Swordfish stock assessment meeting were discussed and agreed, namely related to the species biology, fisheries indicators, identification of data inputs and their specifications for the assessments methods to be used.

The detailed report is available [here](#).

#### **4.6 Mediterranean Swordfish stock assessment meeting**

The Mediterranean Swordfish (SWO-M) stock assessment meeting was held online between 25 May and 2 June, 2020. Prior to the assessment, in March 2020 during the Swordfish Species Group meeting a number of relevant decisions were taken regarding data inputs, stock assessment approaches, and their specifications.

Over the last 50 years stock biomass showed declining trends, which is still occurring in recent years. Eight CPCs (descending order of importance: EU Italy, EU-Spain, EU-Greece, Morocco, Tunisia, Algeria, EU-Malta, and Turkey) account for the majority of those catches. However, information on dead discards of undersized SWO catch series is almost absent (with the exception of EU-Greece and EU-Spain in some years). Therefore, the best scientific estimations of SWO-M total removals were used in the assessment.

Two age structured models XSA and a4a (Assessment for All) and one Bayesian State-Space Production Model (JABBA) were used in the assessment. However, due to conflicts between the catch history and the initial low stock biomass in 1985 on the age structured models, the Group decided to provide the scientific advice for the Mediterranean swordfish stock combining the results of both JABBA models that considered different production functions (Schaefer and Pella-Tomlinson model type). The results showed with 86.7% probability that stock biomass remains below levels that can produce MSY in 2018, with a 41.1% probability that the stock is overfished and overfishing is still occurring (red) and a 45.6% probability that the stock is overfished but overfishing is not occurring (yellow). In summary, the current Mediterranean swordfish biomass ( $B_{2018}$ ) remained below  $B_{MSY}$ , while the current fishing mortality rate is close to and/or below the sustainable level ( $F_{MSY}$ ) that would allow for rebuilding to biomass levels that support MSY in the short to medium term.

Several scenarios were simulated assuming different levels of TAC, aiming stock rebuilding according to Commission objectives. Due to uncertainties on stock productivity these estimates may be over-optimistic and should be interpreted with caution. Concerns were raised due to under-reporting discards of undersized swordfish, which leads to false estimates of the overall catch volume and consequently bias stock status estimates and projections of future stock size under different management scenarios.

The detailed report is available [here](#).

#### **4.7 Meeting of the ICCAT Working Group on Stock Assessment Methods**

The online intersessional meeting of the stock assessment methods working group was held from 7 to 8 May 2020. A variety of items were discussed: CPUE standardization; longline simulator (LLSIM); incorporation of environmental changes into the assessment process; Harvest Control Rules, and Management Strategy Evaluation (MSE); approaches to estimate the level of IUU catches; AOTTP preliminary results; and review of stock assessment software catalogue. The Group had an extensive discussion on MSE, and reiterated the importance of interactions among SCRS, managers, and stakeholders to exchange guidance and feedback on key pieces in ICCAT's ongoing MSE processes. It was also recommended that the SCRS, through WGSAM, develop a standardized set of plots and/or tables to be used for presenting MSE results for all ICCAT stocks. The main recommendations with financial implication from the meeting were the use of LLSIM datasets as capacity building for training methods in CPUE standardization, and that an MSE Independent Peer Review composed of a panel of at least three independent reviewers would be a review of past and current practices, recommendations for improvements and a subsequent design of a generalized framework for the MSE process suited to the ICCAT process.

The detailed report was provided [here](#).

#### **4.8 Porbeagle Stock Assessment Meeting**

The meeting was held online 15-22 June 2020. It focused on the stock assessment of northwest Atlantic porbeagle (POR: *Lamna nasus*) shark, and the southwest and southeast stocks, to the extent possible.

The most up-to-date information available in the ICCAT database system (ICCAT-DB) was revised, namely the fishery statistics data (Task I and Task II). For the northwest stock, the Secretariat used an alternative approach to the one used in Anon. (2009) to estimate non-reported catches (landings and dead discards) for CPCs that have not reported landings and or dead discards in the period 2008-2018, and that have reported catches of porbeagle shark prior to 2008. It was noted that reporting of dead discards continues to be very limited and some landings could remain unreported. CPUE data available for any analysis were limited, but the Group reviewed exploratory indices of abundance from Japanese, Canadian and Uruguayan data. The available length composition data assembled for the meeting was also reviewed.

A total of four modeling approaches were used: the Sustainability Assessment for Fishing Effects (SAFE) approach was used to evaluate whether the North and South Atlantic stocks were experiencing overfishing; the Incidental Catch Model (ICM) was used to evaluate whether the northwest Atlantic stock was overfished and to determine the stock's capacity for future removals; length-based approaches were explored for the northwest, southwest, and southeast stocks, and the performance of input control management options explored in a preliminary MSE approach for the northwest stock. While some preliminary simulation results for a porbeagle MSE were presented, the main intent of the MSE was not to draw any specific conclusions, but rather to demonstrate that analyzing the performance of management procedures was feasible for porbeagle and that there may be some effective input control options for management of this species.

Results of the SAFE approach indicated that neither the combined North Atlantic nor the combined South Atlantic stocks are undergoing overfishing. The Group noted that while this is a data-poor approach, the overfishing status results were robust to the selectivity curve assumed and the post-release mortality value used in the computation of post-capture mortality. The Group noted that for the South Atlantic results are in line with those found in the Southern Hemisphere (SH) assessment, with  $F/F_{MSY}$  values from both studies being of relatively similar magnitude (0.063, range: 0.046 to 0.083 for 2006-2014 in the SH assessment vs. 0.113, range: 0.107-0.119 for 2010-2018 in the SAFE analysis).

The most likely ICM formulation estimated that biomass in 2018 for the northwest stock was 57% of the proxy for biomass at MSY and a 98% probability of the stock being overfished in 2018. Projections predicted that removals of less than 7,000 sharks (214 t) would allow rebuilding with a 60% probability by 2070 (a projection interval of 2.5 generations) and removals of less than 8,000 sharks (245 t) would allow rebuilding with a 50% probability by 2060 (2 generations). According to this formulation, reconstructed removals during 2014-2018, which averaged 47 t, would allow rebuilding with at least a 50% probability sometime between 2030 and 2035.

The detailed report was provided [here](#).

#### ***4.9 Atlantic Albacore Stock Assessment meeting***

The Albacore tuna Species Group included in their workplan for 2020, a stock assessment of the Northern (N-ALB) and Southern (S-ALB) Atlantic Albacore stocks. The stock assessment of these stock took place online between 29 June and 8 July 2020. The Group updated the stock assessment for N-ALB and assessed the S-ALB based on the updated and available data until 2018, following the 2020 SCRS workplan. Assessment results indicated that both stocks are in the green quadrant of the Kobe plot, e.g. not being overfished nor experiencing overfishing. For the N-ALB the Group provided management advice for the 2021- 2023 period following the interim Harvest Control Rule adopted by the Commission in 2017, with a recommended TAC of 37,801 t. For the S-ALB management advice indicates that catches up to 30,000 t are expected to maintain the stock levels above  $B_{MSY}$  until 2033 with a probability higher than 60%. The Group also reviewed the N-ALB MSE process, considering the exceptional circumstances criteria and definitions, and updated the MSE roadmap adopted by the Commission for the 2021-2024 period.

The Group adopted the workplan for 2021 including an updated proposal for the Albacore Research Programme that includes now the North and South Atlantic stock. It was also discussed the Research needs for the Mediterranean stock, expecting to be included soon in the Albacore Research Programme.

The detailed report is available [here](#).

## 5. Executive Summaries on species

The COVID-19 pandemic has imposed a number of restrictions on the operational capability of the SCRS and its Species Groups. Therefore, to provide scientific advice to the Commission the SCRS has concentrated on updating the Executive Summary for only those species which have undergone a stock assessment (Atlantic Albacore, Porbeagle, Mediterranean Swordfish and Bluefin Tuna) in 2020. However, updated Task 1 catches as of 3 September 2020 for all major species are contained in **Appendix 12**, while additional related information is provided in **Addendum 1 to Appendix 8**.

The Committee reiterated that in order to achieve a more rigorous understanding of these Executive Summaries from a scientific point of view, the previous Executive Summaries should be consulted, as well as the corresponding detailed reports which are published in the *Collective Volume of Scientific Papers*.

The Committee also pointed out that the texts and tables of these Summaries generally reflect the information available in ICCAT by 4 September 2020, since they were prepared during the meetings of the Species Groups. Therefore, the catches reported to ICCAT during or after the above date cannot be included in these Summaries.

## **5.1 ALB – ATLANTIC ALBACORE**

The status of the North and South Atlantic albacore stocks is based on the analyses conducted in July 2020 by means of using the available data up to 2018. Complete information on the assessment can be found in the Report of the 2020 ICCAT North and South Atlantic Albacore Stock Assessment Meeting (Anon. 2020a).

The status of the Mediterranean albacore stock is based on the 2017 assessment using available data up to 2015. Complete information is found in the Report of the 2017 ICCAT Albacore Species Group Intersessional Meeting (including assessment of Mediterranean albacore) (Anon. 2017).

### ***ALB-1. Biology***

Albacore is a temperate tuna widely distributed throughout the Atlantic Ocean and Mediterranean Sea. On the basis of the biological information available for assessment purposes, the existence of three stocks is assumed: northern and southern Atlantic stocks (separated at 5°N) and a Mediterranean stock (**ALB-Figure 1**). However, some studies support the hypothesis that various sub populations of albacore exist in the North Atlantic and Mediterranean. Likewise, there is likely intermingling of Indian Ocean and South Atlantic immature albacore which needs further research.

Scientific studies on albacore stocks, in the North Atlantic, North Pacific and the Mediterranean, suggest that environmental variability may have a serious potential impact on albacore stocks, affecting fisheries by changing the fishing grounds, as well as productivity levels and potential MSY of the stocks. Those yet sufficiently unexplored aspects might explain recently observed changes in fisheries, such as the lack of availability of the resource in the Bay of Biscay in some years, or the apparent decline in the estimated recruitment which are demanding focussed research.

The expected life-span for albacore is around 15 years. While albacore is a temperate species, spawning in the Atlantic occurs in tropical waters. Present available knowledge on habitat, distribution, spawning areas and maturity of Atlantic albacore is based on limited studies, mostly from past decades. In the Mediterranean, there is a need to integrate different available studies so as to better characterize growth of Mediterranean albacore. Besides some additional recent studies on maturity, in general, there is poor knowledge about Mediterranean albacore biology and ecology in some areas.

More information on albacore biology and ecology is published in the [ICCAT Manual](#).

### ***ALB-2. Description of fisheries or fishery indicators***

#### *North Atlantic*

The northern stock is exploited by surface fisheries targeting mainly immature and sub-adult fish (50 cm to 90 cm FL) and longline fisheries targeting immature and adult albacore (60 cm to 130 cm FL). The main surface fisheries are carried out by EU fleets (Ireland, France, Portugal and Spain) in the Bay of Biscay, in the adjacent waters of the Northeast Atlantic, including the Azores Islands in summer and autumn, and in the vicinity of the Canary Islands year around. The main longline fleet is the Chinese Taipei fleet which operates in the central and western North Atlantic year around. However, Chinese Taipei fishing effort decreased in the late 1980s due to a shift towards targeting tropical tunas, and then continued at this lower level to the present. Over time, the relative contribution of different fleets to the total catch of North Atlantic albacore has changed, which resulted in differential effects on the age structure of the stock. Since the 1980s, a reduction of the area fished for albacore was observed for both longline and surface fisheries.

Total reported landings, steadily increased since 1930 to peak above 60,000 t in the early 1960s, declining afterwards, largely due to a reduction of fishing effort by the traditional surface (troll and baitboat) and longline fisheries (**ALB-Table 1; ALB-Figure 2**). Some stabilization was observed in the 1990s and early 2000s, mainly due to increased effort and catch by new surface fisheries (driftnet and mid-water pair pelagic trawl). The lowest catch level of the whole time series was observed in 2009 with 15,375 t, but catches have substantially increased since then, and have fluctuated around the TAC in the last few years.

The preliminary total reported catch in 2019 was 34,772 t (above the TAC of 33,600 t), and the catch in the last five years has remained around 30,000 t. During the last years, the surface fisheries contributed to approximately 80% of the total catch (**ALB-Table 1**). The reported catch for 2019, when compared with the average of the last five years, was higher for EU-Spain, EU-Ireland and EU-France.

Longline catch contributed to approximately 15% of the total catch during the last five years. During the last decades, both Chinese Taipei and Japan have reduced their fishing effort directed to albacore. In the case of Japan, albacore was taken mainly as by-catch. The catch reported in 2019 for Japan and for Chinese Taipei was above the last 5-year average.

#### *South Atlantic*

During the last decades, the total annual South Atlantic albacore landings were largely attributed to five fisheries, namely the surface baitboat fleets of South Africa and Namibia, and the longline fleets of Chinese Taipei, Brazil and Japan (**ALB-Table 1**; **ALB-Figure 2**). The surface fleets are albacore directed and mainly catch sub-adult fish (70 cm to 90 cm FL). These surface fisheries operate seasonally, from October to May, when albacore is available in coastal waters. The longline Chinese Taipei fleet operates over a larger area and throughout the year, consisting of vessels that target albacore and vessels that take albacore as by-catch, in bigeye directed fishing operations. On average, the longline vessels catch larger albacore (60 cm to 120 cm FL) than the surface fleets.

Albacore landings increased sharply since the mid-1950s to reach values oscillating around 25,000 t between the mid-1960s and the 1980s, 35,000 t until the last decade when they oscillated around 20,000 t. However, total reported albacore landings for 2017 decreased to 13,825 t, which is among the lowest values in the time series. The preliminary total reported catch in 2019 was 15,640 t. The Chinese Taipei catch in the last years has decreased compared to historical catches, mainly due to a decrease in fishing effort targeting albacore.

In 2019, the estimated South African and Namibian catch (mainly baitboats) was below the average of the last five years. During the last decades, Japan took albacore as bycatch using longline gear, but recently Japan is again targeting albacore and increased the fishing effort in waters off South Africa and Namibia (20°-40°S). Thus, catches during the last decade have substantially increased compared to those in the last few decades.

#### *Mediterranean*

During the last assessment, the catch series was revisited, and after revision, some series were included in the ICCAT database. In 2019, the reported landings were 2,402 t, below those in the last decade (**ALB-Table 1** and **ALB-Figure 2**). The majority of the catch came from longline fisheries. EU-Italy is the main producer of Mediterranean albacore, with around 50% of the catch during the last 10 years. In 2019 the Italian catch remained similar to the last five years average. 2015 was an unusual year in that the fishing pattern was very different as compared to previous years, possibly related to the anticipation of management measures directed to Mediterranean swordfish that modified the fishing strategy in 2015. Therefore, the relative abundance estimates for 2015 CPUE indices were not used in the assessment.

### **ALB-3. State of stocks**

#### *North Atlantic*

In the 2013 benchmark stock assessment, several model formulations (Multifan-CL, Stock Synthesis, VPA and ASPIC) with varying degrees of complexity were used. This allowed the modeling of different scenarios that represented different hypotheses, and the characterization of the uncertainty around the stock status. The results showed that although the range of estimated management benchmarks was relatively wide, most models were in agreement that the stock was overfished, and no model indicated that the stock was undergoing overfishing. The analyses conducted in 2013 involved a large amount of data preparation and scrutiny, and the Committee suggested that future assessment updates could be conducted using simpler models (e.g. production models).

Thus, in 2016 a production model was used to assess the stock status. A thorough revision of North Atlantic Task 1 data was conducted and catch rate analyses were improved and updated with new information for the northern albacore fisheries up to and including data to 2014. Decisions on the final specifications of the base case model were guided by first principles (e.g. knowledge of the fisheries) and data exploration (e.g. correlation between indices). The management procedure (MP) tested within the Management Strategy Evaluation (MSE) was similar to the process followed during the 2016 assessment. Thus, in 2020, the same assessment approach was replicated in order to provide advice according to the MP. The results of these efforts are reflected in the following summaries of stock status that analyzed data through 2018.

The same five CPUE indices (four longline and one baitboat) were used in a production model framework, using the same model configuration as the 2016 assessment (**ALB-Figure 3**). Despite their variable pattern, these indices showed an overall increasing trend during the last decade.

The biomass dynamic model results suggest a biomass drop between 1930 and the 1990s and a recovery since then, while fishing mortality decreases. Relative to MSY benchmarks, the base case scenario estimates that the stock remained slightly overfished with  $B$  below  $B_{MSY}$  between the late 1970s and the 2000s, but has now recovered to levels well above  $B_{MSY}$  (**ALB-Figure 4**). Peak relative fishing mortality levels in the order of 1.66 were observed in the early 1980s but overfishing stopped in the early 2000s, with the current  $F_{2018}/F_{MSY}$  ratio being 0.62. The uncertainty around the current stock status has a clear shape determined by the strong correlation between parameters estimated by the production model. The probability of the stock currently being in the green area of the Kobe plot (not overfished and not undergoing overfishing,  $F < F_{MSY}$  and  $B > B_{MSY}$ ) is 98.4% while the probability of being in the yellow area (overfished,  $B < B_{MSY}$ ) is 1.66%. The probability of being in the red area (overfished and undergoing overfishing,  $F > F_{MSY}$  and  $B < B_{MSY}$ ) is 0% (**ALB-Figure 4**).

Sensitivity analyses revealed that recent stock status indicators are not very sensitive to removing some individual CPUE data points and that the  $B/B_{MSY}$  trajectory showed minimal changes when removing up to 3 years of data at the end of the series, whereas removing 4 years yielded a similar result to the last assessment.

Historical trends of biomass levels are lower than the estimates from the 2016 stock assessment. This is not unexpected and the MSE accounts for this type of behavior. None the less, biomass is still estimated to have been increasing since the 1990s. The stock is estimated to be in the green area of the Kobe plot with very high probability.

#### *South Atlantic*

In 2020, a stock assessment of South Atlantic albacore was conducted including catch and effort data up until 2018, and considering similar methods as in the previous assessment.

For the South Atlantic stock, the standardized CPUE indices are mainly based on longline fisheries, which catch mostly adult albacore. The same three longline CPUEs that were used in 2016 were also selected to update the 2020 stock assessment results. The longest time series of Chinese Taipei showed a strong declining trend in the early part of the time series followed by a less steep decline over the next three decades (similar to the Japanese longline index), and an increasing trend since the early 2000s. The Uruguayan longline CPUE series showed a decrease since the 1980s (**ALB-Figure 5**). The Chinese Taipei CPUE was the only index that informed stock trends in recent years. In addition, standardized CPUE series from the Brazilian longline (2002-2018) and the South African baitboat fishery were made available, which were used for sensitivity analyses.

In the 2020 assessment the Committee selected a base case to best represent the population dynamics of albacore and uncertainty around stock status as well as impact of alternative fishing scenarios. Base case model results suggest that biomass increased since fishing mortality started to decrease in the early 2000s, and currently there is a 99.4% probability that the South Atlantic albacore stock is neither overfished nor subject to overfishing, with only 0.6% probability for the stock to be overfished. The median MSY value was 27,264 t (ranging between 23,734 t and 31,567 t), the median estimate of current  $B_{2018}/B_{MSY}$  was 1.58 (ranging between 1.14 and 2.05) and the median estimate of current  $F_{2018}/F_{MSY}$  was 0.40 (ranging between 0.28 and 0.59). The wide confidence intervals reflect the large uncertainty around the estimates of stock status (**ALB-Figure 6**).

### *Mediterranean*

In 2017, the stock assessment for Mediterranean albacore was conducted using catch data up until 2015 and CPUE data up until 2014. The methods used were coherent with the “limited data” category of this stock. The methods applied included a length-based catch curve analysis and a Bayesian state space surplus production model (JABBA).

Two standardized CPUE series for EU-Spain and EU-Italy longline fisheries were used during this last assessment (**ALB-Figure 7**). In addition, a larval index independent of the fishery, providing information on the trends of the spawning biomass, was used. These indices showed a general decreasing trend for the period 2010-2014.

The results of the 2017 assessment, based on the limited information available, show that the status of the stock is highly uncertain with respect to both fishing mortality and biomass. Despite the high uncertainty, the results would seem to indicate that recent albacore median biomass levels are at about  $B_{MSY}$ , and median fishing mortality levels are below  $F_{MSY}$  (**ALB-Figure 8A**). The probability of being in the red, yellow, orange and green parts of the Kobe plot is 35.7%, 14.1%, 1.7% and 48.5%, respectively (**ALB-Figure 8B**).

However, the Committee noted the lack of CPUE estimates in 2015. Given the recent downward trends of the available series, it is very important to corroborate, in the coming years, whether this trend continues or not. However, the Committee reiterates that the ability to monitor stock trends is limited, and that the currently used fishery dependent indices might be affected by the ban imposed as part of the swordfish recovery plan.

During 2018-2020, two of the three indices used in the last evaluation (the larval index and the Spanish longline index), as well as a new one from the Spanish recreational fishery have been updated. The larval index showed a general decreasing trend in the last years (2012-2016). Both the Spanish longline and the Spanish recreational indices showed a relatively stable trend for the most recent period (2014-2018).

### **ALB-4. Outlook**

#### *North Atlantic*

In 2017, the Commission adopted a Harvest Control Rule (HCR) for North Atlantic albacore and used it to set a 3-year (2018-2020) TAC (Rec 17-04). Using MSE, this HCR was tested as part of an MP prior to and since adoption. The MP uses the results of a production model with parameters and indices similar to those used in the 2016 assessment. The MSE results suggest that managing the stock according to the tested MP would meet the management objectives for this stock (Rec 16-06), i.e. to be in the green quadrant of the Kobe plot with a probability higher than 60%. As with every MSE process, MP and MSE testing can be further improved and expanded in the future (see workplan). In addition, the adopted HCR could be converted into a full MP as detailed in **ALB-Table 3**.

Since 2018, the HCR adopted in Rec. 17-04 was tested together with variants accounting for i) the carry over, ii) the effect of setting a lower TAC limit of 15,000 t, iii) the effect of applying the 20% stability clause when  $B_{CUR} > B_{LIM}$ , iv) the effect of 20% maximum TAC reduction and 25% maximum TAC increase when  $B_{LIM} < B_{CUR} < B_{THR}$ , v) the effect of 20% maximum TAC reduction and 25% maximum TAC increase when  $B_{CUR} > B_{LIM}$ , and vi) the absences of one or more indices for the stock assessment. Results indicate that the HCR adopted in Rec. 17-04 and all the above tested variants achieve ICCAT’s management objective of maintaining stocks in the green quadrant of the Kobe plot with at least 60% probability. Compared to a perfect implementation of the TAC, the carry over scenario (i) produced lower yield and stability, but better stock condition and safety. Historically, catch has remained below TAC in most of the years and has only occasionally been slightly above the TAC (see **ALB-Figure 2**). The carry over effect was tested assuming that these historical differences between catch and TAC would remain in the future, and the Committee notes that the results of the analyses might differ under other assumptions. The other variants tested (ii, iii, iv, v) led to more stability together with comparable yield and while meeting the objective of being in green area of the Kobe plot with more than 60% probability (**ALB-Figure 10**).

It should be noted that there are some differences between the 2020 stock assessment process and the MP tested within the MSE. Examples of differences include 1) the use of five indices rather than four, 2) the availability of catch and indices only until two years prior, rather than one year prior, and 3) an index evaluation process that resulted in some index values for some years being excluded based on the judgement that they were not reflective of abundance trends. However, the Committee considered that these differences were not sufficient to preclude the use of the 2020 stock assessment results to set the TAC for the next 3 years by applying the interim HCR. As discussed in the Workplan, the Committee intends to develop a new MSE that will further address these issues.

The harvest control rule applied to the current biomass ( $B_{2019}$  in the Summary Table below) estimated in the 2020 stock assessment results in a TAC of 37,801 t for 2021-2023. This represents a 12.5% increase with respect to the previous one and is in line with the positive stock status estimated in the 2020 assessment. If the Commission would select any of the variants mentioned in the paragraph above, the resulting TAC would be the same. It is noted that this TAC for 2021-2023 is above the MSY estimate for this stock (36,816 t); this is because the current biomass is well above  $B_{MSY}$  ( $B_{2019}/B_{MSY} = 1.32$ ), and therefore this level of catch can be sustained in the near term.

#### *South Atlantic*

The Kobe matrix indicates that catches around the MSY level of 27,000 tons will maintain biomass levels above  $B_{MSY}$  and fishing mortality below  $F_{MSY}$  with a high probability of 90% over the projection horizon through 2033 (**ALB-Table 2**). In fact, due to the current high stock biomass, catches of up to 30,000 tons are expected to maintain stock levels above  $B_{MSY}$  until 2033 with a probability higher than 60%. However, it is important to note that these catch levels would exceed MSY and it would require a reduction in TAC after 2033 to prevent overfishing (**ALB-Table 2**).

#### *Mediterranean*

Due to the limited quantitative information available to the SCRS, the sensitivity of the stock assessment to different sources of information, and the limited prediction skill of the assessment model, the projections for this stock were not conducted. As a result, future stock status in response to constant catch levels could not be quantified.

### **ALB-5. Effect of current regulations**

#### *North Atlantic*

In 2017, the Commission adopted the interim HCR described in **ALB-Figure 9**, with a maximum TAC of 50,000 t and a maximum change of 20% when  $B_{CUR} > B_{THR}$ . Its application established a TAC of 33,600 t for 2018-2020 (Rec. 17-04) and the possibility to carry over some unused portions of the quotas to be caught later in time (Rec. 16-06) remained. The Committee noted that, since the establishment of the TAC in the year 2001, catch remained substantially below the TAC in all but four years (**ALB-Figure 2**), which might have accelerated rebuilding over the last decade. The bulk of the catch is caught by traditional surface fisheries operating in the Bay of Biscay and surrounding waters. Thus, it is likely that the fluctuations in catches reflect the fluctuations in the availability of the resource to those local regional fisheries, and the carry over allows to compensate the fleets for the years when the stock was less available.

Furthermore, Rec. 98-08 that limits fishing capacity to the average of 1993-1995, remains in force. The effect of this recommendation has not been evaluated but a general decrease of fishing mortality has been observed since its implementation.

#### *South Atlantic*

In 2016 the Commission established a new TAC of 24,000 t for 2017-2020 (Rec. 16-07). The Committee noted that, since 2004, reported catches remained below 24,000 t, except in 2006, 2011 and 2012, where reported catches were slightly above this value (**ALB-Table 1**). The Committee did not test for the effect of perfect implementation of the TAC since 2004.

*Mediterranean*

In 2017 the Commission adopted Rec. 17-05, according to which, no increase in catch and fishing effort is allowed until more accurate scientific advice can be provided by the SCRS. Moreover, a time closure of two months (1 October - 30 November), originally aimed at protecting Mediterranean swordfish juveniles, applies to the longline fleet targeting albacore in the Mediterranean from 2017 onwards. Furthermore, the number of vessels for each CPC is limited to the number of vessels that were authorized to target Mediterranean albacore in 2017 under Rec. 16-05.

**ALB-6. Management recommendations***North Atlantic*

Recommendation 16-06 sets the objective of maintaining the stock in the green area of the Kobe plot with a 60% probability while maximizing long-term yield and, if  $B < B_{MSY}$ , to recover it as soon as possible, while maximizing average catch and minimizing inter-annual fluctuations in TAC levels.

In the 2020 assessment, the Committee noted that the relative abundance of North Atlantic albacore has continued to increase over the last decade and is estimated to be in the green area of the Kobe plot with 98% probability. In 2018, an external peer review was conducted confirming that, overall, the MSE framework appears to be scientifically sound and robust to uncertainty. Thus, the interim HCR adopted by the Commission in 2017 had a robust scientific basis. On this basis, and considering that no exceptional circumstances have been detected using the proposed indicators, the Committee recommends to apply the HCR to the current biomass ( $B_{2019}$  in the Summary Table below) estimates to set next TAC for the 2021-2023 period. The recommended TAC obtained by applying the HCR is 37,801 t, which represents a 12.5% increase with respect to the previous one.

Likewise, the additional analyses conducted by the species group in 2018 and 2019 are based on the same MSE framework and suggest that the Commission could adopt alternative harvest control rules to provide additional stability to the fisheries while meeting management objectives. These alternatives include applying the restriction of 20% maximum TAC change when  $B$  is estimated to be higher than  $B_{LIM}$ , and applying the restriction of 20% maximum TAC reduction and 25% maximum TAC increase when  $B$  is estimated to be higher than  $B_{LIM}$ . On the other hand, the Committee noted that imposing the minimum TAC of 15,000 t would also meet management objectives, but would override the application of paragraph 7.c of Rec. 17-04 (with current estimates of  $B_{MSY}$ ,  $F_{MSY}$  and  $MSY$ ) and would no longer follow the graphic form of the HCR (**ALB-Figure 9**). Results also showed that this scenario scored lowest in stock status indicators.

In view of adopting a long-term management procedure (paragraph 17 of Rec 17-04), the Commission would need to select one HCR (either the interim one or one of the variants tested by the SCRS), plus the specifications of the stock assessment procedure. As for the latter, and while additional management procedures are tested in the future, the Committee recommends specifying the elements of the current stock assessment approach, as specified in **ALB-Table 3**. Should the Commission consider adopting an Exceptional Circumstances protocol, the Committee recommends using the indicators provided in the detailed report of the 2020 intersessional meeting (Anon. 2020a).

*South Atlantic*

Results indicate that, most probably, the South Atlantic albacore stock is not overfished and that overfishing is not occurring. Projections at a level consistent with the  $MSY$  (27,264 t) showed that probabilities of being in the green quadrant of the Kobe plot would remain very high (90%) by 2033. In fact, due to the current high stock biomass, catches of up to 30,000 tons are expected to maintain stock levels above  $B_{MSY}$  until 2033 with a probability higher than 60%. However, it is important to note that these catch levels exceed  $MSY$  and it would require a reduction in TAC after 2033 to prevent overfishing (**ALB-Table 2**).

*Mediterranean*

Unfortunately, limited quantitative information is available to the SCRS for use in conducting a robust quantitative characterization on biomass status relative to Convention objectives. Recent fishing mortality levels appear to be below  $F_{MSY}$ , and current biomass is approximately at  $B_{MSY}$  level. However, there is considerable uncertainty about current stock status. For this reason, the Commission should maintain management measures designed to avoid increases in catch and effort directed at Mediterranean albacore. The analyses suggest that catch levels as high as those in the years 2006-2007 (beyond 5,900 t) proved to be clearly unsustainable. Moreover, recent average catches for this stock are close to the estimated  $MSY$ .

Considering the high uncertainty regarding the most recent abundance trends, the Committee recommends maintaining catches below MSY at least until these abundance trends are further updated. The precise level of catch would depend on the level of risk the Commission is willing to take.

<b>ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY</b>			
	<b>North Atlantic</b>	<b>South Atlantic</b>	<b>Mediterranean</b>
Maximum Sustainable Yield	36,816 t (35,761 - 38,039) <sup>1</sup>	27,264 t (23,734 - 31,567) <sup>2</sup>	3,419 t (2,187 - 7,842) <sup>2</sup>
Current (2019) Yield	34,772 t	15,640 t	2,402 t
Yield in last year of assessment (2018)	29,691 t	17,098 t	
Yield in last year of assessment (2015)			2,774 t
B <sub>MSY</sub>	392,556 t (349,403 - 405,097) <sup>1</sup>	124,453 t (79,611-223,424) <sup>2</sup>	29,168 t (17,939-65,861) <sup>2</sup>
F <sub>MSY</sub>	0.093 (0.091-0.108) <sup>1</sup>	0.219 (0.116-0.356) <sup>2</sup>	0.119 (0.072-0.192) <sup>2</sup>
B <sub>2019</sub> <sup>3</sup>	508,074 t (425,273 - 602,157) <sup>1</sup>		
B <sub>current</sub> /B <sub>MSY</sub>	1.32 (1.13 - 1.51) <sup>4</sup>	1.58 (1.14 - 2.05) <sup>5</sup>	1.002 (0.456 - 1.760) <sup>6</sup>
B <sub>2019</sub> /B <sub>LIM</sub> <sup>7</sup>	3.30 (2.83 - 3.78) <sup>1</sup>		
F <sub>current</sub> /F <sub>MSY</sub>	0.62 (0.52 - 0.74) <sup>8</sup>	0.40 (0.28 - 0.59) <sup>9</sup>	0.830 (0.223-2.194) <sup>10</sup>
Stock Status	Overfished: NO Overfishing: NO	Overfished: NO Overfishing: NO	Overfished: NOT LIKELY Overfishing: NOT LIKELY
Management measures in effect:	Rec. 98-08: Limit number of vessels to 1993-1995 average. Rec. 17-04: TAC of 33,600 t for 2018-2020, according to interim HCR. Management objective is to keep the stock in (or rebuild it to) the green area of the Kobe plot with 60% probability, while maximizing catch and reducing variability of TAC.	Rec. 16-07: TAC of 24,000 t for 2017-2020	Rec. 17-05: Time closure of two months (1 October- 30 November) for longlines, aimed at protecting the Mediterranean swordfish juveniles. A list of vessels authorized to target Mediterranean albacore implemented in 2017. No increase of catch and effort until more accurate advice is delivered.
Recommended TAC for the period 2021-2023 as estimated following the HCR adopted in Rec. 17-04	37,801 t		

<sup>1</sup> Median and 80% CI for the base case.

<sup>2</sup> Median and 95% CI for the base case.

<sup>3</sup> The assessment model estimates the biomass at the beginning of the year following the last year of data, this is B<sub>current</sub> as referred in Rec. [17-04].

<sup>4</sup> B<sub>2019</sub>/B<sub>MSY</sub> Median and 80% CI for the base case.

<sup>5</sup> B<sub>2018</sub>/B<sub>MSY</sub> Median and 95% CI for the base case.

<sup>6</sup> B<sub>2015</sub>/B<sub>MSY</sub> Median and 95% CI for the base case.

<sup>7</sup> The interim B<sub>LIM</sub> is 0.4\*B<sub>MSY</sub>.

<sup>8</sup> F<sub>2018</sub>/F<sub>MSY</sub> Median and 80% CI for the base case

<sup>9</sup> F<sub>2018</sub>/F<sub>MSY</sub> Median and 95% CI for the base case

<sup>10</sup> F<sub>2014</sub>/F<sub>MSY</sub> Median and 95% CI for the base case

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ALB-Table 1. Estimated catches (t) of albacore (*Thunnus alalunga*) by area, gear and flag.

	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	
TOTAL	67491	56326	69615	73086	71812	67517	60379	59585	59039	67063	70088	69919	60095	61470	53379	57763	67407	48794	42320	41663	40764	48743	53000	45814	42757	44304	48995	45006	49223	52813	
ATN	36881	27931	30851	38135	35163	38377	28803	29023	25746	34551	33124	26253	22741	25567	25960	35318	36989	21991	20483	15375	19416	19985	25672	24854	26655	25551	30340	28401	29691	34772	
ATS	28714	26016	36562	32813	35300	27552	28426	28022	30595	27656	31387	38796	31746	28005	22545	18916	24453	20283	18867	22265	19225	24129	25282	19457	13702	15199	14336	13825	17098	15640	
MED	1896	2379	2202	2138	1349	1587	3150	2541	2698	4856	5577	4870	5608	7898	4874	3529	5965	6520	2970	4024	2124	4628	2047	1503	2400	3554	4319	2780	2434	2402	
Landings ATN	Bait boat	18624	8968	12436	15646	11967	16411	11338	9821	7562	8780	11072	6103	6638	7840	8128	10458	14273	8496	7931	4994	6026	5530	8816	4975	7341	9265	14455	12196	11330	14024
	Longline	2683	5315	3152	7093	7309	4859	4641	4051	4035	6710	7321	7372	6235	7826	7037	6911	5223	3237	2647	2619	3913	3666	3759	6514	3093	4458	5394	4951	4473	4630
	Other surf.	3865	3999	5173	7279	7506	3555	3337	4078	6846	6817	5971	2828	365	470	577	624	625	525	274	427	231	359	344	816	163	136	95	138	62	156
	Purse seine	1	222	139	229	292	278	263	26	91	56	191	264	118	211	348	99	188	198	70	84	74	0	167	7	35	115	45	38	39	65
	Trawl	1033	469	2603	1779	2131	3049	2571	2877	1318	5343	3547	5374	3846	2369	7001	6385	3429	4321	2811	2026	6852	6678	6558	9184	5771	6299	6611	8820	10816	
	Troll	10675	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4009	5373	7501	10224	10286	6105	5239	4440	7146	3578	5909	5891	6660	5597	3753	4165	4807	4930
ATN	Bait boat	5982	3459	6518	7379	9339	7091	6960	8110	10353	6709	6873	10355	9712	6976	7477	5119	5938	3421	4443	8007	3750	6058	6933	5213	4765	4965	2949	1846	3228	2852
	Longline	21590	22025	27167	23950	24806	20040	21000	19547	19799	20640	24398	28039	21671	20626	14735	12977	17740	15087	13218	12113	13471	16445	17846	13888	8888	10104	11243	11674	13767	12612
	Other surf.	1138	115	360	36	91	10	209	127	0	73	58	377	323	82	299	288	333	1716	1125	1985	1648	1418	64	264	7	0	108	114	84	134
	Purse seine	4	416	2517	1448	1064	412	257	117	434	183	58	25	39	309	16	534	442	58	81	160	355	208	437	91	42	129	36	190	19	3
	Trawl	0	0	0	0	0	0	120	9	52	0	0	0	12	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MED	Bait boat	83	499	171	231	81	163	205	0	33	96	88	77	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Longline	624	524	442	410	350	87	391	348	194	416	2796	2597	3704	4248	2335	1997	3026	4101	2694	2160	1719	2327	1959	1392	2343	3235	4258	2706	2378	2365
	Other surf.	1098	1198	1533	879	766	1031	2435	1991	2426	4271	2693	2196	1757	46	87	169	134	182	246	634	404	1408	8	18	27	58	29	46	40	13
	Purse seine	91	110	6	559	23	0	0	0	0	0	0	0	1	3557	2452	1362	2803	2237	24	1230	0	869	68	86	14	247	7	26	14	18
	Trawl	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	5	0	0	0	0	5	4	9	0	2	1	
	Troll	0	48	50	59	129	306	119	202	45	73	0	0	117	0	0	1	0	1	0	1	0	6	0	3	0	0	2	1	6	
Discards ATN	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	179	209	300	302	160	151	
ATS	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	39
	Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MED	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	6	7	8	10	16	0	0	
Landings ATN CP	Barbados	0	0	0	0	0	0	1	1	1	0	2	5	8	10	13	9	7	7	4	6	4	20	22	13	16	38	32	15	7	
	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	26	39	416	351	155	230	79	1	399	448	385	216	
	Brazil	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Canada	6	5	1	9	32	12	24	31	23	38	122	51	113	56	27	52	27	25	33	11	14	28	34	32	47	32	20	17	26	31
	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	China PR	0	0	0	0	14	8	20	0	0	21	16	57	196	155	32	112	202	59	24	27	142	101	21	81	35	21	103	124	124	129
	Curaçao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	53	39	146	0	0	0	151	549	0	76
	EU.España	25792	17233	18175	18380	16998	20197	16324	17295	13285	15363	16000	9177	8952	12530	15379	20447	24538	14582	12725	9617	12961	8357	13719	10502	11607	14126	17077	13964	15691	16536
	EU.France	3625	4123	6924	6293	5934	5304	4694	4618	3711	6888	5718	6006	4345	3456	2448	7266	6585	3179	3009	1122	1298	3348	3361	4592	6716	3441	4224	4191	5824	7881
	EU.Ireland	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100	755	175	306	521	596	1517	1997	788	3597	3575	2231	2485	2390	2337	2492	3012	3213
	EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
	EU.Portugal	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953	553	513	556	119	184	614	108	202	1046	1231	567	2609	929	1111	2527	498	2493
	EU.United Kingdom	0	0	59	499	613	196	49	33	117	343	15	0	0	0	6	19	30	50	67	118	57	50	133	136	31	0	0	0	0	0
	FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	4	0	7	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grenada	0	0	0	0	0	2	1	6	7	6	12	21	23	46	25	29	19	20	15	18	18	18	0	0	0	0	0	0	0	0
	Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
	Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Japan	737	691	466	485	505	386	466	414																						

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	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			
TOTAL	67491	56326	69615	73086	71812	67517	60379	59585	59039	67063	70088	69919	60095	61470	53379	57763	67407	48794	42320	41663	40764	48743	53000	45814	42757	44304	48995	45006	49223	52813			
ATS CP																																	
Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	0	5	0	0	0	0	0	0	0		
Belize	0	0	0	0	0	2	0	0	0	8	2	0	0	0	0	0	54	32	31	213	303	365	171	87	98	0	123	219	311	158			
Brazil	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228	2647	522	556	361	535	487	202	271	1269	2077	2016	462	490	658	497	396	1003			
Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	46	24	0	5	0	5	0	0	0	0	0	0	0	0	0		
China PR	0	0	0	0	0	0	0	0	0	39	26	30	26	112	95	100	35	25	89	97	80	61	65	34	120	94	185	116	132				
Curaçao	0	0	0	0	0	0	0	9	192	0	2	0	0	0	0	0	0	0	0	21	4	4	24	0	0	1	14	10	0	0	0		
Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	43	45	50	0	0	0	0	0	6	19		
EU.España	0	280	1943	783	831	457	184	256	193	1027	288	573	836	376	81	285	367	758	933	1061	294	314	351	369	259	418	195	347	303	186			
EU.France	0	50	449	564	129	82	190	38	40	13	23	11	18	63	16	478	347	12	50	60	109	53	161	73	38	53	17	78	16	3			
EU.Portugal	732	81	184	483	1185	655	494	256	124	232	486	41	433	415	9	43	8	13	49	254	84	44	11	1	3	1	9	9	11	3			
EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		
Ghana	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	5	10	14	25	0	0	0	0	0	0	0	0	0	0	0	
Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	56	0	0	15	0	1	3	1	0	0	0		
Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	1		
Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	74	0	0	0	0	0	0	0	0	0	
Honduras	0	0	29	0	0	2	0	7	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Japan	587	654	583	467	651	389	435	424	418	601	554	341	231	322	509	312	316	238	1370	921	973	1194	2903	3106	1131	1752	1096	1189	2985	1527			
Korea Rep.	19	31	5	20	3	3	18	4	7	14	18	1	0	5	37	42	66	56	88	374	130	70	89	33	2	4	48	86	167	170			
Maroc	0	8	92	68	24	24	0	5	4	0	0	0	14	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Namibia	0	0	0	0	1111	950	982	1199	1429	1162	2418	3419	2962	3152	3328	2344	5100	1196	1958	4936	1320	3791	2420	848	1057	1062	994	214	888	260			
Panama	4	240	482	318	458	228	380	53	60	14	0	0	0	0	17	0	87	5	6	1	0	12	3	0	6	5	13	1					
Philippines	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	52	0	13	79	45	95	96	203	415	18	0	0	0	0	0	0	0	0
Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
South Africa	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507	3469	4502	3198	3735	3797	3468	5043	4147	3380	3553	3510	3719	4030	2065	1785	2572	2455			
St. Vincent and Grenadines	0	0	2	0	29	30	41	0	23	0	2116	4303	44	0	0	65	160	71	51	31	94	92	97	110	100	107	101	98	31				
Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
U.S.A.	0	0	0	0	0	0	1	5	1	1	1	2	8	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UK.Sta Helena	1	5	28	38	5	82	47	18	1	1	58	12	2	3	1	35	62	46	94	81	3	120	2	2	0	0	0	0	0	0	0	0	0
Uruguay	55	34	31	28	16	49	75	56	110	90	90	135	111	108	120	32	93	34	53	97	24	37	12	209	0	0	0	0	0	0	0	0	0
Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	684	1400	96	131	64	104	85	35	83	91	0	0	0	0	0	0	0	0
NCC Chinese Taipei	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351	13288	10730	12293	13146	9966	8678	10975	13032	12812	8519	6675	7157	8907	9090	9227	9626			
NCO																																	
Argentina	151	60	306	0	2	0	0	120	9	52	0	0	12	18	0	0	0	0	0	0	130	43	0	0	0	0	0	0	0	0	0	0	0
Cambodia	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuba	2	17	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEI (ETRO)	0	0	28	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEI (Flag related)	0	149	262	146	123	102	169	47	42	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MED CP																																	
EU.Croatia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	12	20	30	11	7	2	2	1			
EU.Cyprus	0	0	0	0	0	0	0	0	0	6	0	0	12	30	255	425	507	712	209	223	206	222	315	350	377	495	542	568	624	652			
EU.España	84	548	227	298	218	475	429	380	126	284	152	200	209	1	138	189	382	516	238	204	277	343	389	244	283	53	51	206	71	68			
EU.France	121	140	11	64	23	3	0	5	0	0	0	0	1	0	0	0	0	2	1	0	1	2	0	0	1	1	0	0	0	0	0	0	0
EU.Greece	500	500	500	1	1	0	952																										

**ALB-Table 2.** South Atlantic albacore estimated probabilities (in %) based on Bayesian surplus production model that the stock fishing mortality is below  $F_{MSY}$  (a), biomass is above  $B_{MSY}$  (b) and both (c). Projections for constant catch levels (16000 t to 34000 t) are shown.

(a) Probability  $F < F_{MSY}$

TAC   Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
16000	100	100	100	100	100	100	100	100	100	100	100	100	100
18000	100	100	100	100	100	100	100	100	100	100	100	100	100
20000	100	100	100	100	100	100	100	100	100	100	100	100	100
21000	100	100	100	100	100	100	100	100	100	100	100	100	100
22000	100	100	100	100	100	100	100	100	100	100	99	99	99
23000	100	100	100	100	100	100	99	99	99	99	99	99	99
24000	100	100	100	99	99	99	99	99	99	99	99	98	98
25000	100	100	99	99	99	99	98	98	98	98	98	97	97
26000	99	99	99	99	98	98	98	97	97	96	95	95	94
27000	99	99	98	98	97	97	96	95	94	93	92	91	90
28000	99	98	98	97	96	95	93	92	91	89	87	86	84
29000	99	98	97	96	94	93	90	88	85	82	80	77	74
30000	98	97	96	94	91	89	85	81	78	73	70	65	62
32000	97	95	92	88	82	76	69	62	56	49	44	39	35
34000	95	91	85	77	67	57	48	40	32	27	22	19	16

(b) Probability  $B > B_{MSY}$

TAC   Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
16000	100	100	100	100	100	100	100	100	100	100	100	100	100
18000	100	100	100	100	100	100	100	100	100	100	100	100	100
20000	100	100	100	100	100	100	100	100	100	100	100	100	100
21000	100	100	100	99	99	99	99	99	99	99	99	99	99
22000	100	100	100	99	99	99	99	99	99	99	99	99	99
23000	100	100	100	99	99	99	99	99	99	99	99	99	98
24000	100	99	99	99	99	99	99	99	98	98	98	98	98
25000	100	100	99	99	99	99	98	98	98	98	97	97	97
26000	100	99	99	99	99	99	98	98	97	97	96	95	95
27000	100	99	99	99	98	98	97	97	96	95	94	93	92
28000	100	99	99	99	98	97	96	95	94	93	91	90	88
29000	100	99	99	98	98	97	96	94	92	90	88	85	83
30000	100	99	99	98	97	96	94	92	89	86	83	79	76
32000	100	99	99	98	96	93	89	85	80	74	68	62	56
34000	100	99	98	96	93	89	82	75	66	58	49	42	36

(c) Probability of green status ( $B > B_{MSY}$  and  $F < F_{MSY}$ ).

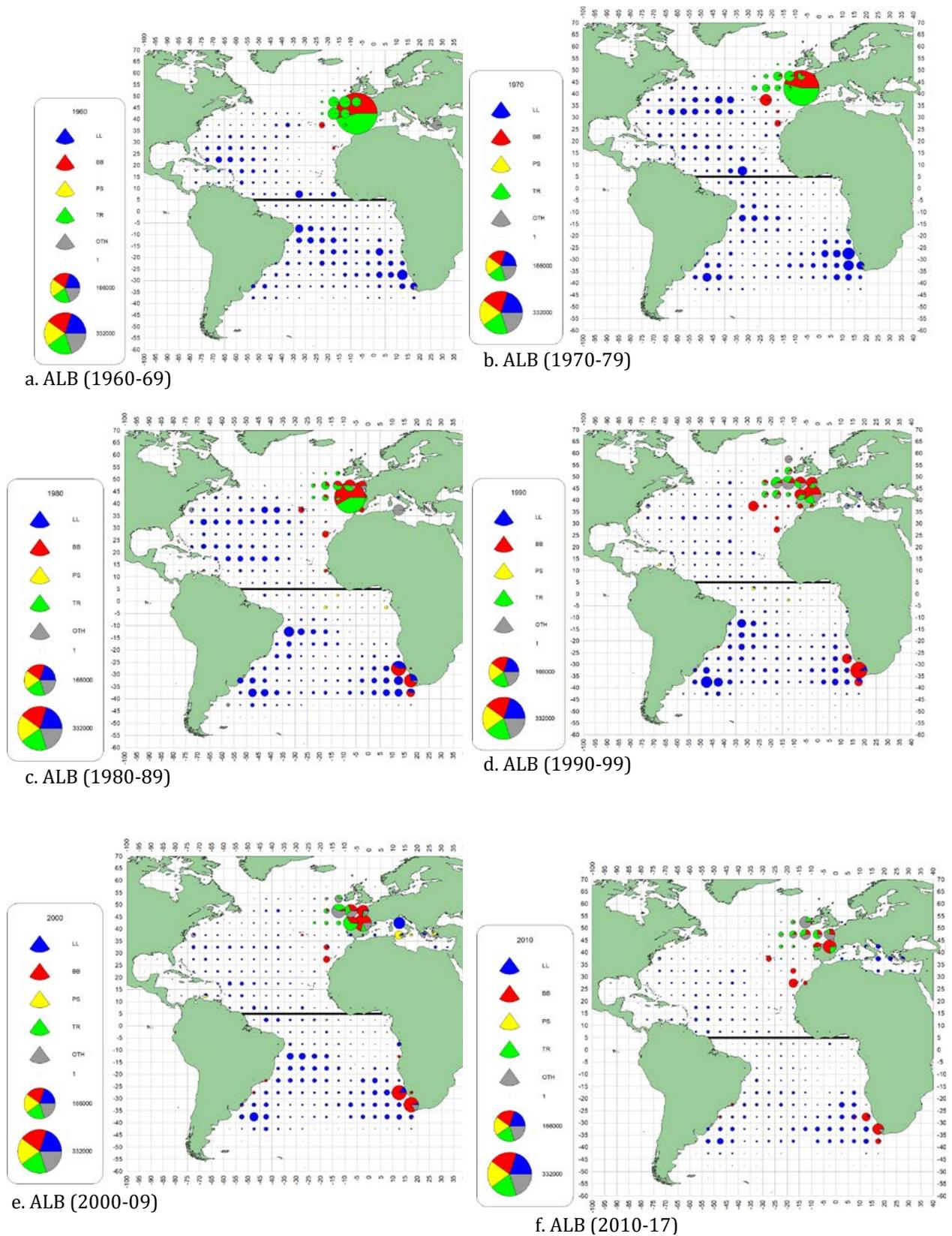
TAC   Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
16000	100	100	100	100	100	100	100	100	100	100	100	100	100
18000	100	100	100	100	100	100	100	100	100	100	100	100	100
20000	100	100	100	100	100	100	100	100	100	100	100	100	100
21000	100	100	100	99	99	99	99	99	99	99	99	99	99
22000	100	100	100	99	99	99	99	99	99	99	99	99	99
23000	100	100	99	99	99	99	99	99	99	99	99	98	98
24000	100	99	99	99	99	99	99	98	98	98	98	98	98
25000	100	99	99	99	99	98	98	98	98	97	97	97	96
26000	99	99	99	98	98	98	97	97	96	96	95	94	94
27000	99	99	98	98	97	97	96	95	94	93	92	91	90
28000	99	98	98	97	96	95	93	92	90	89	87	85	83
29000	99	98	97	96	94	93	90	88	85	82	79	77	74
30000	98	97	96	94	91	89	85	81	78	73	69	65	61
32000	97	95	92	88	82	76	69	62	56	49	44	39	35
34000	95	91	85	77	67	57	48	40	32	27	22	19	16

**ALB-Table 3.** North Atlantic albacore specifications for the management procedure (MP).

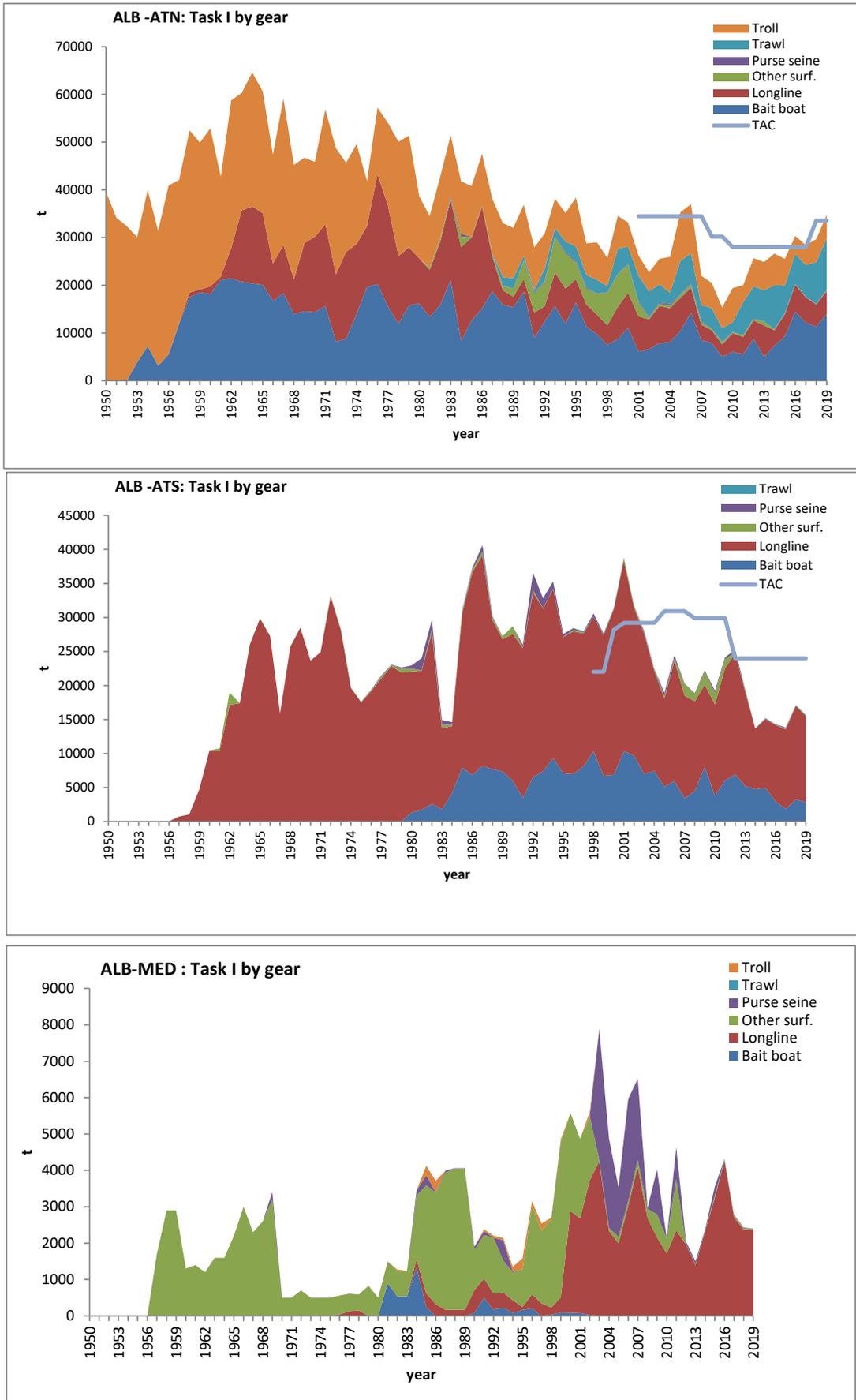
- Indices:

Index	First year
Chinese Taipei LL late	1999
Japan bycatch LL	1988
Spanish baitboat	1981
US LL	1987
Venezuelan LL	1991

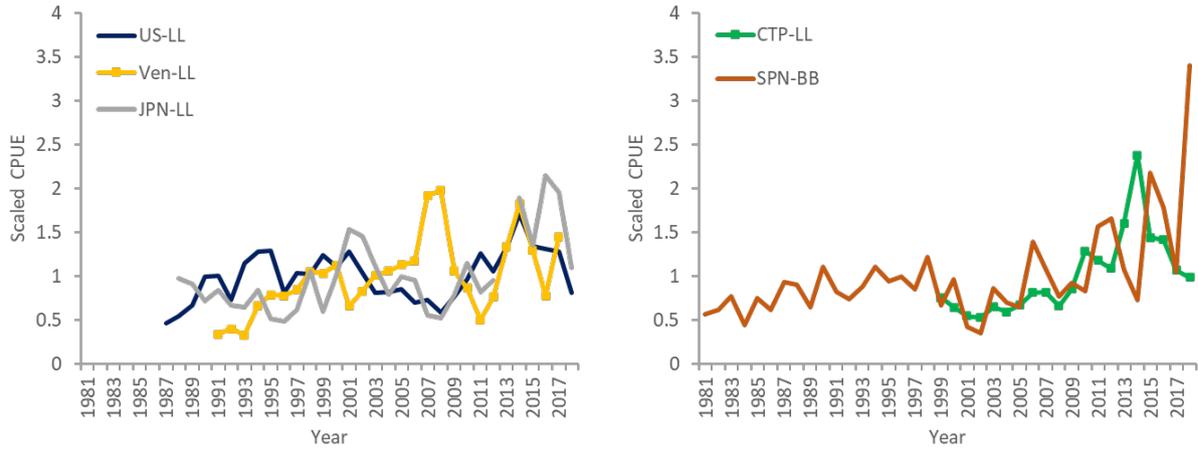
- Software: *mpb*
- Model: Fox (biomass dynamic), with the following specifications:
- Catch time series start year: 1930
- Catch and CPUE time series final year:  $t-1$  preferably ( $t-2$  otherwise) where  $t$  is the year of the MP iteration (when the TAC is set for year  $t+1$ ,  $t+2$  and  $t+3$ ).
- Biomass at the start of the time series =  $K$
- Variance treatment for the CPUE indices: model weighted



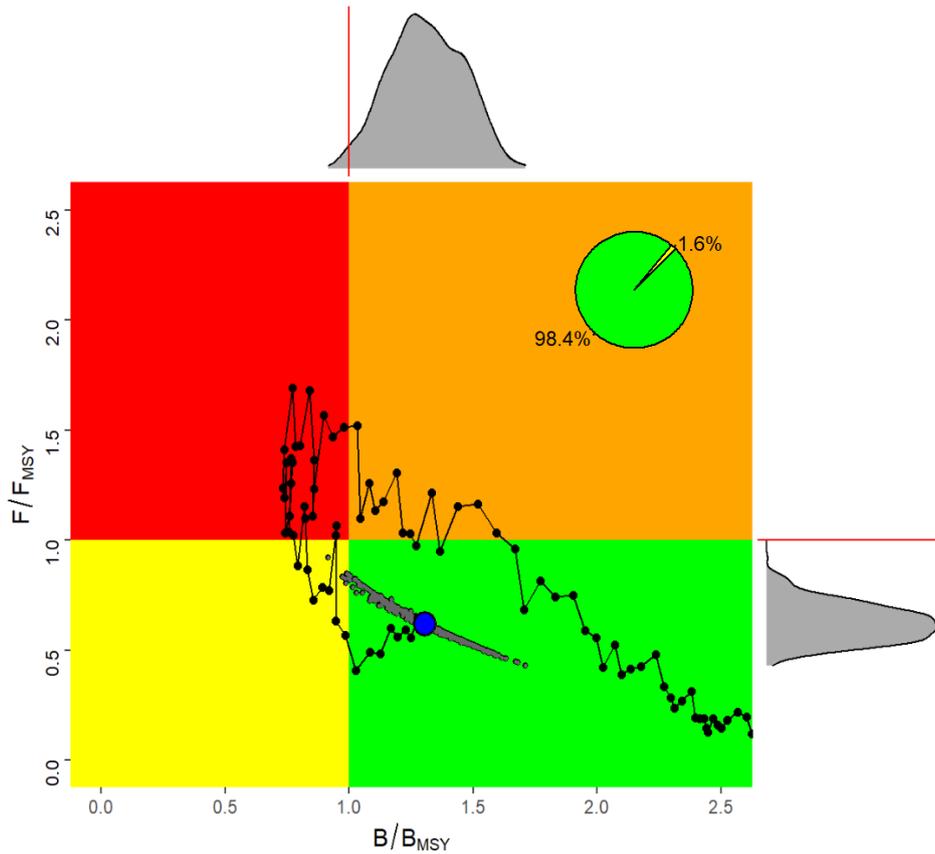
**ALB-Figure 1.** Geographic distribution of albacore accumulated catch by major gears and decade (1960-2018). Baitboat and troll catches prior to the 1990s, these catches were assigned to only one 5°x5° stratum in the Bay of Biscay. Plots are scaled to the maximum catch observed from 1960 to 2017 (last decade only covers 8 years).



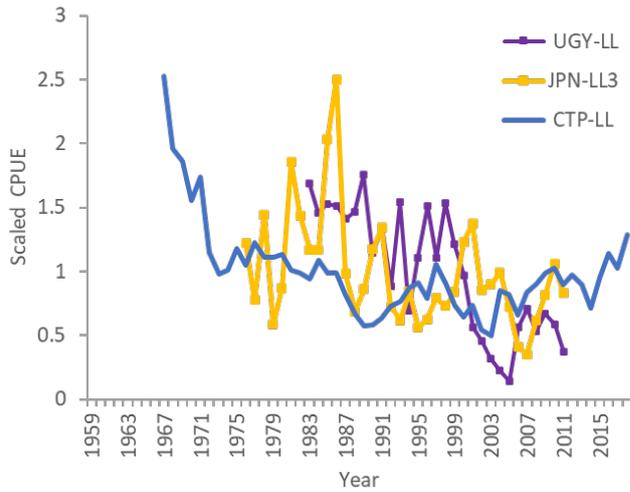
**ALB-Figure 2.** Total albacore catches reported to ICCAT (Task I) by gear for the northern (top), southern (middle) Atlantic stocks including TAC, and the Mediterranean (bottom) stock.



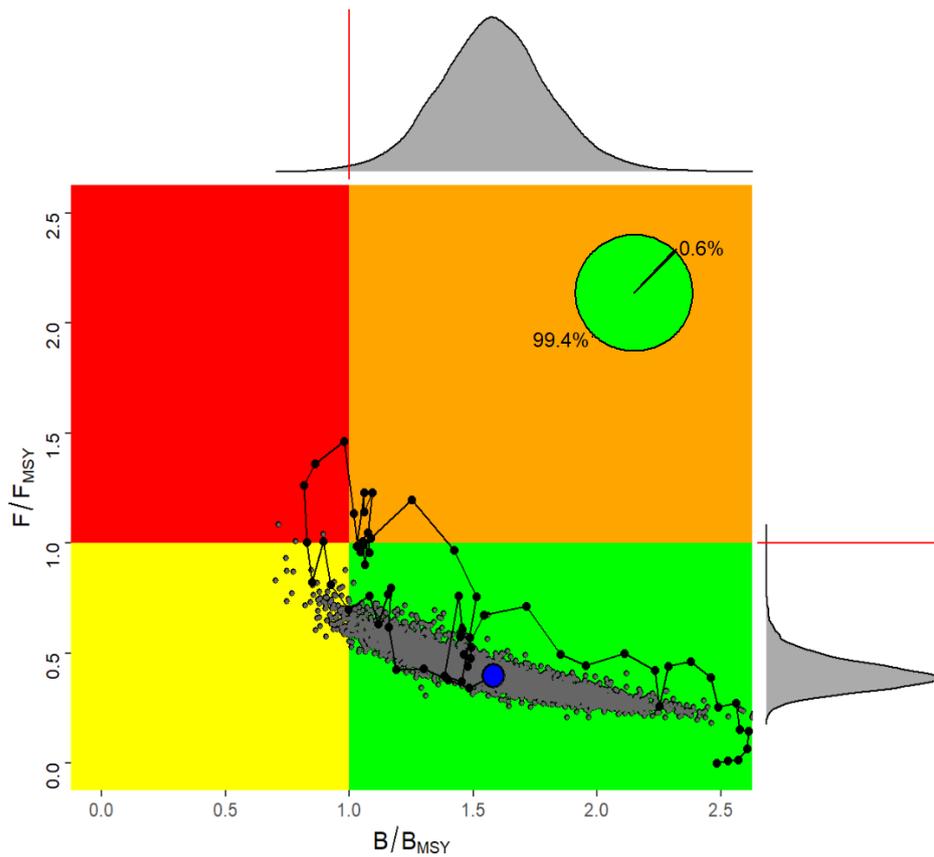
**ALB-Figure 3.** North Atlantic albacore. Standardized catch rate indices used in the 2020 stock assessment from the surface fishery (baitboat) which take mostly juvenile fish, and from the longline fisheries which take mostly adult fish.



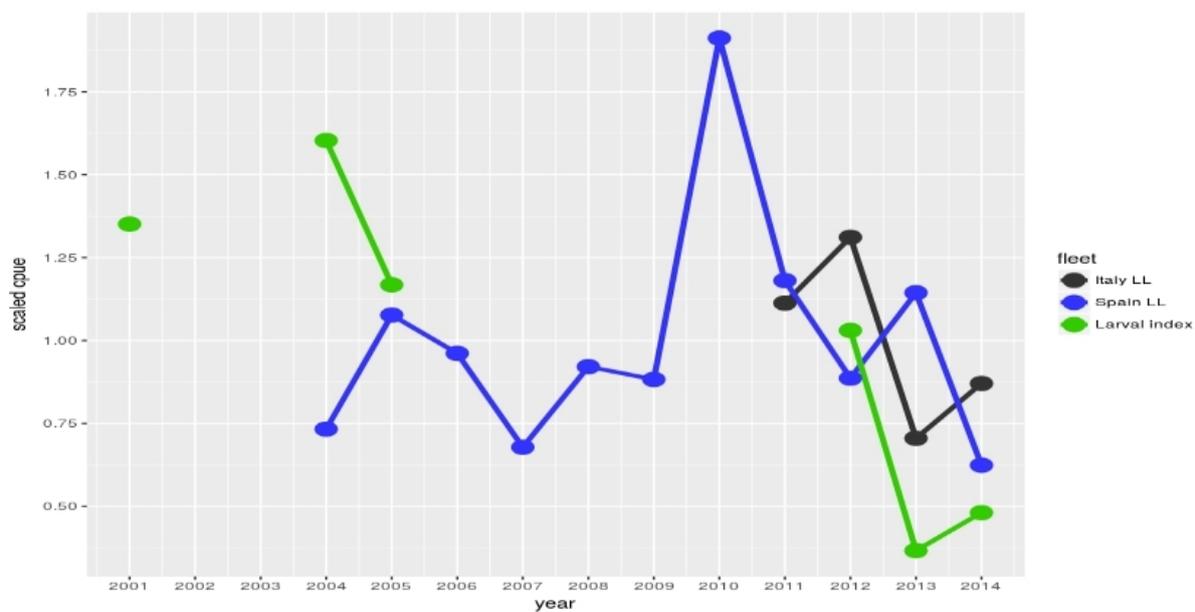
**ALB-Figure 4.** North Atlantic albacore (Kobe plot). Stock status trajectories of  $B/B_{MSY}$  and  $F/F_{MSY}$  over time (1930-2018), as well as uncertainty (grey dots) around the current ( $F_{2018}/F_{MSY}$ ,  $B_{2018}/B_{MSY}$ ) estimate (blue point) based on Surplus production model with probability of being overfished and overfishing (red, 0%), of being neither overfished nor overfishing (green, 98.4%), and of being overfished (yellow, 1.6%).



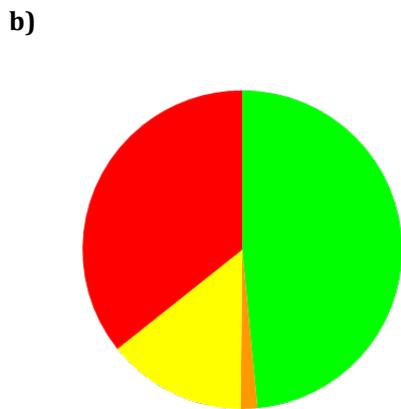
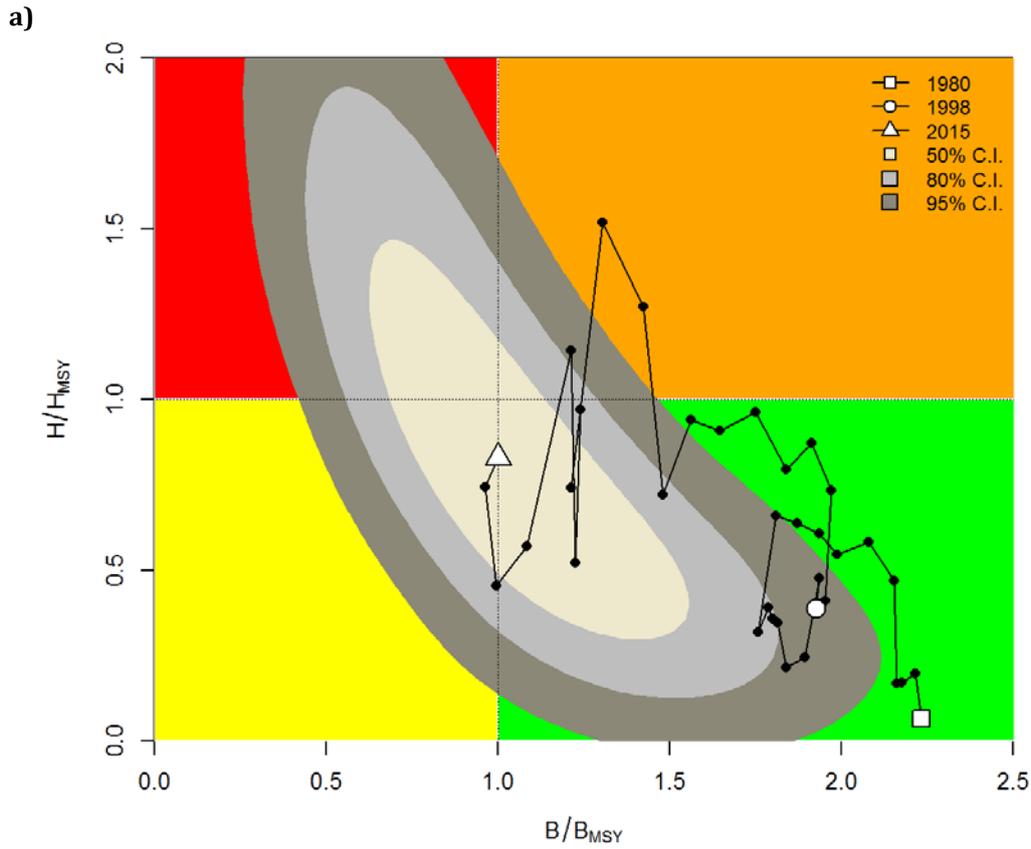
**ALB-Figure 5.** South Atlantic albacore. Standardized catch rates used for the base case of the 2020 stock assessment.



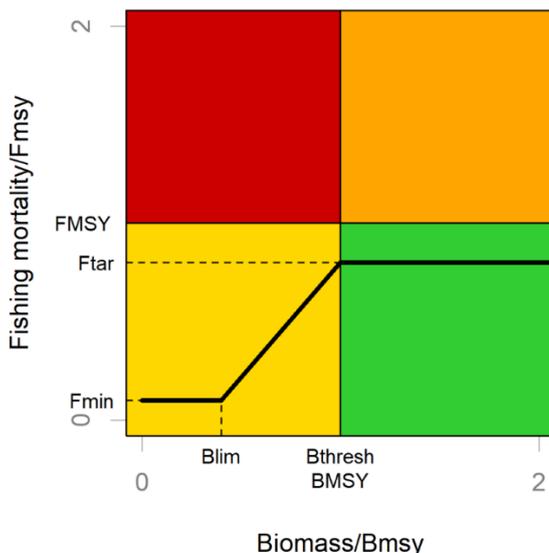
**ALB-Figure 6.** South Atlantic albacore (Kobe plot). Stock status trajectories of  $B/B_{MSY}$  and  $F/F_{MSY}$  over time (1956-2018), as well as uncertainty (grey dots) around the current (2018) estimate (blue point) based on Bayesian surplus production model with probability of being overfished and overfishing (red, 0%), of being neither overfished nor overfishing (green, 99.4%), and of being overfished (yellow, 0.6%).



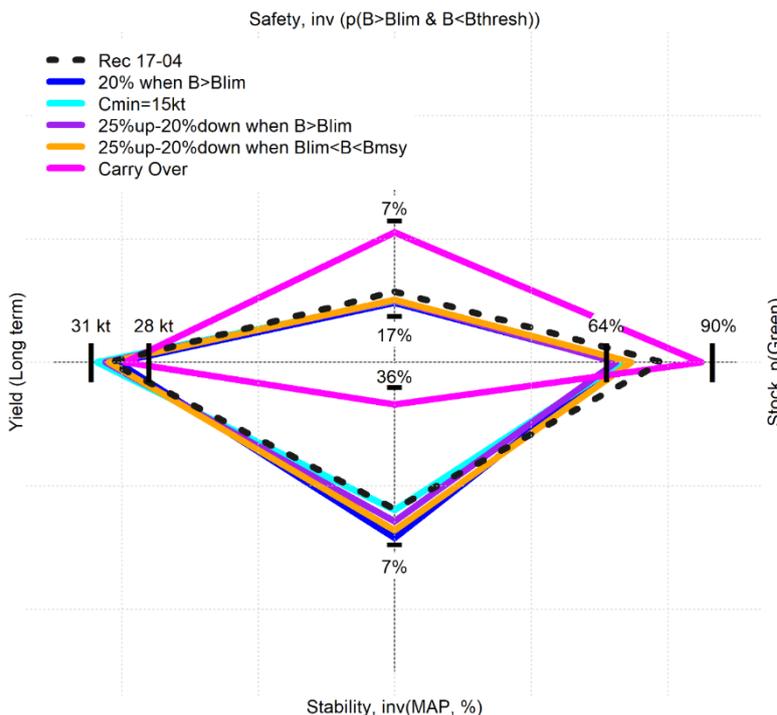
**ALB-Figure 7.** Mediterranean albacore. Set of abundance indices used in the 2017 assessment of the Mediterranean albacore stock.



**ALB-Figure 8.** Mediterranean albacore. a) Stock status trajectories of  $B/B_{MSY}$  and  $F/F_{MSY}$  over time (1980-2015), as well as uncertainty around the current estimate (Kobe plots) for Bayesian surplus production model. (b) Probability of being overfished and overfishing (red, 35.7%), of being neither overfished nor overfishing (green (48.5%), of being overfished but not overfishing (yellow, 14.1%) and of overfishing but not overfished (orange, 1.7%).



**ALB-Figure 9.** Graphic form of the HCR adopted in Rec 17-04.  $B_{LIM}$  (set at  $0.4B_{MSY}$ ) is the limit biomass reference point,  $B_{THRESH}$  (set at  $B_{MSY}$ ) is the point below which fishing mortality decreases linearly,  $F_{TAR}$  (set at  $0.8F_{MSY}$ ) is the target fishing mortality rate to be applied to achieve the management objectives, and  $F_{MIN}$  (set at  $0.1F_{MSY}$ ) is the fishing mortality to be applied when  $B < B_{LIM}$ .



**ALB-Figure 10.** Spider plots representing the relative performance of the HCR adopted in Rec. 17-04, as well as different variants, namely the effect of the carry over as allowed in Rec (17.04) (pink), the effect of setting a lower TAC limit of 15000 t (light blue), the effect of applying the 20% stability clause when  $B_{CUR} > B_{LIM}$  (dark blue), and the effect of 20% maximum TAC reduction and 25% maximum TAC increase when  $B_{THR} > B_{CUR} > B_{LIM}$  (orange) and when  $B_{CUR} > B_{LIM}$  (purple).

## **5.2 BFT – ATLANTIC BLUEFIN TUNA**

The primary efforts of the Committee have been directed at implementing the workplan outlined for 2020 under the current extraordinary circumstances. This workplan originally focused on two areas: a strict update stock assessment and the ongoing development of the Management Strategy Evaluation (MSE), and has had to be adapted to the limitations imposed as a result of the outbreak of COVID-19. The MSE process has been compromised by these abnormal circumstances because the time allocated for technical meetings had to be reduced for reallocation to BFT Species Group intersessional meetings. These have been needed to ensure the completion of the stock assessment update to provide advice on the 2021 TACs, which has become the primary priority of the Committee. The bluefin tuna MSE Technical Group continues with its progress in developing operating models (OMs) by examining a broader spectrum of conditioned OMs, and is well advanced towards recommending a final reference set (or “grid”) of OMs.

Given these impediments, the MSE process will not be completed in time to provide TAC advice to the Commission in 2021 for 2022-2024 based on a management procedure (MP). Accordingly, the Committee recommends extending the MSE process for another year with a goal of completing the MSE process in time for the 2022 Commission meeting to provide TAC advice for 2023-2025. In the event of a further delay in the MSE process, the decision on TAC advice for 2023 will be determined at the 2022 SCRS meeting. The Committee advises that interfacing with the Commission for further input (Panel 2, Scientists and Managers meeting, etc.) will be required intersessionally during 2021, but only once the MSE work is sufficiently advanced. This is because these interactions will be most effective only once interim results from the MSE are available which are sufficient to convey the inherent trade-offs on which the final selection of an MP will need to be based. Multiple dialogue sessions will be required commencing in the second half of 2021 and through 2022, before the Committee provides final advice regarding MP selection at its 2022 annual meeting.

This year’s assessments for both East BFT and West BFT were conducted as strict updates as proposed by the SCRS and then approved by the Commission in 2019. This in turn means that the Committee did not attempt to improve the assessment models by undertaking further analyses, so that the various reservations raised in 2017 concerning this assessment still remain. Furthermore, the models could not be adjusted to take full account of new data and information in ways which might have led to improved results. This leads to additional uncertainty in the results obtained, compared to the uncertainty associated with those reported to the Commission in 2017.

The Committee considered that the strict update assessment of the East stock did not provide reliable information on which to base TAC advice for 2021 which once more brings into focus the need to investigate alternative assessment models to the VPA. However, based on an analysis of the stock size indices, the Committee did not find any clear evidence of changes in stock biomass from 2017 to 2020 to support changing the current TAC (Rec. 19-04) for 2021 and 2022. For the West, the updates of the VPA and Stock Synthesis were informative and the Committee found evidence of stock decline and provides a range of options for 2021, 2022 and 2023 TAC advice.

### ***BFT-1. Biology***

Atlantic bluefin tuna (BFT) have a wide geographical distribution but live mainly in the temperate pelagic ecosystem of the entire North Atlantic and its adjacent waters, for example the Gulf of Mexico, Gulf of St. Lawrence and the Mediterranean Sea. Historical catch information documents the presence in the South Atlantic (**BFT-Figure 1**). Electronic archival tagging information has confirmed that bluefin tuna can tolerate cold as well as warm water temperatures while maintaining a stable internal body temperature. Bluefin tuna preferentially occupy the surface and subsurface waters of the coastal and open-sea areas, but archival electronic tagging and ultrasonic telemetry data indicate that they frequently dive to depths of more than 1,000 m. Bluefin tuna are a highly migratory species that seems to display a homing behavior and spawning site fidelity to primary spawning areas in both the Mediterranean Sea and the Gulf of Mexico. Evidence indicates that spawning in other areas, for example the vicinity of the Slope Sea off the Northeast USA and more recently the Cantabrian Sea, though the persistence and importance of these other areas as spawning grounds remain to be determined. Electronic tagging is also resolving the movements to the foraging areas within the Mediterranean and the North Atlantic, and indicates that bluefin tuna movement patterns vary by tagging site, by month of tagging and according to the age of the fish. The reappearance of bluefin tuna in historical fishing areas (e.g. Norway and, more recently, the Black Sea) suggest that important changes in the spatial dynamics of bluefin tuna may also have resulted from interactions between biological factors, environmental variations and a reduction in fishing effort.

The fisheries for Atlantic bluefin tuna are managed as two management units, conventionally separated by the 45°W meridian. However, efforts to understand the population structure through tagging, genetic and microchemistry studies indicate that mixing is occurring at variable rates between the two management areas.

The ICCAT GBYP, as well as national research programmes, have provided the basis for improved biological studies. Substantial progress has been made in estimating regional, time varying mixing rates for Atlantic bluefin tuna, using otolith stable isotope and genetic analyses. Research on the larval ecology of Atlantic bluefin tuna has advanced in recent years through oceanographic habitat suitability models. Direct age estimation, using otoliths and dorsal fin spines from both stock areas, have been calibrated between readers from several institutions resulting in stock specific age length keys and a new growth model for the western population. Otolith preparation and reading protocols have been updated to minimize bias in age estimation. In 2020 a substantial part of the GBYP on-going activities has had to be postponed or cancelled due to the outbreak of COVID-19. Following Rec. 18-02 parag. 28, a research study of growth in farms was launched in 2019 at five locations, and a new database will be created to integrate all the data from stereo-camera measurements and harvesting operations. Additionally, a Sub-Group on growth of BFT in farms was established in 2020 within the BFT Species Group. This Sub-Group was created to ensure that the best scientific data would be provided to the Commission. Due to the timing of the harvesting operations, the first meaningful results will become available in 2021 (see SCRS/2020/129).

Currently, the Committee assumes for assessment purposes that eastern Atlantic and Mediterranean bluefin tuna contributes fully to spawning at age 5. There are also indications that some young individuals (of age 5) of unknown origin caught in the West Atlantic are mature, but there is considerable uncertainty with regards to their contribution to the western stock spawning. Therefore, the Committee has considered two spawning schedules for the western stock; one identical to that used for the East and one with peak spawning at age 15. However, the latest review of reproductive biology has shown that both the current vectors for spawning fraction at-age might be biased, and that the magnitude of that bias is unknown. Juvenile growth is rapid for a teleost fish, but slower than for other tuna and billfish species. Fish born in June attain a length of about 30-40 cm and a weight of about 1 kg by October. After one year, fish reach about 4 kg and 60 cm in length. At 10 years of age, a bluefin tuna is about 200 cm and 170 kg and reaches about 270 cm and 400 kg at 20 years of age. Bluefin tuna is a long-living species, with a lifespan of about 40 years as indicated by radiocarbon deposition, and can reach 330 cm (SFL) and weigh up to 725 kg. In 2017, the Committee revised the natural mortality assumptions, and adopted a single new age specific natural mortality vector for both stocks.

Important electronic and conventional tagging activity has been conducted for both juvenile and adult fish for several years in the Atlantic and Mediterranean by the ICCAT GBYP, National Programmes and NGOs. Contributions from e-tag data from all groups are supporting ongoing efforts to provide important insights into bluefin tuna stock structure, distribution, mixing and migrations, and are helping to estimate fishing mortality rates and to condition the MSE operating models.

## ***EAST BLUEFIN TUNA***

### ***BFTE-2. Fishery trends and indicators –East Atlantic and Mediterranean***

Reported catches in the East Atlantic and Mediterranean reached a peak of over 50,000 t in 1996 and then decreased substantially, stabilizing at around TAC levels established by ICCAT for the most recent period (**BFTE-Figure 1**). Catches between 2015 and 2019 (as of 18 August 2020) were 16,201 t, 19,131 t, 23,616 t, 27,757 t and 28,760 t for the East Atlantic and Mediterranean, of which, 11,360 t, 13,163 t, 16,401 t, 19,600 t and 19,434 t were reported for the Mediterranean for those same years (**BFT-Table 1**). The Committee has been informed of the existence of unquantified IUU catches which should be taken into account.

Available information has demonstrated that catches of bluefin tuna from the East Atlantic and Mediterranean were seriously under-reported between the mid-1990s through 2007. The Committee estimated that the realized total catch during this period was likely of the order of 50,000 t to 61,000 t per year, based on the number of vessels operating in the Mediterranean Sea and their respective catch rates. Since the 2017 assessment (Anon., 2018), these estimates (1996-2007) have been treated as the actual catches.

During the 2017 Stock Assessment meeting (Anon. 2018), the decision was made to use ten abundance indices up to 2015 (seven CPUE series and three fisheries independent indices). The 2020 updated stock assessment has included the indices used for the 2017 stock assessment which were updated up to 2018, with the exception of the larval index which was updated to 2017 (**BFTE-Figure 2**). The Committee anticipates that additional indices could be used for tracking the abundance of the stock (e.g. GBYP aerial survey).

CPUE indices (**BFTE-Figure 2**) have been affected appreciably by regulatory measures through changes to operational patterns, length of the fishing season and target sizes; thus it is difficult to distinguish the effect of these changes on CPUE index values from the effects of changes in abundance.

### ***BFTE-3. State of the stock***

There have been considerable improvements in data quality and quantity over the past few years; nevertheless important gaps remain in the temporal and spatial coverage for detailed size and catch-effort statistics for several fisheries, especially in the Mediterranean before the implementation of stereo video cameras in 2014. However, inconsistencies have been found in the length frequencies for some of the purse-seiner catches since 2014; these consequently require further revision.

The 2017 and 2020 assessment results from the VPA base case indicated that the spawning stock biomass (SSB) peaked in the mid-1970s after increasing initially, and then declined until 1991 and remained steady until the mid-2000s. From the late 2000s, SSB exhibited a substantial increase through to 2018 (**BFTE-Figure 3**). This increase as estimated in 2020 was appreciably larger than for the 2017 assessment, and not confirmed by the updated indicators (**BFTE-Figure 3**). The uncertainty about the magnitude of the recent SSB increase estimated by the VPA is even higher than for the 2017 assessment due to considerable instability in the recruitment estimates. Recruitment estimates for 2008 onwards (**BFTE-Figure 3**) are noticeably higher than for the 2017 assessment, showing a reverse of the trend of those estimated in the 2017 assessment. This was seen to be of concern when projecting the VPA forward to provide advice based on short-term projections, as well as leading to concern that the model results were very sensitive to adding one additional year of data (i.e. they led to an estimate of a substantial overall increase in biomass with the addition of only the last year of data). Concerns also remain that the size composition of many eastern Atlantic and Mediterranean fleets is poorly characterized for a number of years before the implementation of stereo video cameras in 2014.

The estimated fishing mortality rates on the younger ages (i.e., average  $F$  for ages 2 to 5) displayed a continuous increase until the late 1990s, and then showed a sharp decline to reach very low levels after the late 2000s (**BFTE-Figure 3**). This result is a consequence of the dramatic reduction in the catches of ages 2 to 3 in recent years in response to the new minimum size regulations implemented in 2007 [Rec. 06-05]. The trend of  $F$  in young ages was similar to that for the 2017 assessment. For the oldest fish ( $F$  at plus group for ages 10 and older) showed (**BFTE-Figure 3**) an initial decline from 1968 to 1973, and fluctuated slightly a little below 0.05 afterwards. This  $F$  increased in 1994 and continued increasing to 2005 ( $F_{10+}=0.26$ ). This period (from the mid-1990s to the mid-2000s) evidenced the highest fishing mortality on larger fish. As noted in previous assessments, decreased TACs and catches resulted in substantial decreases in  $F_{10+}$  from the mid 2000s to 2010.

The current perception of the stock status depends on recruitment estimates which are highly unstable and is also closely related to the assumptions made about stock structure and migratory behaviour, which remain poorly known. Nonetheless, compared to 2017, the extra data now available confirm a recent stock biomass increase, although the magnitude of the increase remains difficult to quantify.  $F_{CUR}$  appears to be clearly below  $F_{0.1}$  ( $F_{CUR[2015-2017]}/F_{0.1}= 0.426$ ), indicating a stock status determination of not overfishing.

### ***BFTE- 4. Outlook***

The Committee considers that recent recruitment estimates from the updated VPA assessment are highly uncertain and any short term catch advice based on  $F_{0.1}$  from the updated assessment would not be robust. Consequently, the Committee is not presenting new short-term projections. Due to the limited possibilities for improving the quality of the data, the Committee does not expect to be able to provide further clarity regarding future recruitment in 2021.

In 2018 and 2019, as requested in Rec. 18-02 the Committee evaluated whether the stock size indicators supported the TAC advice for 2019 (32,240 t) and 2020 (36,000 t), which arose from the 2017 assessment, and found that to be the case on both occasions. Evaluation of recent changes in these indicators in 2020 (SCRS/2020/128) has strengthened the support for Rec. 18-02 as these indicators did not indicate any substantial change since the 2017 assessment.

Consequently, based on an analysis of the updated stock size indices, the Committee finds no clear evidence which would warrant a change to the current TAC (Rec 19-04).

#### ***BFTE-5. Effect of current regulations***

Based on SCRS advice, in 2017 the Commission adopted Rec. 17-07 and updated it in 2019 with Rec. 19-04. It is too early since the associated TACs (2018-2020) were implemented to be able to evaluate their effect on the resource.

The Committee noted that reported catches are in line with recent TACs. However, the Committee has been informed of the existence of unquantified illegal catches of unknown magnitude.

The combination of size limits and the reduction of catch has certainly contributed to a rapid increase in the abundance of the stock.

#### ***BFTE-6. Management recommendations***

The Committee noted that biomass indicators did not provide any evidence to alter the current management advice originally provided in 2017. The Committee points out that the projections from the 2017 advice showed that a constant catch of 36,000 tons from 2018 onwards reflects  $F < F_{0.1}$  with a probability higher than 60% in 2021 and in 2022 (**BFTE-Table 1**).

Consequently, the Committee recommends that the 2020 TAC [Rec 19-04 para. 5] of 36,000 t be maintained for 2021 and 2022. However, the 2022 advice will be reviewed in 2021 based on updates of the abundance indicators as has been done in recent years.

<b>EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY</b>	
Current reported catch (2019)	28,760 t*
$F_{0.1}$	0.107 (0.081-0.147) <sup>1</sup>
$F_{2015-2017}/F_{0.1}$ <sup>2</sup>	0.426 (0.359-0.502) <sup>1</sup>
Stock Status <sup>3</sup>	Overfishing: No
[Rec. 19-04] TAC 2020	36,000 t

<sup>1</sup> Median and approximate 80% confidence interval from bootstrapping from the assessment.

<sup>2</sup>  $F_{2015-2017}$  refers to the geometric mean of the estimates for 2015-2017 (a proxy for recent F levels).

<sup>3</sup> Biomass reference points to determine stock status were not estimated in the 2017 assessment or its 2020 update due to uncertainty in recruitment potential

\* As of 18 August 2020.

2020 ADVICE TO THE COMMISSION

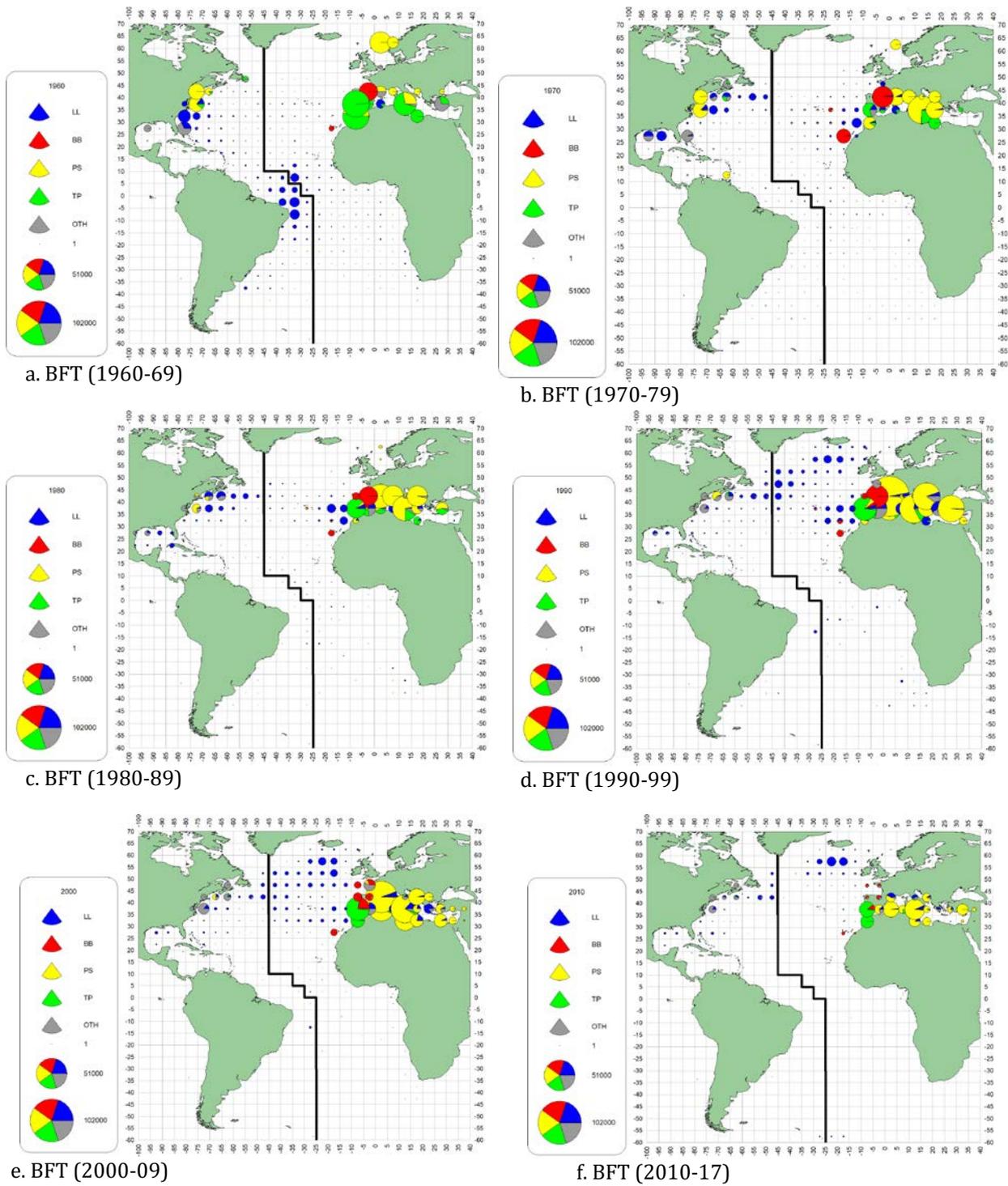
**BFT-Table 1.** Estimated catches (t) of Northern bluefin tuna (*Thunnus thynnus*) by area, gear and flag.

			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	
TOTAL			26381	29318	34128	36642	48881	49751	54009	53545	52657	52772	52775	52784	53319	52305	52125	51756	51812	62638	26460	21798	13195	11781	12688	14725	14887	18042	21032	25466	29784	31065	
BFT-E			23599	26389	31831	34258	46769	47303	51497	51211	50000	50000	50000	50000	50000	50000	50000	50000	50000	61000	24460	19818	11338	9774	10934	13243	13261	16201	19131	23616	27757	28760	
	ATE		6313	6543	7396	9317	7054	9780	12098	16379	11630	10247	10061	10086	10347	7394	7402	9023	7529	8441	8243	6684	4379	3984	3834	4163	3918	4841	5968	7216	8157	9326	
	MED		17286	19846	24435	24941	39715	37523	39399	34831	38370	39753	39939	39914	39653	42606	42598	40977	42471	52559	16217	13133	6959	5790	7100	9080	9343	11360	13163	16401	19600	19434	
BFT-W			2782	2929	2296	2384	2113	2448	2512	2334	2657	2772	2775	2784	3319	2305	2125	1756	1811	1638	2000	1980	1857	2007	1754	1482	1627	1842	1901	1850	2027	2305	
Landings	ATE	Bait boat	1993	1653	1422	3884	2284	3093	5369	7215	3139	1554	2032	2426	2635	1409	1902	2282	1263	2436	2393	1260	725	636	283	243	95	172	1085	1195	692	845	
		Longline	1510	3196	3618	2802	2311	4522	4212	4057	3789	3570	3736	3303	2896	2748	2064	2700	2033	1705	2491	1951	1194	1125	1139	1167	1194	1467	1829	2208	2730	3177	
		Other surf.	252	126	523	976	590	555	273	60	387	404	509	558	631	521	290	424	831	502	181	297	124	35	49	141	210	193	261	295	340	319	
		Purse seine	54	46	462	24	213	458	323	828	700	726	661	153	887	490	1078	1197	408	0	0	2	1	0	0	2	0	0	42	49	11	24	
		Sport (HL+RR)	1	0	7	0	25	0	0	237	28	33	126	61	63	109	89	11	99	11	12	11	12	44	51	53	46	43	104	35	101	118	357
		Traps	2504	1522	1365	1631	1630	1152	1921	3982	3586	3960	2996	2996	3585	3235	2116	1978	2408	2895	3788	3166	3164	2292	2137	2311	2564	2376	2905	2716	3363	4258	4594
	MED	Bait boat	25	148	158	48	0	206	5	4	11	4	38	28	1	9	17	5	0	0	0	0	38	1	0	2	2	9	25	0	50	56	72
		Longline	1178	3057	3145	2470	6993	8469	9856	7313	4117	3338	3424	4144	3234	3484	3036	3427	3408	3269	2376	1344	1242	962	587	605	588	776	1523	1184	1517	1436	
		Other surf.	344	356	447	371	776	545	417	282	284	228	728	354	340	198	197	175	81	85	0	0	1	1	1	20	29	3	37	90	34	51	
		Purse seine	11797	13805	18580	20065	27948	23799	26021	24279	31792	33798	33237	33043	34044	37291	37869	36639	38363	48994	13540	11448	4986	4293	6172	7982	8184	9993	11315	14466	17119	17200	
		Sport (HL+RR)	1559	769	952	1238	2307	3562	2149	2340	1092	1533	1773	1167	1520	1404	1325	619	494	117	149	160	448	356	202	240	289	361	284	335	567	319	
		Traps	2382	1711	1152	749	1691	942	951	613	1074	852	739	1177	515	221	154	112	125	93	152	144	281	165	125	222	232	192	0	272	300	353	
	ATW	Longline	741	903	689	712	539	491	545	382	764	915	858	610	729	186	644	425	565	420	606	366	529	743	478	470	498	553	562	559	664	675	
		Other surf.	536	578	509	406	307	384	429	293	342	279	283	201	107	139	97	89	85	63	78	121	107	147	117	121	119	138	93	123	77	168	
		Purse seine	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32	178	4	28	0	11	0	2	29	38	34	0	0	0	0		
Sport (HL+RR)		1004	1083	586	854	804	1114	1032	1181	1108	1125	1121	1650	2036	1399	1139	924	1005	1023	1134	1251	1009	888	917	692	810	1085	1204	1144	1263	1450		
Traps		2	0	1	29	79	72	90	59	68	44	16	16	28	84	32	8	3	4	23	23	39	26	17	11	20	6	10	13	3	4		
Discards		ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	7	9
	Purse seine		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	9	11	2	4	5	6	4
	MED	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ATW	Longline	115	128	211	88	83	138	167	155	123	160	222	105	211	232	181	131	149	100	159	207	174	202	224	145	139	19	29	10	17	7	
		Other surf.	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	2	2	
Purse seine		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	4	5	0	0		
Sport (HL+RR)		0	0	0	0	0	0	0	14	3	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Landings	ATE CP	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	0	0	0	0	85	103	80	68	39	19	41	24	42	72	119	42	38	36	36	38	37	45	54	64	79	89	
		EU.Denmark	0	0	0	37	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
		EU.España	3830	2273	2318	4962	3137	3819	6186	9519	4565	4429	3493	3633	4089	2172	2801	3102	2339	3680	3536	2409	1550	1483	1329	1553	1282	1655	1986	2509	2489	2729	
		EU.France	510	565	894	1099	336	725	563	269	613	588	542	629	755	648	561	818	1218	629	253	366	228	135	148	223	212	254	343	350	461	462	
		EU.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.Ireland	0	0	0	0	0	0	0	14	21	52	22	8	15	3	1	1	2	1	1	1	2	4	10	13	19	14	32	16	17	6	
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
		EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.Portugal	27	103	128	91	363	169	199	712	323	411	441	404	186	61	27	82	104	29	36	53	58	180	223	235	243	263	327	429	450	475	
		EU.Sweden	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.United Kingdom	0	0	0	0	0	1	0	1	1	12	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	7	
		Guinée Rep.	0	0	0	0	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Iceland	0	0	0	0	0	0	0	0	2	27	0	0	1	0	0	0	0	0	0	0	0	0	2	5	4	30	37	6	0	0	
		Japan	1464	2981	3350	2484	2075	3971	3341	2905	3195	2690	2895	2425	2536	2695	2015	2598	1896	1612	2351	1904	1155	1089	1093	1129	1134	1386	1578	1905	2262	2514	
		Korea Rep.	0	0	0	0	4	205	92	203	0	0	6	1	0	0	3	0	1	0	0	0	0	0	0	0	0	0	161	181	208	232	
		Maroc	408	531	562	415	720	678	1035	2068	2341	1591	2228	2497	2565	1795	1953	2389	1923	2418	1947	1909	1348	1055	990	960	959	1176	1433	1703	2164	2790	
		Norway	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	44	51	12	18
		Panama	0	0	0	0	1	19																									

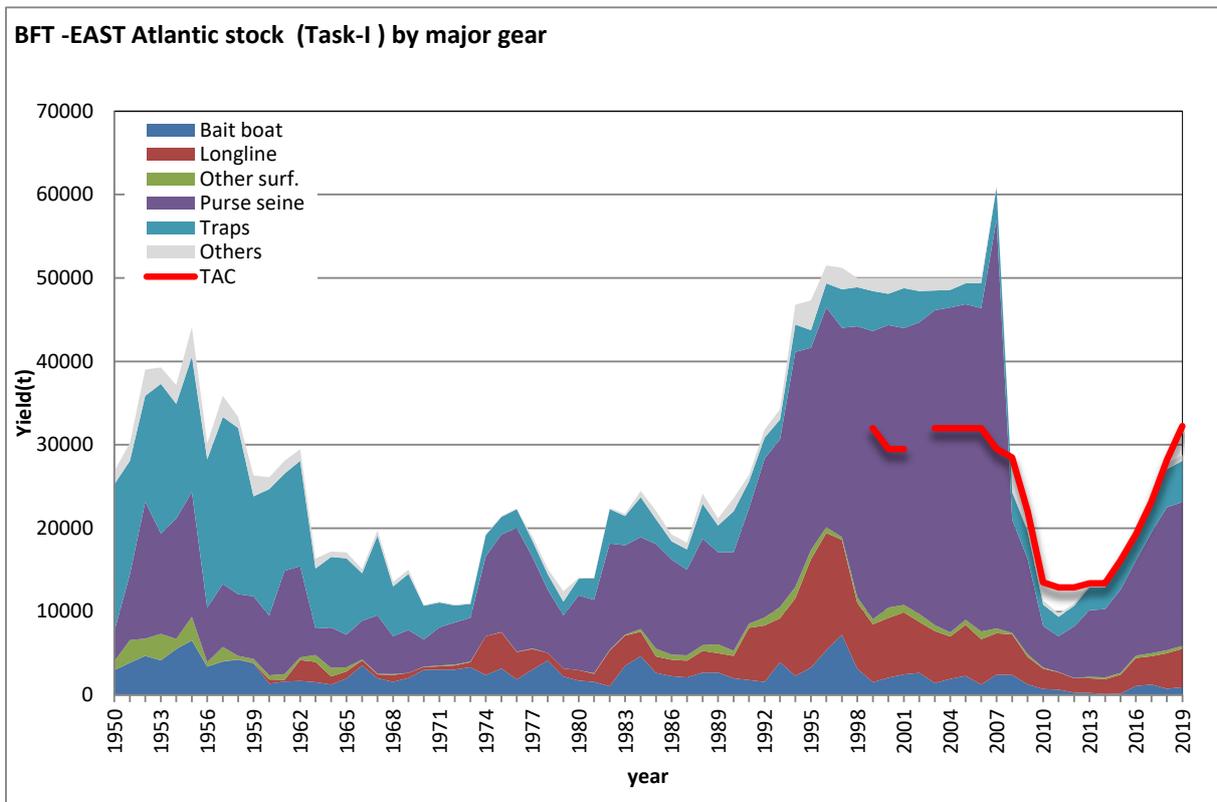
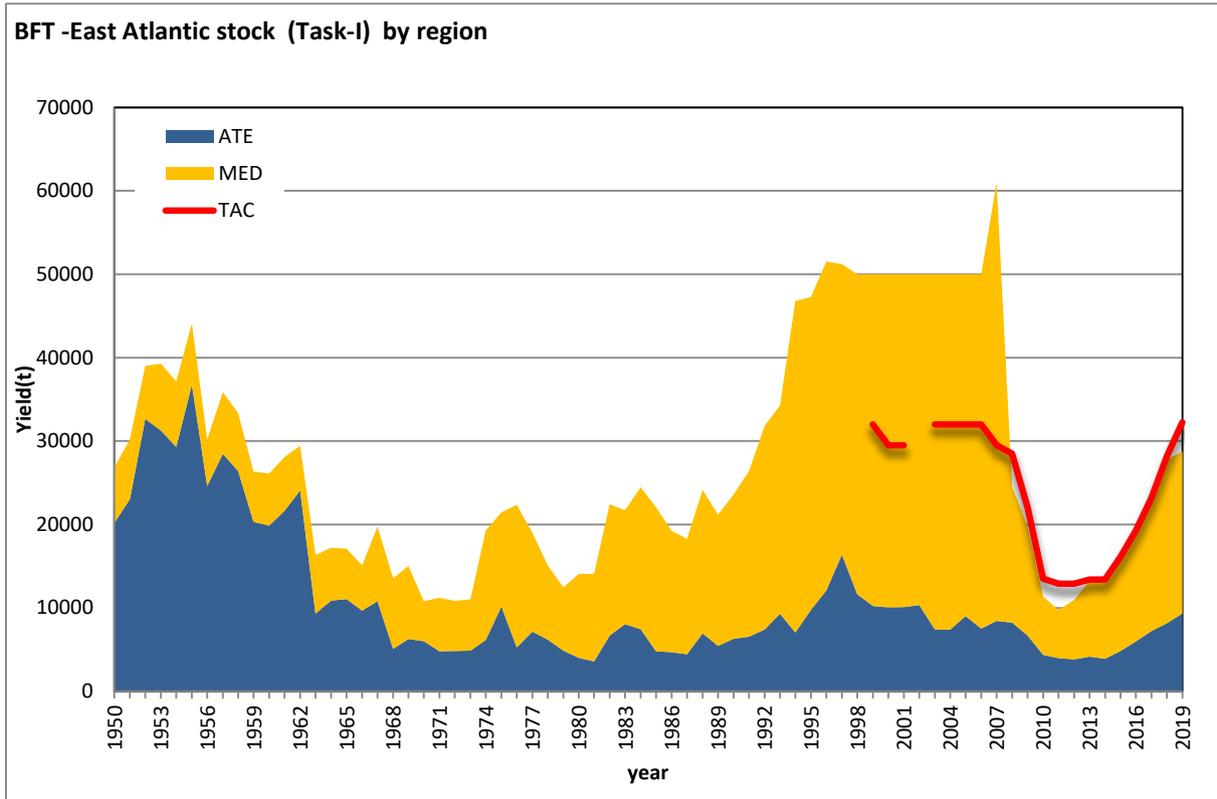


**BFTE-Table 1.** The probabilities of  $F < F_{0.1}$  for quotas from 0 to 50,000 t for 2018 through 2022 under the recent 6 years (2006-2011) recruitment scenario, as estimated in 2017 stock assessment. Shading corresponds to the probabilities of being in the ranges of 50-59%, 60-69%, 70-79%, 80-89% and greater or equal to 90%. Catches for 2016 and 2017 are assumed to be equal to the 2016 and 2017 TAC in all scenarios.

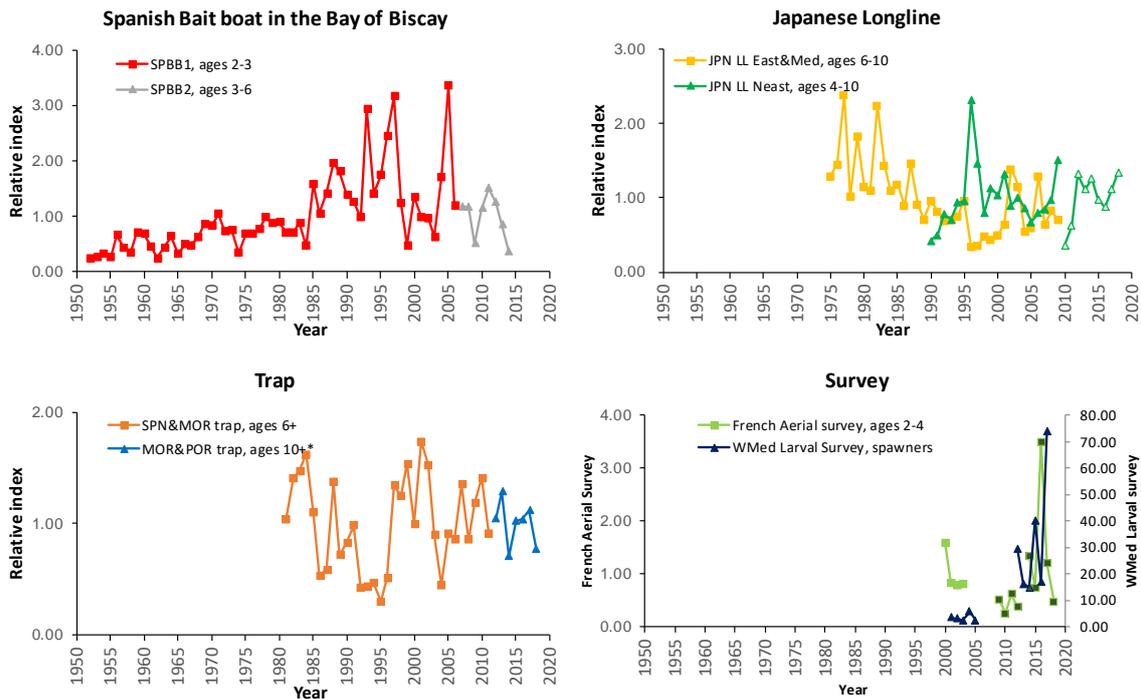
Catch (t)	2018	2019	2020	2021	2022
18,000	100	100	100	100	100
20,000	99	99	99	99	99
22,000	99	99	98	98	98
23,655	98	98	98	98	98
24,000	98	98	97	98	97
26,000	97	96	96	96	96
28,000	95	94	94	94	94
30,000	93	92	92	90	89
31,000	90	90	89	89	88
32,000	89	88	87	86	83
33,000	86	85	83	81	80
34,000	82	81	79	78	75
35,000	79	77	76	72	70
36,000	75	73	70	68	64
37,000	70	68	65	62	59
38,000	65	63	60	57	54
39,000	59	57	54	52	49
40,000	56	52	49	46	44
45,000	36	35	34	30	28
50,000	24	22	20	18	18



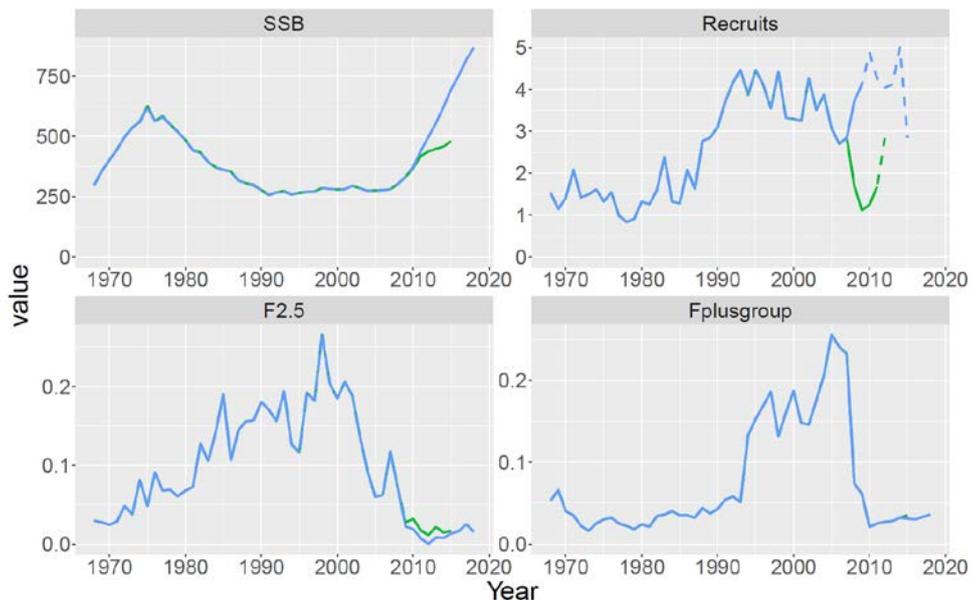
**BFT-Figure 1.** Geographic distribution of bluefin tuna catches per 5x5 degrees and per main gears from 1960 to 2017 (last decade only covers 8 years).



**BFTE-Figure 1.** Reported catch for the East Atlantic and Mediterranean from Task I data from 1950 to 2019 split by main geographic areas (top panel) and by gears (bottom panel) together with unreported catch estimated by the SCRS from 1998 to 2007 and TAC levels since 1998.



**BFTE-Figure 2.** Plots of the updated fishery dependent and independent indicators used for the East Atlantic and Mediterranean bluefin tuna stock. All indicators are standardized series and scaled to their averages. Indices denoted with “\*” represent revised indices rather than strict updates of indices used in the 2017 stock assessment. The Spanish BB series was split in two series to account for changes in selectivity patterns, and the latest series was calculated using French BB data due to the sale of the quota by the Spanish fleet. The Japanese Longlines CPUE for the Northeast Atlantic (split in 2009/2010), the Morocco-Portugal Trap combined CPUE and French aerial survey index (split in 2008/2009) have been updated until 2018. The larval survey in the western Mediterranean was updated until 2017.



**BFTE-Figure 3.** Spawning stock biomass (in thousand metric ton), recruitment (in million), and fishing mortality (average over ages 2 to 5, and 10+) estimates from VPA base run in the 2020 stock assessment (blue) compared to the 2017 stock assessment (green) for the period between 1968 and 2015. The last years recruitments (dashed line: 2012-2013 for the 2017 stock assessment, and 2010-2015 for the 2020 stock assessment) were poorly estimated.

**BLUEFIN TUNA - WEST*****BFTW-2. Fishery indicators***

The total catch for the West Atlantic peaked at 18,608 t in 1964, mostly due to the Japanese longline fishery for large fish off Brazil (that started in 1962) and the U.S. purse seine fishery for juvenile fish (**BFT-Table 1, BFTW-Figure 1**). Catches dropped sharply thereafter to slightly above 3,000 t in 1969 with declines in longline catches off Brazil in 1967 and in purse seines. Catches increased to over 5,000 t in the 1970s due to the expansion of the Japanese longline fleet into the northwest Atlantic and Gulf of Mexico and an increase in purse seine effort targeting larger fish for the sashimi market. Catches declined abruptly in 1982 from close to 6,000 t in the late 1970s and early 1980s with the imposition of a catch limit. The total catch for the West Atlantic, including discards, fluctuated without trend after 1982, reaching 3,319 t in 2002 (the highest since 1981, with all three major fishing nations indicating higher catches). Total catch in the West Atlantic subsequently declined steadily to 1,638 t in 2007 and then fluctuated without pronounced trend. The catch in 2017 was 1,850 t, 2,027 t in 2018 and 2,305 t (as of 18 August 2020) in 2019 (**BFTW-Figure 1**).

The Committee notes that ongoing work conducted as part of the MSE process is evaluating the sensitivity to assumed stock of origin of the large catches coming from the South Atlantic. Future modelling considerations of these catches should consider that while these catches are currently assumed to be of Western stock origin the true stock of origin remains unknown.

The Committee notes that the TAC in the West has not been caught for the last 6 years. Based on information received, the Committee considers that this is not due to low stock abundance but rather to market and operational conditions.

The most recent (2020) stock assessment used 9 CPUE and two survey indices up to and including 2018 (**BFTW-Figure 2**). Indices presented here are strict updates of these indices except as denoted with an asterisk where slight modifications to the data or model structure have been made.

Several indices exhibit trends that may be indicative of environmentally driven changes in availability. As in 2017, the 2020 Stock Synthesis assessment reconciled the conflicting trends in some Canadian and United States indices under a hypothesis of environmentally mediated availability of fish to the two regions. The Canada Acoustic index experienced a very low value for 2018 and subsequently also for 2019; it appears that the index is in a state of transition, possibly due to environmentally driven changes in the spatial distribution of the fish or of their prey. For modelling the Committee chose to split the index for this assessment, which is equivalent to removing the 2018 datapoint from the assessment. Additionally, the USRR 115-144 index provided an extremely low value for 2018.

***BFTW-3. State of the stock***

The SCRS cautions that conclusions from the latest assessment (Anon., 2020), using data through to 2018, do not capture the full degree of uncertainty in the assessments and projections. The various major contributing factors to uncertainties include mixing between the stocks, recruitment, age composition, age at maturity, and indices of abundance. As in 2017 the 2020 assessment also applied two stock assessment methods (VPA and Stock Synthesis) for management advice for the western stock. Models used in 2020 are strict updates of the 2017 models, with some modifications to estimated recruitment specifications to better account for uncertainty in recent and future recruitment.

Previous stock assessments determined stock status based on MSY-related reference points using two alternative recruitment potential scenarios: a 'low recruitment' scenario and a 'high recruitment' scenario. The 2017 assessment did not provide management advice based on MSY reference points. Instead, the focus was on giving short-term advice based on an  $F_{0.1}$  reference point (taken to be a proxy for  $F_{MSY}$ ) using recent recruitment and assuming that near term recruitment will be similar to the recent past recruitment (**BFTW-Figure 3**). As in the 2017 assessment two spawning fraction scenarios (a young age at spawning, consistent with the eastern stock and older age of spawning with 100% spawning contribution at age 15) were considered in the assessment methods. Rather than presenting two series of spawning stock biomass (SSB) based on these two spawning fraction scenarios, total biomass is presented as this does not depend on which of these scenarios is selected.

Results from the VPA indicate quite similar biomass and recruitment trends to the 2017 model. Biomass decreased sharply between 1974 and 1981 (**BFTW-Figure 4**), followed by more than two decades of stability (at about 50% of the 1974 biomass) across the turn of the century, and then by a gradual increase from 2004 to 60% of the 1974 biomass in 2018. Recruitment was high in the early 1970s, but subsequently fluctuated around a lower average until 2003 when there was a strong year class (**BFTW-Figure 4**). Recruitment has shown a downward trend since 2004, with recent (2010-2015) recruitments quite low. The three additional years (2013-2015) remain low with some of the lowest estimated recruitment in the time series.

Stock Synthesis gave a longer time series view of the population, (**BFTW-Figure 4**), capturing the higher recruitments estimated in the 1960s (though this is dependent on the assumption that the catches in the west were primarily of western rather than eastern origin fish). In 2017 the Stock Synthesis models estimated higher biomass than the VPA, but in 2020 the updated Stock Synthesis model and VPA estimates now are similar in magnitude for the overlapping period 1979 – 2015 (**BFTW-Figures 3-5**). Total biomass in 2015 was 14% of biomass in 1950 and 36% of biomass in 1974. Similar to VPA, Stock Synthesis estimates a mostly declining recruitment trend since 2003 with a slight increase in 2014-2016, though these recent increases are considered not to be well informed by data.

Though numbers of age 9+ fish are at or above 40-year peaks (**BFTW-Figure 5**) for both models, the numbers of age 6-8 year old fish is estimated to be at the lowest in the last 40 years due to low recent recruitments.

The Committee notes that further work is being conducted as part of the GBYP to collect more data on mixing, movement and stock of origin. These data are being incorporated into the Management Strategy Evaluation whereby they should help refine understanding of stock mixing.

### *Summary*

Both sets of results from the VPA and Stock Synthesis were equally weighted to formulate advice. Current  $F$  (average of 2015-2017) relative to the  $F_{0.1}$  reference point was 0.8 (VPA) and 0.84 (Stock Synthesis), indicating that overfishing is not occurring (**BFTW-Table 1, BFTW-Figure 4**). Under the updated models the current TAC (Rec. 17-06) is likely to have led to overfishing relative to  $F_{0.1}$  beginning in 2018.

Management advice is based on a fishing mortality reference point to project short-term catches based on recent recruitments.  $F_{0.1}$  was considered a reasonable proxy for  $F_{MSY}$ , although it can be higher or lower than  $F_{MSY}$  depending on the stock recruitment relationship, which in this case is poorly determined.

### ***BFTW-4. Outlook***

In 1998, the Commission initiated a 20-year rebuilding plan designed to achieve  $SSB_{MSY}$  with at least 50% probability. As indicated above, the Committee did not use biomass-based reference points in formulating 2017 advice, nor in the 2020 update. The Committee is not evaluating if the stock is rebuilt because it has been unable to resolve the long-term recruitment potential. If an  $F_{0.1}$  strategy were to continue to be applied, over the longer term the resource would fluctuate around the true, but unknown, value of  $B_{0.1}$  whatever the future recruitment level. The  $F_{0.1}$  strategy compensates for the effect of recruitment changes on biomass by allowing higher catches when recent recruitment is higher and reducing catches when recent recruitments are lower. Under this strategy, biomass may decrease at times because the stock is above  $B_{0.1}$  or following lower recruitments.

The 2020 assessment indicates that recent (2012-2015) recruitments are low and further are lower than those estimated for the same time period in the 2017 assessment and from the averages assumed for the 2017 projections. In 2017 the population was projected to decline by ~7.5% from 2017 to 2020 at the current (2020) TAC of 2,350 tons (Anon, 2019). However, based on the updated assessments, biomass is estimated to have actually experienced an 11.7% decline over the same time period (**BFTW-Table 2**). The expected changes in biomass under constant catch scenarios and one constant  $F_{0.1}$  scenario, are shown in **BFTW-Table 3** and **BFTW-Figure 6**.

With three additional years added to the 2017 assessment (2016-2018), the overall biomass continues to decrease due to the 2003 year-class having passed its peak biomass together with below average recruitment in recent years. While the high numbers of 9 plus year old fish continue to contribute to catches, 6-8 year old fish that will form a large component of the next three year TACs are at very low abundance and hence lead to declining allowable catch in order to remain consistent with an  $F_{0.1}$  strategy where declining recruitment implies commensurate reductions in catch.

The Committee reiterates that the effects of mixing and management measures on the eastern stock remain a considerable source of uncertainty for the outlook of the western stock. Consequently, changes to assessment and management approaches that take explicit account of mixing are a high priority.

#### ***BFTW-5. Effect of current regulations***

The 2020 assessment estimates that the biomass has decreased by 11.7% (**BFTW-Table 2**) over the time period 2017-2020. The current TAC recommendation (Rec. 17-06) is set to end in 2020 with new TAC advice requested by the Commission. Under the updated models the current TAC is likely to have led to overfishing relative to  $F_{0.1}$  beginning in 2018 (**BFTW-Figure 3**). Roll-over of the 2020 TAC in Rec. 17-06 to 2021 is also expected to lead to overfishing (**BFTW-Table 1**)-and would result in a 6.4% reduction in the population biomass relative to 2020 (**BFTW-Table 4**).

#### ***BFTW-6. Management recommendations***

The Commission recommended total allowable catches (TAC) of 2,350 t in 2018, 2019 and 2020 (Rec. 17-06). The Committee provides management options including the constant TAC scenarios shown in the Kobe II strategy matrix as well as a six scenarios for TAC advice. The TAC for each year, resulting impact on total stock biomass, percent change in biomass and probability of not overfishing associated with each scenario are shown in **BFTW-Table 4** to illustrate trade-offs for the Commission to consider.

Scenario 1 corresponds to fishing at approximately  $F_{0.1}$  for 2021-2023. Scenario 2 is an approximate but not exact 60% probability of not overfishing in each year 2021, 2022 and 2023. Scenario 3 corresponds to a strict rollover of the 2020 TAC for 2021 and then fishing at  $F_{0.1}$  in 2022 and 2023. Scenario 4 is a stepwise reduction in TAC designed to achieve a similar biomass in 2023 as the  $F_{0.1}$  strategy in 2023 and to end overfishing with >50% probability by 2023. Scenario 5 and 6 are constant TAC scenarios derived from interpolating the Kobe Strategy matrix to achieve at least a 50 and 60% probability of not over fishing at any time over the three year period.

TAC should be reviewed annually by the Commission on the advice of the SCRS (which would be based on consideration of updates of the fishery indicators as well as intersessional work conducted to improve indices). This would permit the SCRS to, on any of those occasions, recommend that the next TAC be amended given sufficiently strong signals in the indicators.

### **SUMMARY TABLE**

Estimated recent fishing mortality rate (geometric mean of apical  $F$  for the period 2015 to 2017) relative to the  $F$  reference point,  $F_{0.1}$  (a proxy for  $F_{MSY}$  based on two recent recruitment specifications). Range across Stock Synthesis and VPA models are shown in parentheses.

<b>WEST ATLANTIC BLUEFIN TUNA SUMMARY</b>	
Current Catch including discards (2019)	2,305*
$F_{\text{current}}$ (2015-2017)	0.088 (0.076-0.10)
$F_{0.1}$	0.112 (0.089-0.135)
Estimated probability of overfishing ( $F_{\text{current}(2015-2017)}/F_{0.1}$ )	3%
Stock status <sup>1</sup>	Overfishing : No
Management Measures:	[Rec. 17-06] TAC of 2,350 t in 2018-2020, including dead discards.

\* As of 25 August 2020

<sup>1</sup> Biomass reference points to determine stock status were not estimated in the 2020 assessment due to uncertainty in recruitment potential.

2020 ADVICE TO THE COMMISSION

**BFT-Table 1.** Estimated catches (t) of Northern bluefin tuna (*Thunnus thynnus*) by area, gear and flag.

		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	2020	
TOTAL		26381	29318	34128	36642	48881	49751	54009	53545	52657	52772	52775	52784	53319	52305	52125	51756	51812	62638	26460	21798	13195	11781	12688	14725	14887	18042	21032	25466	29784	31065		
BFT-E		23599	26389	31831	34258	46769	47303	51497	51211	50000	50000	50000	50000	50000	50000	50000	50000	61000	24460	19818	11338	9774	10934	13243	13261	16201	19131	23616	27757	28760			
ATE		6313	6543	7396	9317	7054	9780	12098	16379	11630	10247	10061	10086	10347	7394	7402	9023	7529	8441	8243	6684	4379	3984	3834	4163	3918	4841	5968	7216	8157	9326		
MED		17286	19846	24435	24941	39715	37523	39399	34831	38370	39753	39939	39914	39653	42606	42598	40977	42471	52559	16217	13133	6959	5790	7100	9080	9343	11360	13163	16401	19600	19434		
BFT-W		2782	2929	2296	2384	2113	2448	2512	2334	2657	2772	2775	2784	3319	2305	2125	1756	1811	1638	2000	1980	1857	2007	1754	1482	1627	1842	1901	1850	2027	2305		
Landings	ATE																																
	Bait boat	1993	1653	1422	3884	2284	3093	5369	7215	3139	1554	2032	2426	2635	1409	1902	2282	1263	2436	2393	1260	725	636	283	243	95	172	1085	1195	692	845		
	Longline	1510	3196	3618	2802	2311	4522	4212	4057	3789	3570	3736	3303	2896	2748	2064	2700	2033	1705	2491	1951	1194	1125	1139	1167	1194	1467	1829	2208	2730	3177		
	Other surf.	252	126	523	976	590	555	273	60	387	404	509	558	631	521	290	424	831	502	181	297	124	35	49	141	210	193	261	295	340	319		
	Purse seine	54	46	462	24	213	458	323	828	700	726	661	153	887	490	1078	1197	408	0	0	2	1	0	0	2	0	0	42	49	11	24		
	Sport (HL+RR)	1	0	7	0	25	0	237	28	33	126	61	63	109	89	11	99	11	12	11	44	51	53	46	43	104	35	101	118	357			
	Traps	2504	1522	1365	1631	1630	1152	1921	3982	3586	3960	2996	3585	3235	2116	1978	2408	2895	3788	3166	3164	2292	2137	2311	2564	4376	2905	2716	3363	4258	4594		
	MED																																
	Bait boat	25	148	158	48	0	206	5	4	11	4	38	28	1	9	17	5	0	0	0	38	1	0	2	2	9	25	0	50	56	72		
	Longline	1178	3057	3145	2470	6993	8469	9856	7313	4117	3338	3424	4144	3234	3484	3036	3427	3408	3269	2376	1344	1242	962	587	605	588	776	1523	1184	1517	1436		
	Other surf.	344	356	447	371	776	545	417	282	284	228	728	354	340	198	197	175	81	85	0	0	1	1	1	20	29	3	37	90	34	51		
	Purse seine	11797	13805	18580	20065	27948	23799	26021	24279	31792	33798	33237	33043	34044	37291	37869	36639	38363	48994	13540	11448	4986	4293	6172	7982	8184	9993	11315	14466	17119	17200		
	Sport (HL+RR)	1559	769	952	1238	2307	3562	2149	2340	1092	1533	1773	1167	1520	1404	1325	619	494	117	149	160	448	356	202	240	289	361	284	335	567	319		
	Traps	2382	1711	1152	749	1691	942	951	613	1074	852	739	1177	515	221	154	112	125	93	152	144	281	165	125	222	232	192	0	272	300	353		
	ATW																																
Longline	741	903	689	712	539	491	545	382	764	915	858	610	729	186	644	425	565	420	606	366	529	743	478	470	498	553	562	559	664	675			
Other surf.	536	578	509	406	307	384	429	293	342	279	283	201	107	139	97	89	85	63	78	121	107	147	117	121	119	138	93	123	77	168			
Purse seine	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32	178	4	28	0	11	0	0	2	29	38	34	0	0	0	0			
Sport (HL+RR)	1004	1083	586	854	804	1114	1032	1181	1108	1125	1121	1650	2036	1399	1139	924	1005	1023	1134	1251	1009	888	917	692	810	1085	1204	1144	1263	1450			
Traps	2	0	1	29	79	72	90	59	68	44	16	16	28	84	32	8	3	4	23	23	39	26	17	11	20	6	10	13	3	4			
Discards	ATE																																
	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	MED																																
Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	9	11	2	4	5	6	4		
Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
ATW																																	
Longline	115	128	211	88	83	138	167	155	123	160	222	105	211	232	181	131	149	100	159	207	174	202	224	145	139	19	29	10	17	7			
Other surf.	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	2	2		
Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	4	5	0	0	0	0		
Sport (HL+RR)	0	0	0	0	0	0	14	3	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Landings	ATE CP																																
	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	China PR	0	0	0	0	0	0	0	0	0	85	103	80	68	39	19	41	24	42	72	119	42	38	36	36	38	37	45	54	64	79	89	
	EU.Denmark	0	0	0	37	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.España	3830	2273	2318	4962	3137	3819	6186	9519	4565	4429	3493	3633	4089	2172	2801	3102	2339	3680	3536	2409	1550	1483	1329	1553	1282	1655	1986	2509	2489	2729		
	EU.France	510	565	894	1099	336	725	563	269	613	588	542	629	755	648	561	818	1218	629	253	366	228	135	148	223	212	254	343	350	461	462		
	EU.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.Ireland	0	0	0	0	0	0	14	21	52	22	8	15	3	1	1	2	1	1	1	1	2	4	10	13	19	14	32	16	17	6		
	EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0		
	EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.Portugal	27	103	128	91	363	169	199	712	323	411	441	404	186	61	27	82	104	29	36	53	58	180	223	235	243	263	327	429	450	475		
	EU.Sweden	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.United Kingdom	0	0	0	0	0	1	0	1	1	12	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	
	Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	7	
	Guinée Rep.	0	0	0	0	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Iceland	0	0	0	0	0	0	0	0	2	27	0	0	1	0	0	0	0	0	0	0	0	0	0	2	5	4	30	37	6	0	0	
	Japan	1464	2981	3350	2484	2075	3971	3341	2905	3195	2690	2895	2425	2536	2695	2015	2598	1896	1612														



**BFTW-Table 1.** Kobe II matrix giving the probability that the fishing mortality rate (F) will be less than the F reference point ( $F \leq F_{0.1}$ , overfishing not occurring) over the next three years for alternative constant annual catches, based on results from the 2020 VPA and Stock Synthesis (combined as indicated in the main text).

TAC	2021	2022	2023
0	100%	100%	100%
1000	100%	100%	99%
1250	98%	96%	94%
1500	91%	86%	80%
1550	89%	82%	75%
1600	85%	76%	67%
1650	82%	67%	56%
1700	75%	57%	45%
1750	67%	48%	35%
1800	57%	37%	27%
1850	46%	28%	21%
1900	38%	23%	17%
1950	29%	17%	13%
2000	23%	14%	12%
2250	9%	6%	6%
2350	6%	5%	4%
2500	4%	2%	2%
2750	1%	1%	0%
3000	0%	0%	0%

**BFTW-Table 2.** Relative change in total stock biomass relative to 2017 under alternative closest catch scenarios to 2350 t from the 2017 assessment (top rows) and depletion relative to 2017 from the 2020 assessments projected with either the realized or assumed TAC for 2018-2020, showing that the stock is now more depleted than original predicted. For both the 2017 and 2020 models, Stock Synthesis biomass is biomass as the beginning of the year and VPA represents mid-year biomass. For the 2020 model, Stock Synthesis and VPA projections come from averaging the deterministic model runs for 2 recruitment and 2 maturity specifications.

	<u>TAC</u>	2018	2019	2020
2017 model	2250	-1.7%	-4.0%	-7.2%
2017 model	2500	-1.7%	-4.8%	-8.7%
Realized or assumed TAC		2027	2350	2350
2020 model		-2.6%	-6.2%	-11.7%

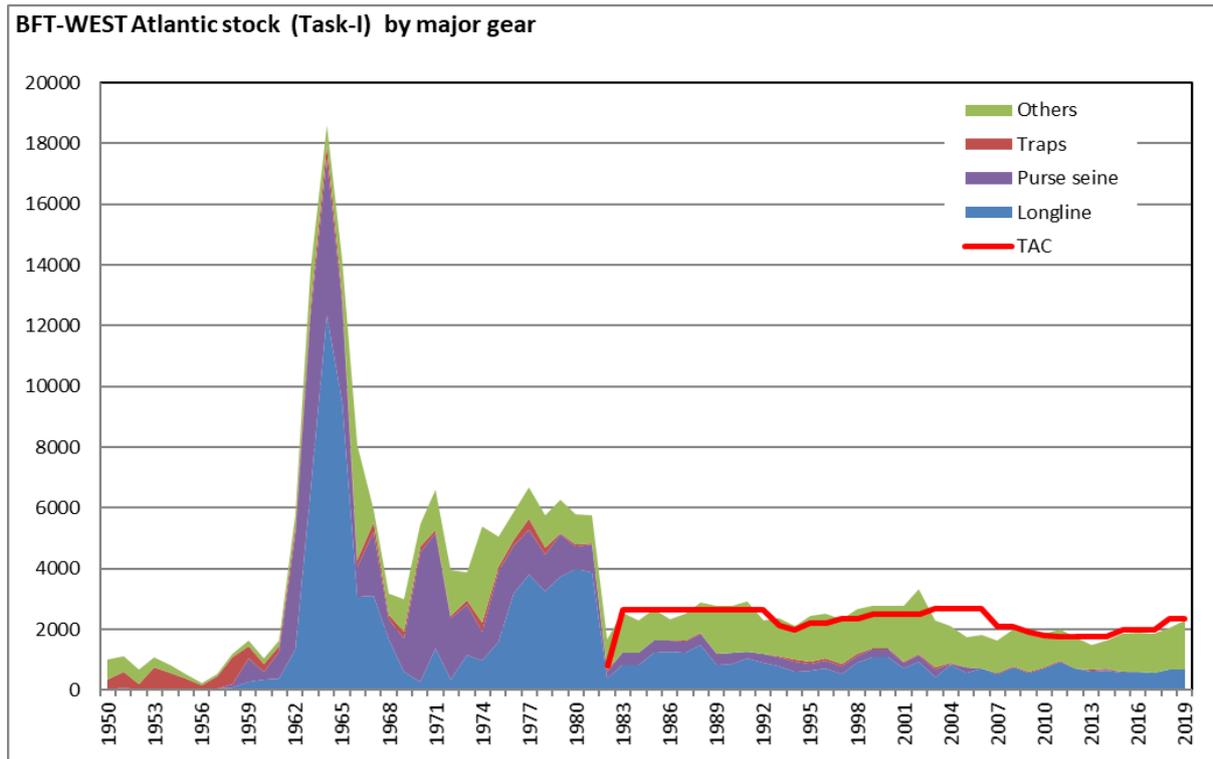
**BFTW-Table 3.** Percentage change in total stock biomass at the middle of the year relative to 2020 under alternative constant catch scenarios from the 2020 assessment, based on the projections from Stock Synthesis and VPA, averaged across 2 recruitment and 2 maturity specifications. Stock Synthesis and VPA projections come from averaging the deterministic model runs.

<u>Catch</u>	2021	2022	2023
1000	-4%	-4%	-4%
1250	-4%	-6%	-7%
1500	-5%	-7%	-10%
1550	-4.7%	-7.6%	-10.1%
1600	-4.8%	-7.9%	-10.7%
1650	-4.9%	-8.2%	-11.2%
1700	-5.1%	-8.5%	-11.7%
1750	-5.2%	-8.8%	-12.2%
1800	-5.3%	-9.1%	-12.7%
1850	-5.4%	-9.4%	-13.3%
1900	-5.5%	-9.8%	-13.8%
1950	-5.6%	-10.1%	-14.3%
2000	-5.7%	-10.4%	-14.8%
2250	-6.2%	-12.0%	-17.4%
2350	-6.4%	-12.6%	-18.5%
2500	-6.8%	-13.5%	-20.0%
2750	-7.3%	-15.1%	-22.7%
3000	-7.9%	-16.7%	-25.3%

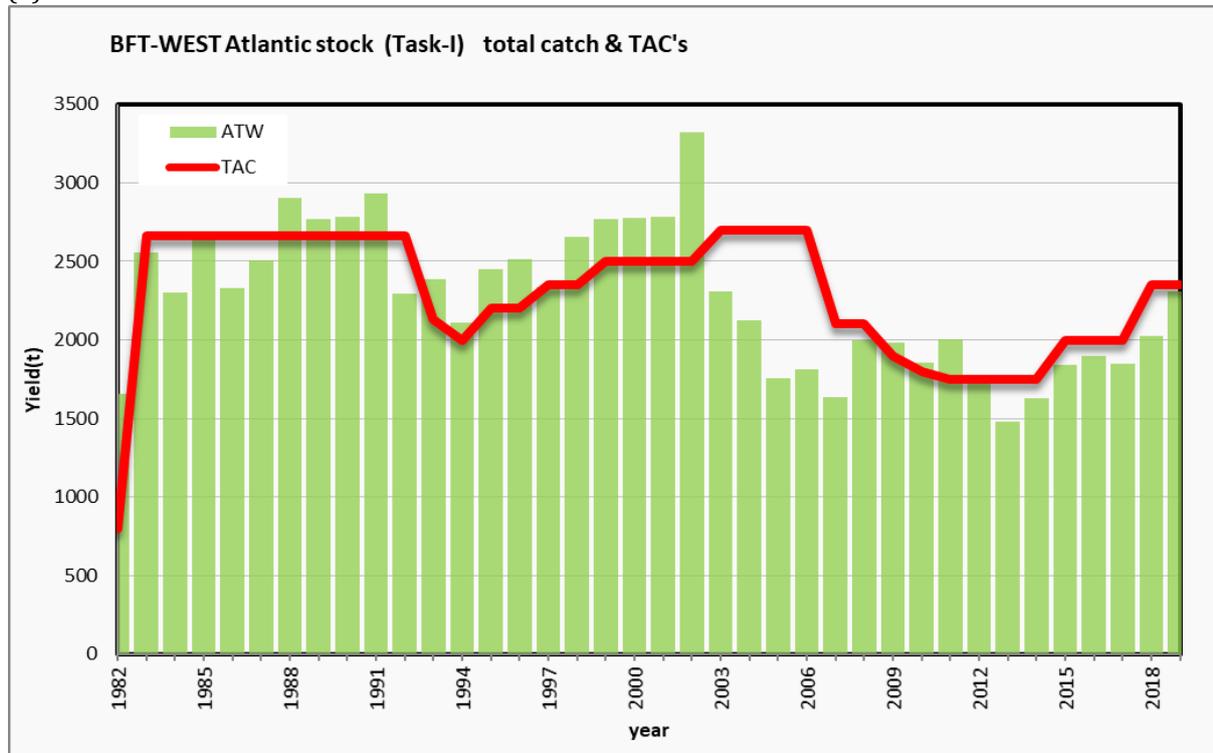
**BFTW-Table 4.** Scenarios for three-year TAC advice. Predicted yield (t), total stock biomass (t), % total biomass change from 2020 and probability of not overfishing, by management scenario averaged across both VPA and Stock Synthesis. Scenarios 1 and 2 come from an approximation of a 50 and 60% probability of not overfishing in each year but did not quite achieve the desired intent in the time available. All TAC scenarios reflect running projections with the prescribed TAC to accurately estimate probabilities resulting from having taken the previous year's TAC shown below.

Management Scenario	Predicted Yield (t)			Predicted (mid-year) Total Biomass (t)			Percent Change in Total Biomass (mid-year) from 2020			Probability of Not Overfishing		
	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023
1. Approximate 50% Probability of Not Overfishing or approximate Constant $F=F_{0.1}$	1831	1738	1678	22918	22000	21218	-5.3%	-9.1%	-12.4%	49%	46%	44%
2. Approximate 60% Probability Not Overfishing	1785	1684	1633	22940	22072	21342	-5.2%	-8.8%	-11.8%	58%	58%	54%
3. Rollover in 2021 to $F=F_{0.1}$	2350	1685	1632	22647	21506	20778	-6.4%	-11.2%	-14.2%	6%	50%	48%
4. 255 mt step 2021 -2023	2095	1840	1585	22780	21681	20900	-5.9%	-10.4%	-13.7%	15%	27%	56%
5. 1630 t constant	1630	1630	1630	23021	22257	21551	-4.9%	-8.1%	-11.0%	83%	71%	61%
6. 1680 t constant	1680	1680	1680	22995	22181	21424	-5.0%	-8.4%	-11.5%	78%	61%	50%

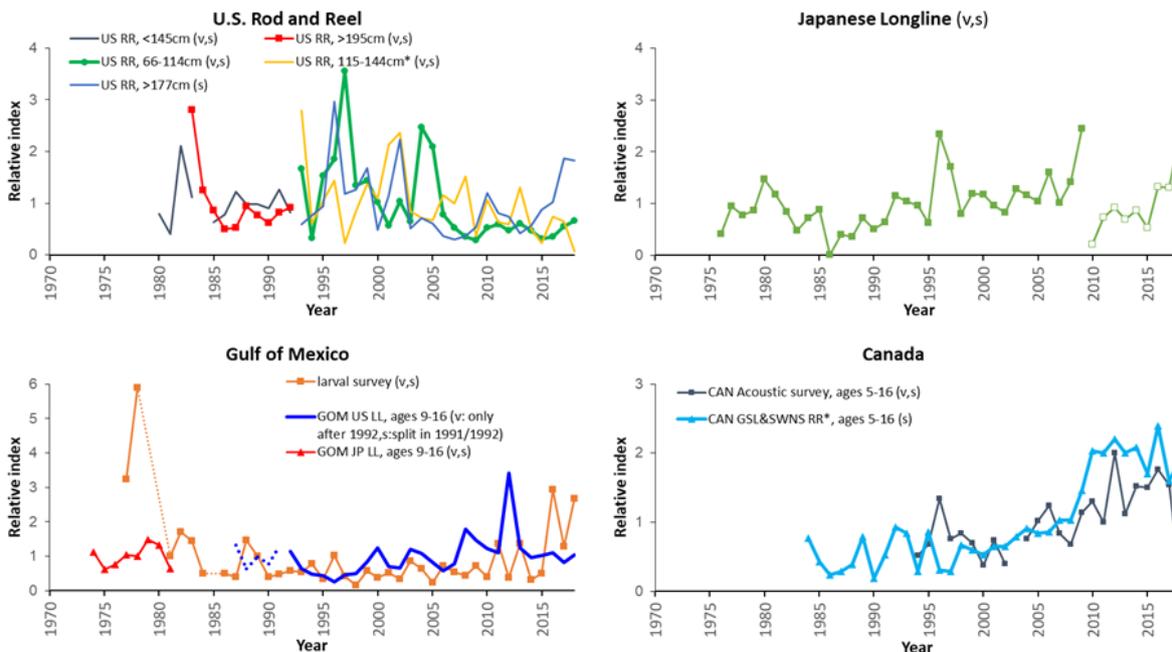
(a)



(b)

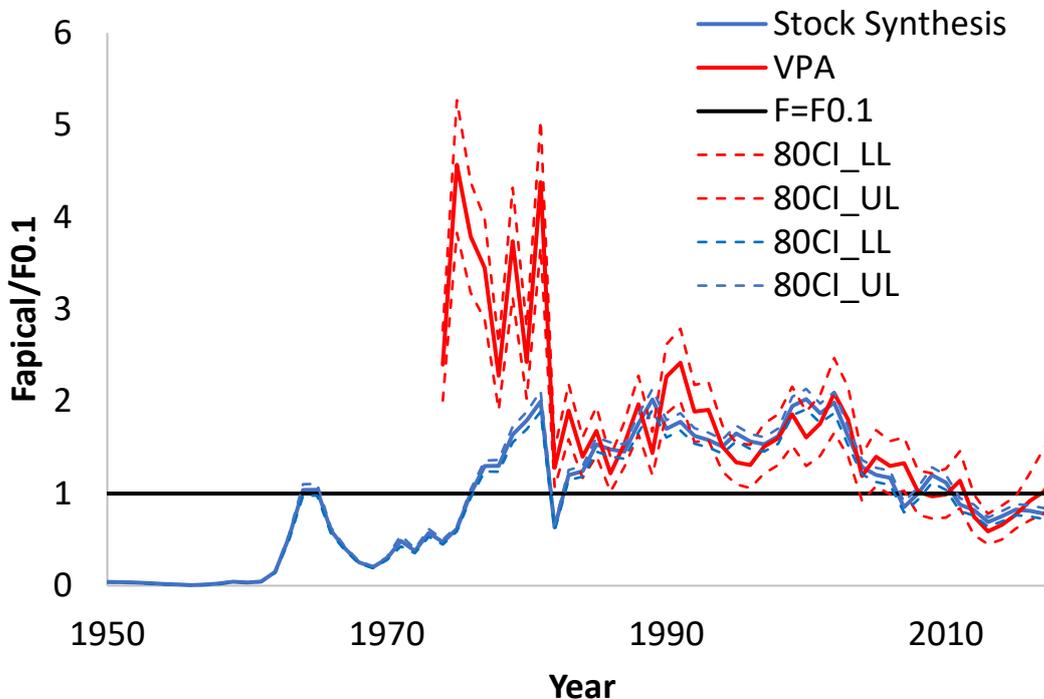


**BFTW-Figure 1.** Historical catches of western bluefin tuna: (a) by gear type and (b) TACs agreed by the Commission (which are shown for comparison).

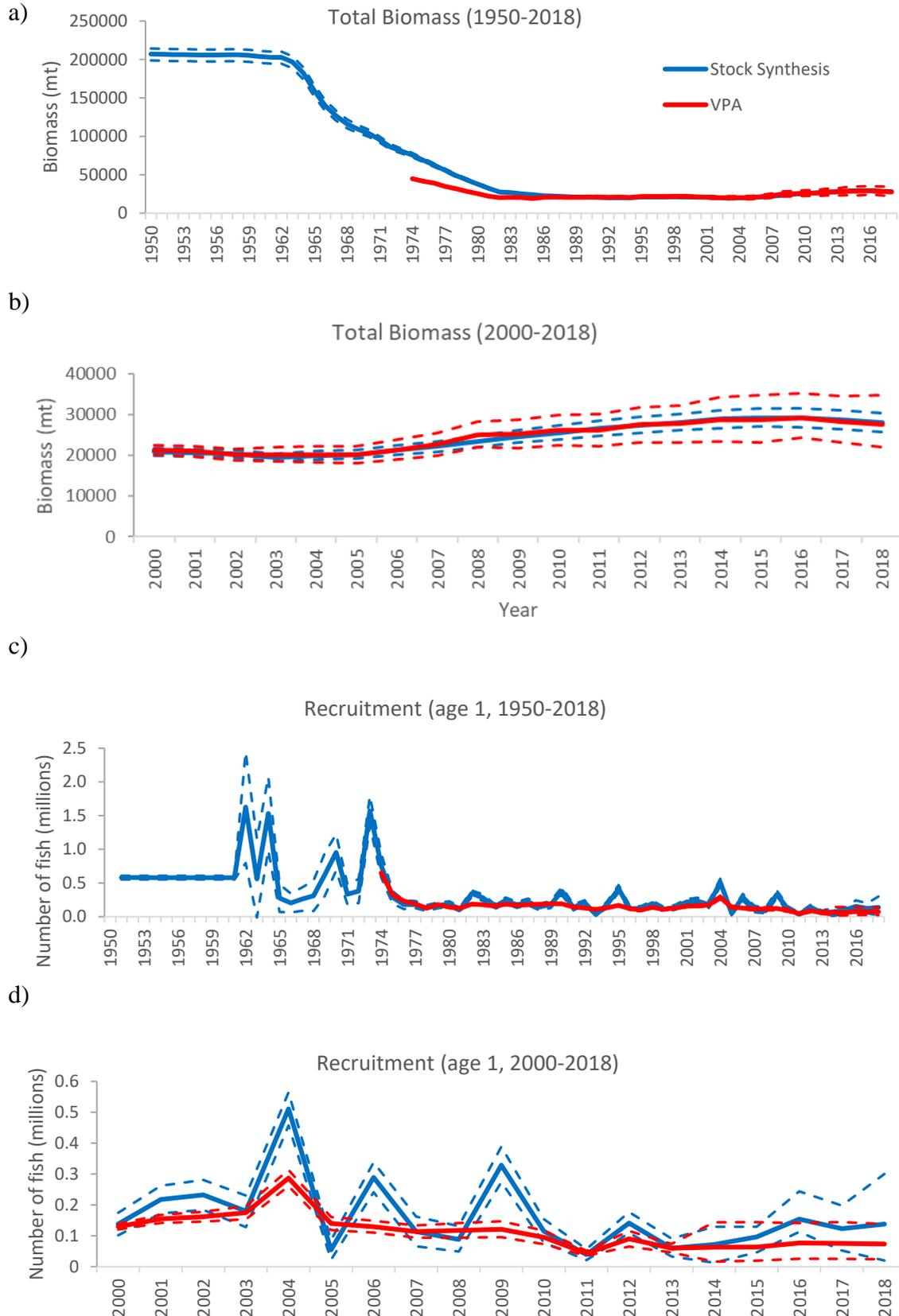


**BFTW-Figure 2.** Indices of relative abundance for western bluefin tuna. Indices denoted with “\*” represent revised indices rather than strict updates of indices used in the 2017 stock assessment. Indices denoted with an “s” were used in Stock Synthesis and indices with a “v” were used in VPA. The Canadian Acoustic index data point for 2018 was not used in the assessment models.

### Apical Fishing Mortality Relative to $F_{0.1}$ Reference point

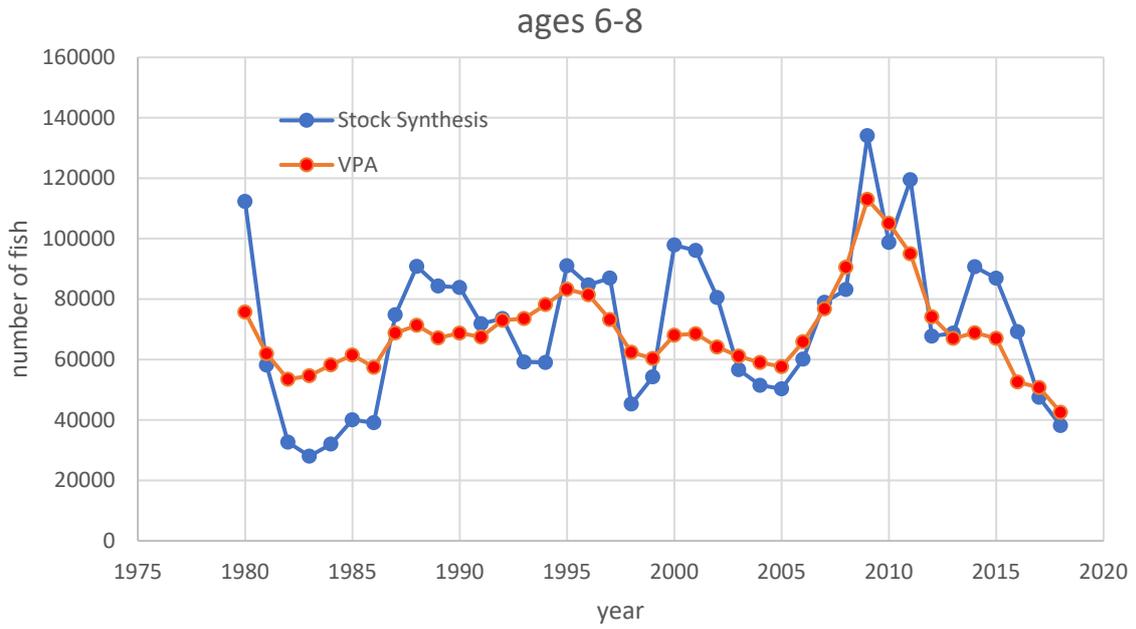


**BFTW-Figure 3.** Fishing mortality relative to the  $F_{0.1}$  reference point as estimated by VPA (red) and Stock Synthesis (blue) for the 2020 assessment. The 80% confidence intervals are indicated with dashed lines.

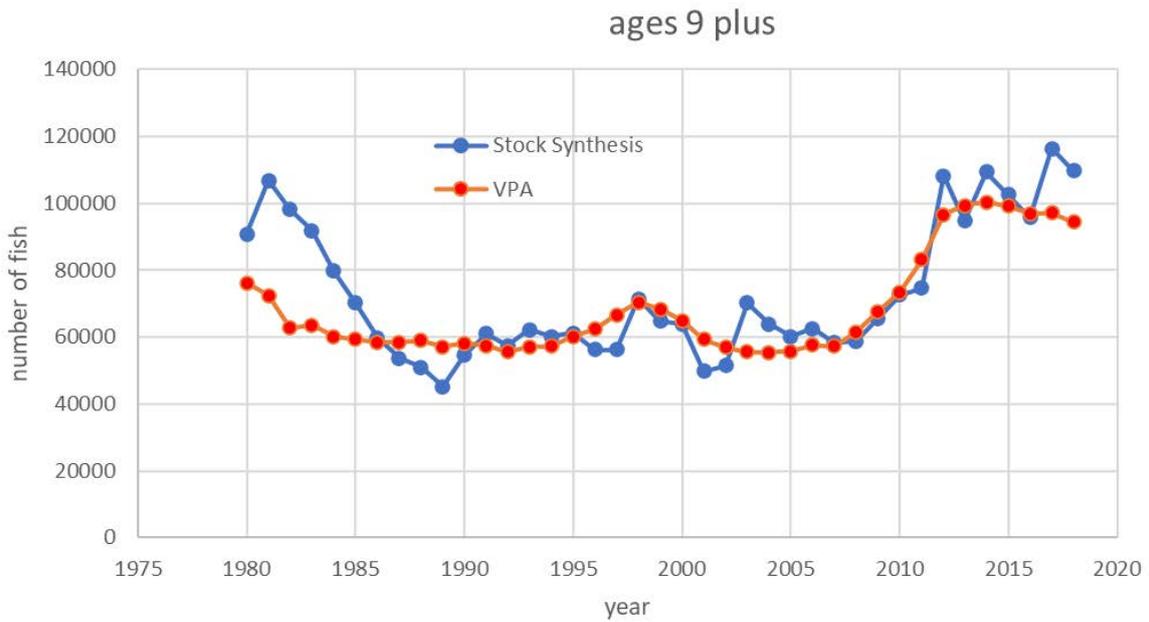


**BFTW-Figure 4.** Estimates of (a) total stock biomass for 1950-2018 and (b) for 2000-2018, and (c) recruitment for 1950-2018 and (d) for 2000-2018 for the base VPA (red) and Stock Synthesis (blue) models from the 2020 assessment. The 80% confidence intervals are indicated with dashed lines. For VPA recruitment estimates for the recent years (e.g. 2014-2018) have been replaced by the values obtained from the recruitment specifications (average with autocorrelation).

a)

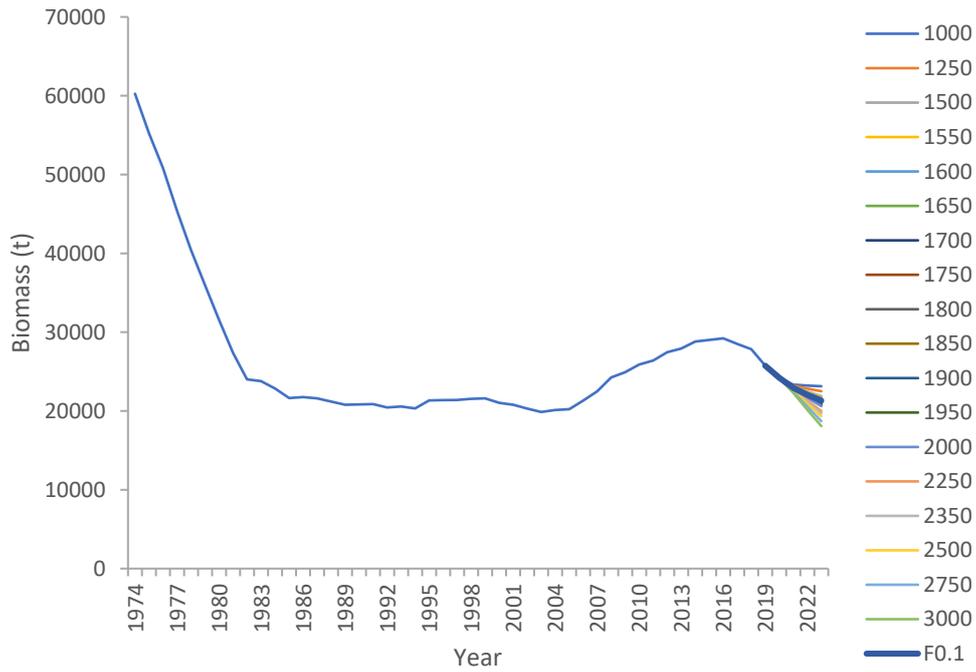


b)

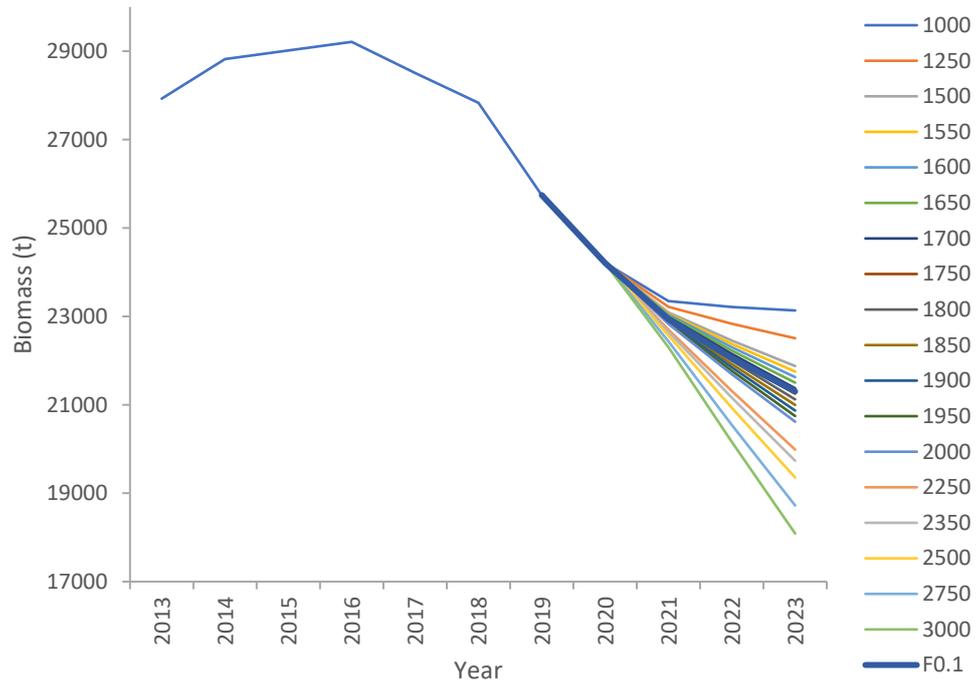


**BFTW-Figure 5.** a) Numbers of age 6-8 fish predicted by VPA and Stock Synthesis and b) age 9 and above.

a)



b)



**BFTW-Figure 6.** Projected total stock biomass (mt) of bluefin tuna in the West Atlantic under alternative constant catch scenarios, averaged across both recruitment and maturity specifications and both Stock Synthesis and VPA. The deterministic model runs are averaged across all scenarios. (a) Upper panel: 1974-2023, (b) lower panel: zoomed in to 2013 to 2023.

### **5.3 SWO-MED – MEDITERRANEAN SWORDFISH**

In 2019 the Mediterranean swordfish landings were the lowest observed since the full development of the fisheries in the mid-1980s. The most recent assessment of the stock was conducted in 2020, making use of the available catch, effort and size information through 2018. The present report summarizes assessment results and readers interested in more detailed information on the state of the stock should consult the report stock assessment session (Anon. 2020b).

#### ***SWO-MED-1. Biology***

Research results based on genetic studies have demonstrated that Mediterranean swordfish compose a unique stock separated from the Atlantic ones, although there is incomplete information on stock mixing and boundaries. Although mixing between stocks is believed to be low, past biological, genetic and tagging studies have suggested the possible occurrence of mixing between the Mediterranean and North Atlantic stocks, but further studies need to identify the degree of mixing. A brief review of past tagging experiments indicated that the existing results cannot provide robust information about mixing patterns and confirmed that further work is needed on this aspect.

According to previous knowledge, the Mediterranean swordfish have different biological characteristics compared to the Atlantic stocks. The growth parameters are different, and the sexual maturity is reached at younger ages than in the Atlantic.

In the western Mediterranean, mature females as small as 110 cm LJFL have been observed and the estimated size at which 50% (L50) of the female population is mature occurs at 142.2 cm. According to the growth curves used by the SCRS, these two sizes correspond to 2 and 3.5 year-old fish, respectively. An even lower L50 size for females has been estimated for the central Mediterranean, even though further confirmation is needed. Males reach sexual maturity at smaller sizes and mature specimens have been found at about 90 cm LJFL. Research on this aspect is on-going in the frame of the ICCAT swordfish project.

#### ***SWO-MED-2. Fishery indicators***

Mediterranean swordfish landings showed an upward trend from 1965-1988, reaching a peak of 20,365 t (**SWO-MED-Table 1, SWO-MED-Figure 1**). The sharp increase between 1983 and 1988 may be partially attributed to improvement in the national systems for collecting catch statistics; thus, earlier catches may be higher than those appearing in Task I tables. Since 1988 and up to 2011, the reported landings of swordfish in the Mediterranean Sea have declined fluctuating mostly between 12,000 to 16,000 t. In the last eight years (2012-2019), following the implementation of the three-month fishery closure and the establishment of the list of authorized vessels, overall nominal fishing effort has been decreased and catches are less than 10,000 t. In general, these catch levels are relatively high and similar to those of bigger areas such as the North Atlantic. Updated information on Mediterranean swordfish catch by gear type is provided in **SWO-MED-Table 1** and **SWO-MED-Figure 1**.

The Task 1 removals, including estimates of dead discards for 2018 that was used in the assessment was 8,677 t, which is the lowest annual catches since 1972. The biggest producers in the recent years of the assessment (2008-2018) are EU-Italy (40%), EU-Spain (15%), EU-Greece (9%), Morocco (11%), Tunisia (11%) and Algeria (5%). Also, EU-Cyprus, EU-Malta and Turkey have fisheries targeting swordfish in the Mediterranean. Minor catches of swordfish have also been reported by EU-Croatia, EU-France, Japan, and Libya.

In recent years (2008-2019), the main fishing gears used are longlines (on average, representing around 96% of the annual catches) and gillnets. Since 2003, gillnets have been gradually eliminated following ICCAT recommendations for a general ban of driftnets in the Mediterranean. Minor catches are also reported from harpoon, trap and fisheries targeting other large pelagic species (e.g. albacore). From 1999 a deep longline (100-600 m depth; mesopelagic longline) gear has been gradually introduced and nowadays has partially replaced the surface longline gears in several Italian, French and Spanish swordfish fleets. This is particularly noteworthy, as these fisheries are among the largest within the stock area, and the changes have implications for the use of catch rates as indices of abundance in the stock assessments.

Standardised CPUE series from different longline fisheries targeting swordfish that were used in the 2020 stock assessment session, do not show a consistent pattern but most of them indicate declining trends in the most recent years. It should be noted that CPUE series did not cover the earlier years of the reported landings. No trend over the past 30 years was identified regarding the mean fish weight in the catches, but it should be noted that the volume of undersized discards in the Task 1 data may be underestimated in the last decade (**SWO-MED-Figure 2**).

### ***SWO-MED-3. State of the stocks***

Since the 2016 assessment, there have been several changes both in fisheries operations and in the data available as input to the assessment models, which have undergone substantial revisions and the integration of new information. In addition, in 2020 stock assessment a Bayesian surplus production model, using a long series of data (1950 - 2018), was examined and was chosen for providing the scientific advice for the Mediterranean swordfish stock. Until 2016, advice was based on age structured models which were re-examined again. However, due to lack of indices of abundance for the earlier period, the input data for the age-structured models started in 1985, when the stock was already under high exploitation. From the age-structured models it was estimated that the stock was already overfished in 1985, although total catches had never exceeded MSY estimates from either age-structured or surplus production models prior to 1985. This was considered biologically implausible and it was deduced that these models were unable to properly estimate stock productivity due to data limitations (insufficient data series).

Under different assumptions about reporting levels of undersized fish in the catch, age-structured analysis including data from 1985-2018 indicated that current SSB levels are much lower than those in the 80s, while recruitment shows a declining trend in the last decade. Due to limited data for the earlier period of the fishery (See data catalogue in the 2020 Mediterranean swordfish stock assessment meeting report (Anon 2020), Table 2), the age structured analysis failed to provide reliable estimates of stock productivity, and conclusions on the state of the stock were based on the surplus production model approach.

Results of the Bayesian surplus production model that used the whole catch series from 1950 to 2018, assuming also discard under-reporting in the last decade, indicated that stock biomass started declining from 1970 onwards, while fishing mortality starting exceeding  $F_{MSY}$  in the late 1980's when catches peaked (**SWO-MED-Figure 3**). The stock became overfished in the early 1990's following the full development of the fishery and the relatively high catches observed in middle-late 1980's. The analysis concluded that there is a 41.1% probability that the stock is overfished and overfishing is still occurring (red) and a 45.6% probability that the stock is overfished but overfishing is not occurring (yellow) (**SWO-MED-Figure 4**).

The Committee again noted the large catches of swordfish less than 4 years old and the relatively low number of large individuals in the catches. Fish less than four years old usually represent more than 70% of the total yearly catches in terms of numbers.

### ***SWO-MED-4. Outlook***

The assessment of Mediterranean swordfish indicates that the stock is most likely overfished and current fishing mortality is just below  $F_{MSY}$  levels. The stock has been in overfished state since the early 1990s because of the large catches in the 1980s and the selection pattern which captures many immature fish. Current catches are dominated, in terms of number, by fish less than 4 years old and the highest fishing mortality is corresponding to fish of age 3. Additionally, estimated recruitment has been declining for the last 10 years.

Projections of different catch levels, based on the output of the production model assessment indicate that TAC equal to 10,000 t would result in stock rebuilding with a 60% probability by the end of the projections period (2028). Projections were not carried out beyond 2028 due to uncertainty with the models. Probabilities increase if lower TACs are adopted. Projection results are summarized in **SWO-MED-Figure 5** and **SWO-MED-Table 2**. It should be noted, however, that these projection estimates are based on the assumption that future stock productivity will be around the average of the whole studied period. The declining recruitment in the most recent years, may indicate that stock productivity has decreased and in that case stock projections may be optimistic and should be interpreted with caution.

***SWO-MED-5. Effect of current regulations***

ICCAT imposed a Mediterranean-wide one-month fishery closure for all gears targeting swordfish in 2008, followed by a two-month closure since 2009. Through Recommendations 11-03 and 13-04 the Commission has adopted additional management measures intended to bring the stock back to levels that are consistent with the ICCAT Convention objective. Those measures include an additional one-month closure accompanied by minimum catching size regulations, a list of authorized vessels, specifications on the technical characteristics of the longline gear, and onboard domestic observers on a given percentage of longline vessels. Recently, through Rec. 16-05, which replaced Rec. 13-04, a 15-year recovery plan has been adopted. In addition, increased catching size, and fishing capacity limitations were established, accompanied by TACs (10,500 t in 2017 Rec. 16-05, with a 3% annual reduction over the period 2018-2022) and a seasonal closure of the albacore fishery to reduce juvenile swordfish by-catches. The European Union introduced a driftnet ban for highly migratory species in 2002 and in 2003 ICCAT adopted a recommendation for a general ban of this gear in the Mediterranean [Rec. 03-04]. Rec. 04-12 forbids the use of various types of nets and longlines for sport and recreational fishing for tuna and tuna-like species in the Mediterranean.

After the adoption of the aforementioned ICCAT Recommendations, reported catches have decreased significantly from the 2000s' level, making the catches of the period 2012-2019 among the lowest of the last three decades. In addition, reported catches of undersized swordfish have also decreased more than 50%, compared with the levels of the decade of 2000s. Importantly, based on observations onboard, the recent increase of the minimum catching size from 90 to 100 cm has resulted in discard increases (up to 600%) in some fisheries. Both hooking and post-release mortality are unknown for this stock. However, for the Atlantic very high values of hooking mortality (ranging between 78-88%) have been reported for swordfish less than 125 cm LJFL, and it is possible that similar high values also occur in the Mediterranean. The Committee showed concern that such discards are not being fully reported and reiterated that all dead discards should be reported in Task I NC for all fisheries. Additionally, they should be included in the analysis of CPUE data trends. The additional measures foreseen under Rec. 16-05 have only recently been adopted and their effects cannot be fully evaluated.

***SWO-MED-6. Management recommendations***

Over the last 50 years stock biomass shows declining trends, starting with the period around 1970-1990, when the fishery was in a strong developing phase. In the following period until about 2010, declining trends were rather modest accompanied by small-scale fluctuations. In the most recent period, the stock biomass has continued to decline. As expected, fishing mortality followed an opposite trend with sharper increases during the 1980s. Current stock biomass is about 30% lower than that corresponding to MSY, while fishing mortality is around  $F_{MSY}$ . According to the Commission objectives the stock requires rebuilding and relevant scenarios were simulated assuming different levels of TACs. Analysis indicated that the probability of stock rebuilding by the end of the projection period (2028) is 60% if a TAC equal to 10,000 t is implemented. The probability increases if lower TACs levels are selected. As there are uncertainties on stock productivity, these estimates may be optimistic and should be interpreted with caution.

The Committee noted that since the establishment of minimum catching sizes, particularly after the recent size increase imposed through Rec. 16-05 the discard levels of undersized swordfish are increasing at least for certain fisheries and are largely dead. However, discards are not being reported for all fleets. Though an attempt has been made to statistically estimate discard levels and consider them in stock assessment models, the real volume of total discards is unknown due to this under-reporting. Such under-reporting leads to false estimates of the overall catch volume and consequently bias stock status estimates and projections of future stock size under different management measures.

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**MEDITERRANEAN SWORDFISH SUMMARY**


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Maximum Sustainable Yield	13,325 t (10,899 – 17,346 t) <sup>1</sup>
Current (2019) Yield	8,150 t
B <sub>MSY</sub>	71,319 t (42,562 – 113,758) <sup>1</sup>
F <sub>MSY</sub>	0.19 (0.12 - 0.34) <sup>1</sup>
Relative Biomass (B <sub>2018</sub> /B <sub>MSY</sub> )	0.72 (0.38 - 1.29) <sup>1</sup>
Relative Fishing Mortality (F <sub>2018</sub> /F <sub>MSY</sub> )	0.93 (0.42 - 1.68) <sup>1</sup>
Stock Status (2018)	Overfished: Yes
	Overfishing: No
Management Measures in Effect:	Driftnet ban [Rec. 03-04]
	Three-month fishery closure, gear specifications (number and size of hooks and length of gear), minimum catching size regulations, list of authorized vessels, fishing capacity restrictions, domestic observers onboard on longlines.
	TAC [Rec. 16-05]: 10,500 t in 2017, 10,185 t in 2018, 9,879 in 2019, 9,583 in 2020, 9,296 in 2021 and 9,017 in 2022.

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<sup>1</sup> 95% credibility intervals of 30,000 MCMC iterations from Bayesian surplus production models

**SWO-MED-Table 1.** Estimated catches (t) of swordfish (*Xiphias gladius*) in the Mediterranean by gear and flag. Longline dead discards of Algeria, EU-Italy, Maroc, Tunisia and Turkey (2008-2018) were estimated by the SG-SWO (Anon, 2020b). These discards represent about 20% of the total catches in 2018 and were not estimated for 2019. The estimation method is detailed in the assessment report (Anon 2020b).

		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		
TOTAL	MED	16018	15746	14709	13265	16082	13015	12053	14693	14369	13699	15569	15006	12814	15694	14405	14622	14915	14227	13683	13235	14754	12640	11046	10070	10969	11983	12300	10390	8677	8150		
Landings	Longline	7346	7365	7631	7377	8985	6319	5884	5389	6674	6223	7129	7498	8042	10748	10877	10954	11323	11113	11479	11020	11918	10288	9131	9047	9718	10675	10878	8345	6934	8015		
	Other surf.	8671	8381	7078	5888	7097	6696	6169	9304	7695	7476	8440	7508	4772	4945	3519	3555	3576	3094	658	819	1347	1162	782	49	83	78	53	57	61	45		
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	113	16	19	1546	1396	1488	1191	1133	973	1168	1230	1369	1988	1682	89		
Landings	CP																																
	Albania	0	0	0	0	0	0	13	13	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Algerie	712	562	395	562	600	807	807	807	825	709	816	1081	814	665	564	635	702	601	802	468	459	216	387	403	557	568	671	550	528	517		
	EU.Croatia	0	0	0	0	0	0	0	0	10	20	0	0	0	0	0	0	0	0	4	3	6	6	4	10	16	10	25	20	28	33		
	EU.Cyprus	173	162	56	116	159	89	40	51	61	92	82	135	104	47	49	53	43	67	67	38	31	35	35	51	59	54	53	50	45	24		
	EU.España	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498	1226	951	910	1462	1697	2095	2000	1792	1744	1591	1607	2073	2283	1733	1487	1387	1460		
	EU.France	0	0	0	0	0	0	0	0	0	0	0	12	27	20	19	22	20	14	14	16	78	81	12	66	127	182	179	113	86	71		
	EU.Greece	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1230	1120	1311	1358	1887	962	1132	1494	1306	877	1731	1344	761	761	392	350	745		
	EU.Italy	9101	8538	7595	6330	7765	7310	5286	6104	6104	6312	7515	6388	3539	8395	6942	7460	7626	6518	4549	5016	6022	5274	4574	2862	3393	4272	3946	2987	1779	2473		
	EU.Malta	135	129	85	91	47	72	72	100	153	187	175	102	257	163	195	362	239	213	260	266	423	532	503	460	376	489	410	330	308	407		
	EU.Portugal	0	0	0	0	0	0	0	0	0	0	13	115	8	1	120	14	16	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
	Japan	2	1	2	4	2	4	5	5	7	4	2	1	1	0	2	4	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	
	Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	Libya	0	0	0	0	0	0	0	0	11	0	8	6	0	10	2	0	16	0	0	0	0	0	0	0	0	0	585	960	30	70		
	Maroc	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379	3300	3253	2523	2058	1722	1957	1587	1610	1027	802	770	770	480	1110	1000	1013	982		
	Syria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	28	0	0	0	9	4	0	0	0	0	0	0		
	Tunisie	176	181	178	354	298	378	352	346	414	468	483	567	1138	288	791	791	949	1024	1011	1012	1016	1040	1038	1036	1030	1034	1007	1003	974	934		
	Turkey	243	100	136	292	533	306	320	350	450	230	370	360	370	350	386	425	410	423	386	301	334	190	80	97	56	35	77	441	427	414		
	NCC Chinese Taipei	0	0	0	1	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NCO NEI (MED)	1360	1292	1292	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	CP																																
	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175	102	100	42	78	84	145	147	176	205	197			
	EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	84	89		
	EU.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	113	16	19	27	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	724	751	817	734	618	456	538	670	623	907	535			
	Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	343	278	301	160	201	193	198	123	285	350	355			
	Tunisie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	221	221	222	227	227	226	272	273	266	374	364			
	Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	43	48	27	10	14	16	10	20	151	148			

**SWO-MED-Table 2.** Estimated probabilities of the Mediterranean swordfish stock (a) being below  $F_{MSY}$  (overfishing not occurring), (b) above  $B_{MSY}$  (not overfished) and (c) above  $B_{MSY}$  and below  $F_{MSY}$  (green zone) for a range of fixed total catches (0 – 15,000 t) over the projection horizon 2021-2028 based on joint projection MCMC posteriors of JABBA model runs ('Reference' and 'ASEM' models).

a) Probability that  $F \leq F_{MSY}$

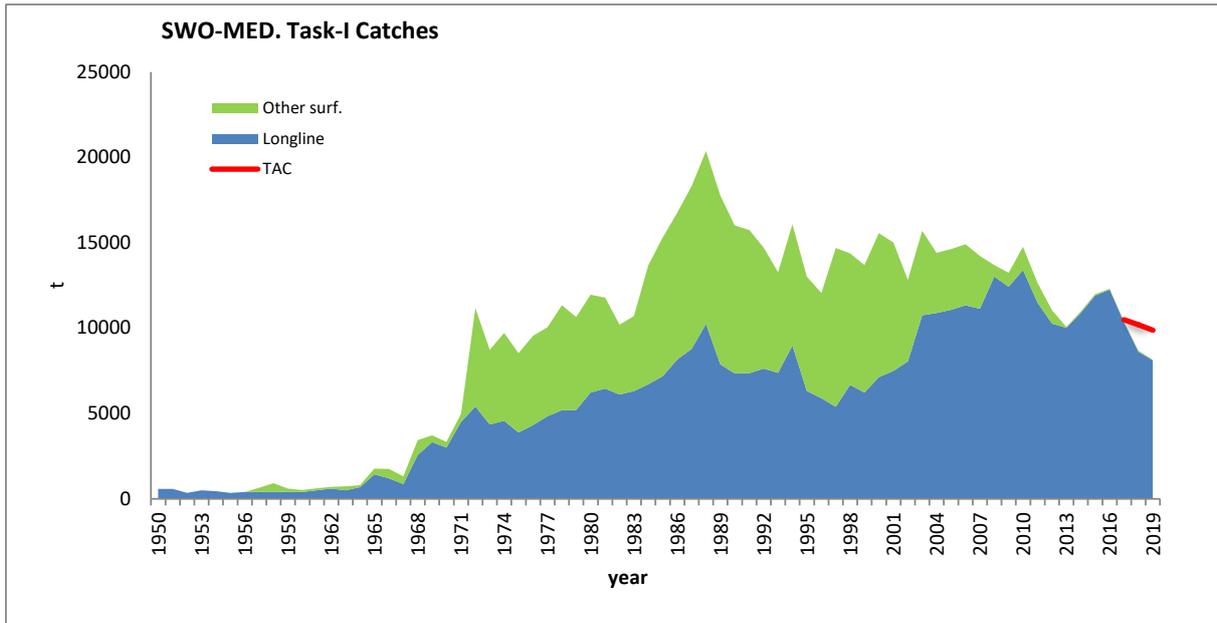
TAC   Year	2021	2022	2023	2024	2025	2026	2027	2028
0	100	100	100	100	100	100	100	100
7000	84	87	90	91	93	94	94	95
8000	76	80	83	85	87	88	90	90
9000	68	72	75	77	80	81	82	84
10000	58	62	65	68	70	72	73	74
10250	56	60	62	65	67	69	71	72
10500	54	57	60	62	64	66	68	69
10750	51	54	57	59	61	63	64	66
11000	49	52	55	57	59	60	61	63
11250	47	50	52	54	56	57	58	59
11500	45	47	49	51	53	54	55	56
11750	43	45	47	48	50	51	52	53
12000	41	43	44	46	47	48	49	50
12250	39	40	42	43	44	45	45	46
12500	37	38	39	40	41	42	42	43
12750	35	36	37	38	38	39	39	40
13000	33	34	35	35	36	36	36	36
14000	27	27	27	26	26	26	26	25
15000	22	21	20	20	19	18	18	17

b) Probability that  $B \geq B_{MSY}$

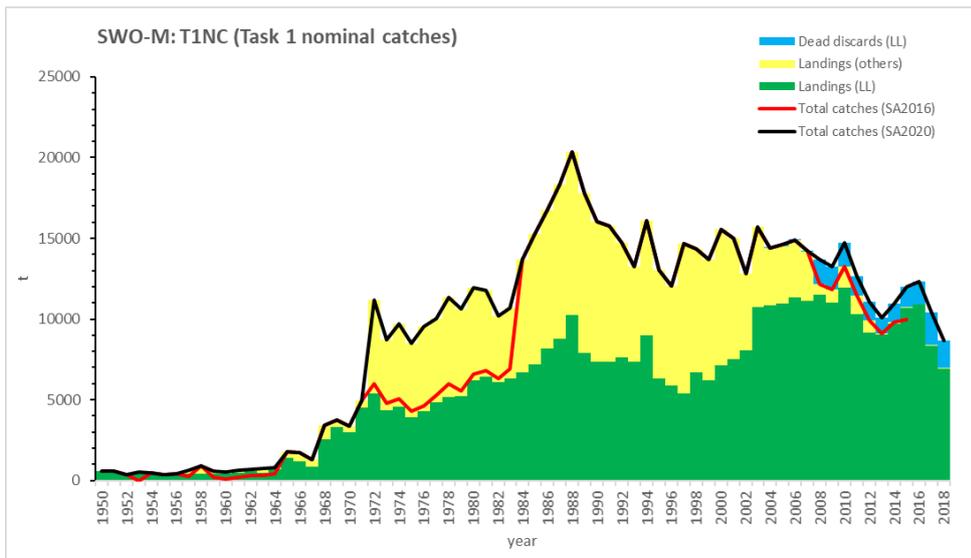
TAC   Year	2021	2022	2023	2024	2025	2026	2027	2028
0	31	52	71	84	92	96	98	99
7000	31	41	51	59	67	72	77	81
8000	31	39	47	55	61	67	71	75
9000	31	38	44	50	56	60	64	68
10000	31	36	41	46	50	53	57	60
10250	31	36	40	45	49	52	55	58
10500	31	35	39	43	47	50	53	56
10750	31	35	39	42	45	48	51	53
11000	31	35	38	41	44	47	49	51
11250	31	34	37	40	43	45	47	50
11500	31	34	37	39	42	44	45	47
11750	31	34	36	38	40	42	43	45
12000	31	33	35	37	39	41	42	43
12250	31	33	35	36	37	38	39	40
12500	31	32	33	35	36	37	38	38
12750	31	32	33	34	35	35	36	36
13000	31	32	33	33	34	34	34	34
14000	31	30	30	29	29	28	28	27
15000	31	29	27	26	24	23	22	21

c) Probability that  $F \leq F_{MSY}$  and  $B \geq B_{MSY}$ 

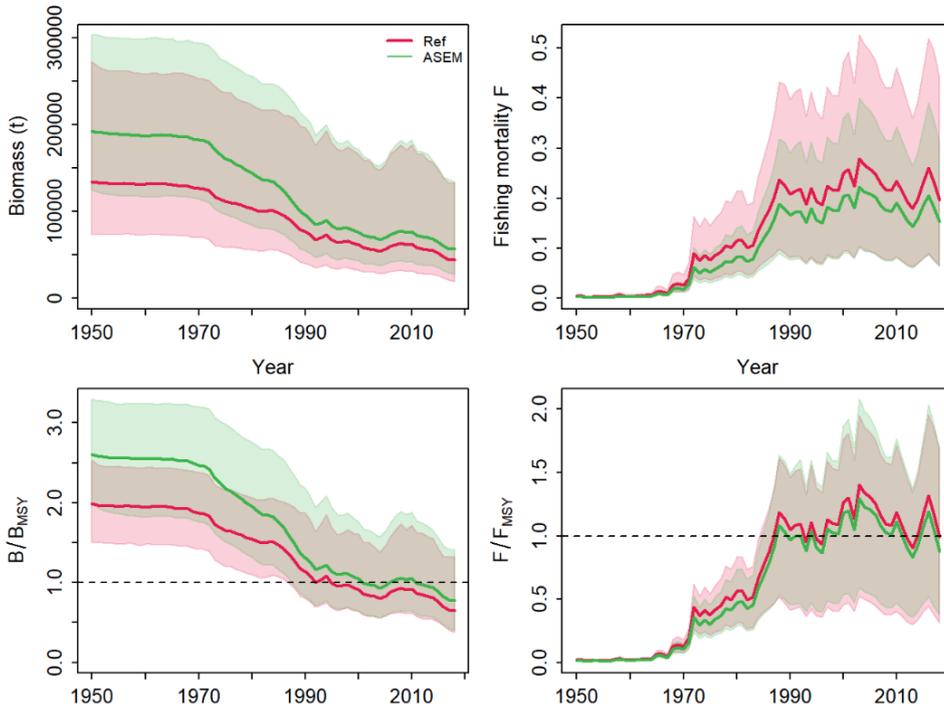
TAC   Year	2021	2022	2023	2024	2025	2026	2027	2028
0	31	52	71	84	92	96	98	99
7000	31	41	51	59	67	72	77	81
8000	31	39	47	55	61	67	71	75
9000	31	38	44	50	56	60	64	68
10000	31	36	41	46	50	53	57	60
10250	31	36	40	45	49	52	55	58
10500	31	35	39	43	47	50	53	56
10750	31	35	39	42	45	48	51	53
11000	31	34	38	41	44	47	49	51
11250	31	34	37	40	43	45	47	49
11500	30	34	37	39	41	44	45	47
11750	31	33	36	38	40	42	43	45
12000	30	33	35	37	38	40	41	43
12250	30	32	34	35	37	38	39	40
12500	30	31	32	34	35	36	37	38
12750	29	31	32	33	33	34	35	35
13000	29	30	31	31	32	32	33	33
14000	25	25	25	25	25	25	25	24
15000	21	20	20	19	18	18	17	17



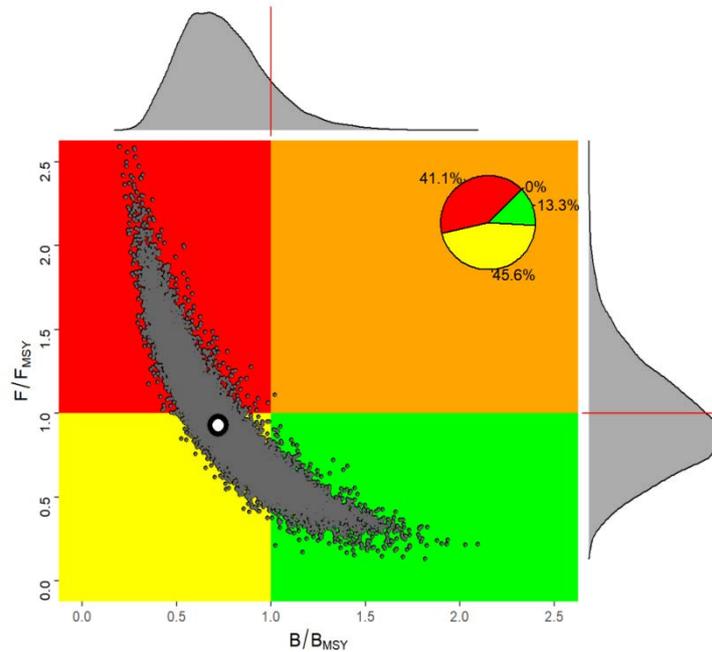
**SWO-MED-Figure 1.** Estimates of Task I swordfish catches (t) in the Mediterranean by major gear types, for the period 1950-2019, and corresponding annual TACs since 2017 [Rec .16-05].



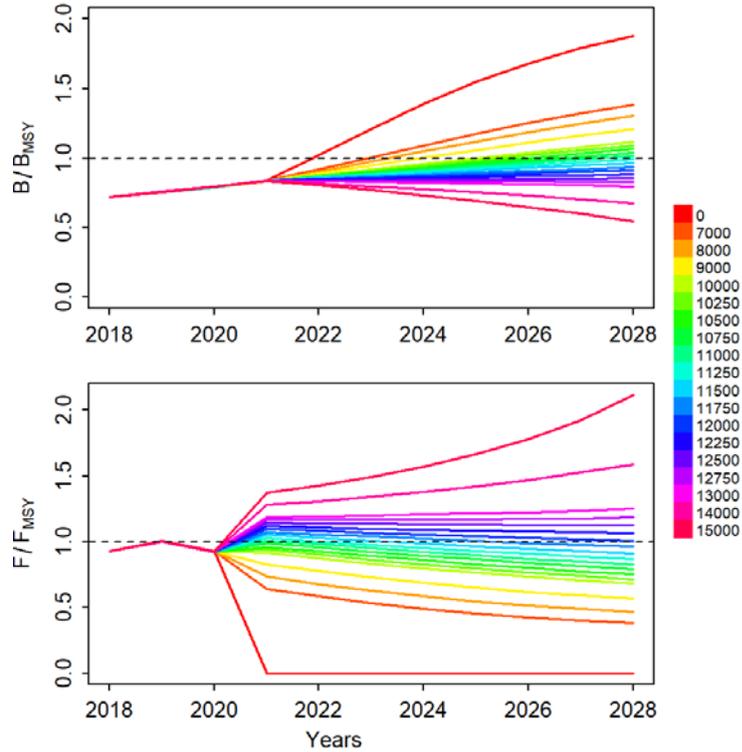
**SWO-MED-Figure 2.** SWO-M total nominal catches (T1NC, t) by year, showing total landings (LL and other gears) and dead discards (reported and estimated in SCRS/2020/028). The total catches used in the 2016 stocks assessment (SA2016) is shown for comparative purposes.



**SWO-MED-Figure 3.** Trends in biomass and fishing mortality (upper panels) and biomass relative to  $B_{MSY}$  ( $B/B_{MSY}$ ) and fishing mortality relative to  $F_{MSY}$  ( $F/F_{MSY}$ ) (bottom panels) for each scenario from the Bayesian state-space surplus production model fits to Mediterranean swordfish.



**SWO-MED-Figure 4.** Kobe phase plot showing the combined posteriors of  $B_{2018}/B_{MSY}$  and  $F_{2018}/F_{MSY}$  presented in the form of joint MCMC posteriors of JABBA model runs for Mediterranean swordfish. The probability of posterior points falling within each quadrant is indicated in the pie chart.



**SWO-MED-Figure 5.** Trends of projected relative stock biomass (at begin of year, upper panel,  $B/B_{MSY}$ ) and fishing mortality (at end of year, bottom panel,  $F/F_{MSY}$ ) of Mediterranean swordfish under different TAC scenarios (0 – 15,000 t), based upon the combined projections of JABBA model runs. Each line represents the median of 30000 MCMC iterations by projected year.

#### **5.4 POR – PORBEAGLE**

The latest information on the status of the porbeagle (*Lamna nasus*) stock is available in the SCRS 2020 report of the stock assessment meeting of the species (Anon. 2020c).

##### ***POR-1. Biology***

A great variety of shark species are found within the ICCAT Convention area, from coastal to oceanic species. Biological strategies of these sharks are very diverse and are adapted to the needs within their respective ecosystems where they occupy a very high position in the trophic chain as active predators. Therefore, generalization as regards to the biology of these very diverse species results in inevitable inaccuracies, as would occur for teleosts. To date, ICCAT has prioritized the biological study and assessment of the major sharks of the epipelagic system as these species are more susceptible to being caught as by-catch by oceanic fleets targeting tuna and tuna-like species. Among these shark species there are some of special prevalence and with an extensive geographical distribution within the oceanic-epipelagic ecosystem, such as the blue shark and shortfin mako shark, and others with less or even limited prevalence, such as porbeagle, hammerhead sharks, thresher sharks, and white sharks.

Porbeagle is a large pelagic shark that shows a wide geographic distribution associated with cold-temperate waters. Porbeagle has aplacental viviparity with an oophagous reproductive system, which limits their fecundity but increases the probability of survival of their young. The porbeagle has a litter size of usually just four individuals and a gestation period of 8-9 months. Median size at maturity is about 174 cm FL (fork length) or 8 years for males and 218 cm FL or 13 years for females, with mating taking place between September and November. Breeding frequency was determined to be annual, but a recent study found that at least a portion of the Northwest Atlantic population is biennial or possibly even triennial based on the finding of a resting stage. Although uncertainty regarding their biology remains, available life history traits (slow growth, late maturity and small litter size) indicate that it is vulnerable to overfishing. A behavioral characteristic of this species is its tendency to segregate temporally and spatially by size and/or sex during feeding, mating-reproduction, gestation and birth processes. Tagging studies have suggested that the species exhibits large-scale migratory behaviour and periodic vertical movement, but the lack of information on some components of the populations precludes a complete understanding of their distribution/migration patterns by ontogenetic stage and in some cases identifying their pupping/mating grounds. Numerous aspects of the biology of this species are still poorly understood or completely unknown, particularly for some regions, which contributes to increased uncertainty in quantitative and qualitative assessments.

The stock structure for porbeagle shark was first addressed in 2009 at the joint ICCAT/ICES stock assessment. Data at that time supported the view of restricted movements between the NE and NW Atlantic individuals. Therefore, it was concluded that in the North Atlantic there were two stocks. Regarding the South Atlantic, it was understood that there were two stocks, SW and SE, although the possibility was raised that both southern stocks would extend to the bordering oceans (Pacific and Indian). Since 2009, a number of mark-recapture, pop-off archival satellite tag (PSAT) studies have further examined the movements of porbeagle particularly in the North Atlantic Ocean. Nearly all of the long-term satellite tagging, conventional tagging, and survival tagging supports that porbeagle stocks in the Northeast Atlantic are separate from the Northwest. There is little tagging information from the South Atlantic. In addition to tagging studies, a study of genomic DNA suggests there is strong genetic subdivision between the North Atlantic and Southern Hemisphere populations, but found no differentiation within these hemispheres. New information derived from fishery and research data from the South Atlantic, Pacific and Indian Oceans indicates that there is a continuous distribution of the species in the three oceans and that it ranges from 20° to 60° South latitude. Overall, there is insufficient data to define the appropriate number of stocks in the Southern Hemisphere.

##### ***POR-2. Fishery indicators***

The Committee considered that, based on the most recent and best available information, there are two stocks in the North Atlantic (NW, NE) and likely a single stock in the South Atlantic. However, two areas (SW and SE) are considered for catch data reporting purposes in the South Atlantic (**POR-Table 1** and **POR Figure 1**).

Few CPUE series were presented during the 2020 porbeagle assessment as management measures led to changes in the fishery that resulted in lack of sufficient data on Porbeagle catch rates or changes in management that could not be accounted for in the CPUE standardization procedure.

Two standardized CPUE series were presented for the NW Atlantic stock: a Canadian fishery-independent survey and a Japanese pelagic longline fishery series based on observer data. The Canadian survey showed a decline from 2007 to 2017 but was deemed not to reflect abundance; the Japanese series showed a stable trend during 2000-2014 and an increase from 2014 to 2018, which could be attributable to an increase in juvenile sharks. A standardized CPUE series was presented for the SW stock based on data from Uruguayan longliners from 1982 to 2012. The Uruguayan tuna fleet can be divided into two well-defined periods: 1982-1992 Japanese-Style longline (deep sets), and 1993-2012 American-Style longline (shallow sets). The first period had higher standardized CPUE values, suggesting that fishing method factors such as set depth or bait type may have an effect on porbeagle catch rates.

### ***POR-3. State of the stocks***

Due to changes in management practices that would have affected the development of CPUE series and potentially length composition data, in 2020 the Committee was constrained to use non-traditional stock assessment methods. Overfished stock status could only be determined for the NW stock and overfishing stock status; for the combined stocks in the North Atlantic and the South Atlantic. The Committee did not attempt to formally assess the NE stock as it will be assessed by the ICES WGEF (Working Group of Elasmobranch Fishes) in 2021-2022.

Two modelling approaches were used to assess the status of porbeagle shark in the Atlantic and two additional methods were also explored. The SAFE (Sustainability Assessment for Fishing Effects) was used to evaluate whether the combined North and combined South Atlantic stocks were experiencing overfishing. The ICM (Incidental Catch Model) was used to evaluate whether the NW Atlantic stock was currently overfished and to determine the stock's capacity for future removals. Exploratory analyses that were not used to derive advice for the current assessment included the ICM fit to the South Atlantic stock, length-based approaches fit to the NW, SW, and SE stocks, and input control management options explored in a preliminary MSE approach for the NW stock. All of the exploratory approaches showed promise and could be further explored in future assessments.

Results of the SAFE approach indicated that neither the North Atlantic nor the South Atlantic stocks are undergoing overfishing. It was noted that while this is a data-limited approach, the overfishing status results were robust to the selectivity curve assumed and the post-release mortality value used in the computation of post-capture mortality. The Committee noted that for the South Atlantic results are in line with those found in the 2017 Southern Hemisphere (SH) porbeagle ABNJ (Areas Beyond National Jurisdiction) stock status assessment, with  $F/F_{MSY}$  values from both studies being of relatively similar magnitude (annual mean=0.063, range: 0.046 to 0.083 for 2006-2014 in the SH assessment vs. 0.113, range: 0.107-0.119 for 2010-2018 in the SAFE analysis).

An equal mix of annual and biennial reproduction was considered the most likely scenario for the porbeagle population in the NW Atlantic so these productivity assumptions were used for the base case formulation of the ICM. Two alternate parameterizations of the ICM were evaluated to determine the model's sensitivity to life history assumptions as well as to the assumed population size in 2018. The first sensitivity analysis assumed a reproductive periodicity of only one year (annual reproduction), consistent with productivity assumptions in the 2009 assessment. The second assumed larger population size in 2018, so that predicted abundance in 2009 matched the value of 200,000 animals from the Canadian Statistical-Catch-at-Age model presented at the 2009 assessment. In all formulations, the stock was predicted to be overfished in 2018 with > 70% probability, even though abundance has been increasing since 2001. The scenarios differed in how far 2018 abundance was below the MSY proxy for biomass, with both sensitivity analyses suggesting that the population was closer to the reference point. The base case formulation of the ICM estimated biomass in 2018 to be 57% of the MSY proxy reference point (353,000 animals), giving a 98% probability of the stock being overfished.

Due to a lack of reporting, the magnitude of dead discards remains uncertain and post-release mortalities are not incorporated in this assessment, so there remains considerable uncertainty in the assessment of status. If actual total removals (unreported landings, dead discards, and post-release mortalities) do not largely exceed what has been estimated, then with the large reduction in recent reported removals, the committee considers it unlikely that the stock is undergoing overfishing; but it considers that the stock remains overfished.

The Northeast Atlantic stock has the longest history of commercial exploitation. A lack of CPUE data for the peak of the fishery adds considerable uncertainty in identifying the status relative to virgin biomass. Exploratory assessments indicate that 2008 biomass is below  $B_{MSY}$  and that recent (2008) fishing mortality is near or above  $F_{MSY}$  (**POR-Figure 2**). Recovery of this stock to  $B_{MSY}$  under no fishing mortality is estimated to take ca. 15-34 years. The 2009 EU TAC of 436 t in effect for the Northeast Atlantic may have allowed the stock to remain stable, at its depleted biomass level, under most credible model scenarios. Since 2010 the EU TAC has been set at zero.

#### ***POR-4. Outlook***

Projections conducted with the ICM for the NW stock indicated that removals of less than 7,000 sharks (214 mt) would allow rebuilding with a 60% probability by 2070 (a projection interval of 2.5 generations) and removals of less than 8,000 sharks (245 mt) would allow rebuilding with a 50% probability by 2060 (**POR-Table 2** and **POR-Figure 3**). If removals remained similar to 2014-2018 (mean = 47 mt), the stock was predicted to rebuild with at least a 50% probability between 2030 and 2035). However, the Committee emphasized that recent removals are very likely underestimated because few CPCs report dead discards, and post-release mortality of live discards was not taken into account.

#### ***POR-5. Effect of current regulations***

In 2013 Uruguay prohibited retention of porbeagle sharks and Canadian directed fisheries for porbeagle have also been closed since 2013. The other main porbeagle directed fishery in the North Atlantic (EU) ceased operations in 2010. Estimated catches (including landings and dead discards) for the NE stock have steadily decreased since the species became prohibited in 2010 (21 t) to 0 t in 2019; for the NW stock catches of 284 t were estimated for 2013 but have decreased to 28 t in 2019; catches for the SE and SW stocks are insignificant (< 4 t annually) since 2015. However, the Committee noted that these catches likely significantly underestimate total removals because they do not include dead discards in many cases and post-release mortality of live releases in all cases. Furthermore, the magnitude of porbeagle removals in non-ICCAT coastal fisheries is unknown but likely high (**POR-Figure 1**).

The proportion of catches released alive has increased since 2015 following the implementation of Rec 15-06, which obligates that CPCs require their vessels to promptly release unharmed, to the extent practicable, porbeagle sharks caught in association with ICCAT fisheries when brought alive alongside for taking on board the vessel.

Porbeagle was listed under Appendix II of the Convention on International Trade in Endangered Species (CITES) in 2013. Among other things, CITES Appendix II carries a requirement that Parties issue export and import, as well as introduction from the sea, permits based on findings that the take is legal and sustainable. Development of these “non-detriment findings” and related permitting processes is underway.

Parties to the Convention on Migratory Species (CMS) have listed 29 elasmobranch species under its Appendices. Appendix II, which includes porbeagle, signals a commitment to international cooperation toward conservation.

#### ***POR-6. Management recommendations***

The Committee recommends that the Commission work with countries catching porbeagle and relevant RFMOs to ensure recovery of North Atlantic porbeagle stocks (e.g. ICES, NAFO). In particular, porbeagle fishing mortality should be kept at levels in line with scientific advice and with removals not exceeding the current level. New targeted porbeagle fisheries should be prevented, porbeagles retrieved alive should be released following best handling practices to increase survivorship, and all catches should be reported.

Management measures and data collection should be harmonized as much as possible among all relevant RFMOs dealing with these stocks, and ICCAT should facilitate appropriate communication.

1. The SCRS needs cooperation from all CPCs to improve catch statistics, which is critical to advancing the assessments of all porbeagle stocks.

- a. Only 1 CPC has reported live discards of porbeagle. The Committee underlines that the reporting and quantification of live discards is critical, especially for a stock where all live animals must be released (Rec. 15-06); the Commission should find ways to encourage improved reporting of live discards.
- b. There is a need for CPCs to strengthen their monitoring and data collection efforts, including but not limited to improved estimates of dead discards and the estimation of CPUEs using observer data.
- c. The Committee requests CPCs revise their porbeagle catch series (landings, live discards, and dead discards) including incidental captures from their other non-ICCAT fisheries (gillnet, trawling, purse seiner, etc.) to allow the SCRS to incorporate all mortality sources into future assessments and reduce the uncertainty in stock status and projections.
- d. In addition, the Committee recommends that the ICCAT liaise with parties (e.g. other RFMOs) and engage in data mining to determine the total capture from non-ICCAT parties.

2. The Committee notes that management recommendations for porbeagle stocks under ICCAT responsibility are drafted for ICCAT fisheries. However, porbeagle stocks are subject to mortality from CPCs' coastal fisheries and countries that are not ICCAT Parties. Therefore, the Committee recommends that CPCs implement a live release requirement for all porbeagle caught in their waters and that ICCAT develop integrated management approaches (with other countries, other Regional Fisheries Bodies, FAO) to assure the sustainability of Atlantic porbeagle stocks.

3. The Committee notes that some landings and the majority of discards go unreported, meaning that total mortality of porbeagle from all sources (i.e. landings, dead discards and live releases that subsequently die as a result of gear interactions) is underestimated. For the purposes of this assessment, the Committee estimated unreported landings and dead discards preliminarily that were 89% higher than reported, but did not estimate mortality following live release. The Commission should be aware that actual removals are higher than what is being reported and Kobe matrices will be optimistic to the extent that removals are underreported.

4. Considering the underreporting of removals, and the current low stock status of the NW Atlantic stock ( $B_{2018}/B_{MSY}=0.57$ ), the Committee recommends that total removals (i.e. the sum of landings, dead discards, and post-release mortality of live releases) do not exceed current levels (including unreported removals) to allow for stock recovery. Although the Kobe matrix might suggest that some increases in total removals could allow for potential recovery in the long term, the assessment suggests that the stock is productive enough to recover in a much shorter time frame if total removals are maintained at a lower level. This is consistent with Rec. 11-13 that overfished stocks be recovered in as short a period as possible. However, the Commission should be aware that actual removals (particularly dead discards and post-release mortalities of live releases) are higher than what is being reported and the Kobe matrix is overly optimistic to the extent that removals are underreported.

5. While there is large uncertainty in southern stock structure, new information suggests a single stock of porbeagle in the South Atlantic; the Committee had, until now, considered two stock units, SW and SE. Indeed, there may be a southern stock that extends across Indian and Pacific Ocean basins. More research on stock structure needs to be undertaken to determine an appropriate unit stock. Until this research is done, the Committee recommends leaving the management units as currently defined.

6. The Committee was not able to draw any conclusions on the overfished status of the southern stock(s). It noted that indeed, conventional data (e.g. landings, representative length compositions) cannot be collected for any northern or southern porbeagle stocks, so the Committee concluded that alternative (e.g., fishery independent) data collection methods that allow CPUE or length-frequency data (or other altogether different forms of data) to be collected are required to provide more reliable estimates of stock status in the North and in the South Atlantic.

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**NORTHWEST ATLANTIC PORBEAGLE SUMMARY**


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Yield (2019)		28 t <sup>1</sup>
Relative Biomass	$B_{2018}/B_{MSY}$	0.57 <sup>2</sup>
Relative Fishing Mortality	$F_{MSY}$	0.049 <sup>3</sup>
	$F_{2010-2018}/F_{MSY}$	0.413 <sup>3</sup>
Stock Status (2018)	Overfished	Yes
	Overfishing	Not likely
Management Measures in Effect		Rec. 15-06

<sup>1</sup> Estimated catch for the Northwest stock as of 3 September 2020. Catch does not include all dead discards and includes no mortalities resulting from live releases.

<sup>2</sup> Value obtained with the ICM model. The reference point used ( $SPR_{MER}$ ) is a proxy for  $B_{MSY}$ .

<sup>3</sup> Value obtained with the SAFE approach for the North Atlantic.

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**NORTHEAST ATLANTIC PORBEAGLE SUMMARY**


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Yield (2019)		0 t <sup>1</sup>
Relative Biomass	$B_{2008}/B_{MSY}$	0.09-1.93 <sup>2</sup>
Relative Fishing Mortality	$F_{MSY}$	0.02-0.03 <sup>3</sup>
	$F_{2008}/F_{MSY}$	0.04-3.45 <sup>4</sup>
Stock Status (2008)	Overfished	Yes
	Overfishing	No
Management Measures in Effect		<a href="#">Rec. 15-06</a>

<sup>1</sup> Estimated catch for the Northeast stock as of 3 September 2020. Catch does not include all dead discards and includes no mortalities resulting from live releases.

<sup>2</sup> Range obtained from BSP (high) and ASPM (low) models. Value from ASPM model is  $SSB/SSB_{MSY}$ . The value of 1.93 from the BSP corresponds to a biologically unrealistic scenario; all results from the other BSP scenarios ranged from 0.29 to 1.05.

<sup>3</sup> Range obtained from the BSP and ASPM models (low and high for both models).

<sup>4</sup> Range obtained from BSP (low) and ASPM (high) models. The value of 0.04 from the BSP corresponds to a biologically unrealistic scenario; all results from the BSP scenarios ranged from 0.70 to 1.26.

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**SOUTH ATLANTIC PORBEAGLE SUMMARY**


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Yield (2019)		0 t <sup>1</sup>
Relative Biomass	$B_{2018}/B_{MSY}$	Unknown
Relative Fishing Mortality	$F_{MSY}$	0.062 <sup>2</sup>
	$F_{2010-2018}/F_{MSY}$	<u>0-113</u> <sup>2</sup>
Stock Status (2018)	Overfished	Undetermined
	Overfishing	Not likely
Management Measures in Effect		<a href="#">Rec. 15-06</a>

<sup>1</sup> Sum of the estimated catch for the Southwest and Southeast Atlantic stock areas as of 3 September 2020. Catch does not include all dead discards and includes no mortalities resulting from live releases.

<sup>2</sup> Value obtained with the SAFE approach for the South Atlantic.

**POR-Table 1.** Estimated catches (t) of porbeagle (*Lamna nasus*) by area, gear and flag.

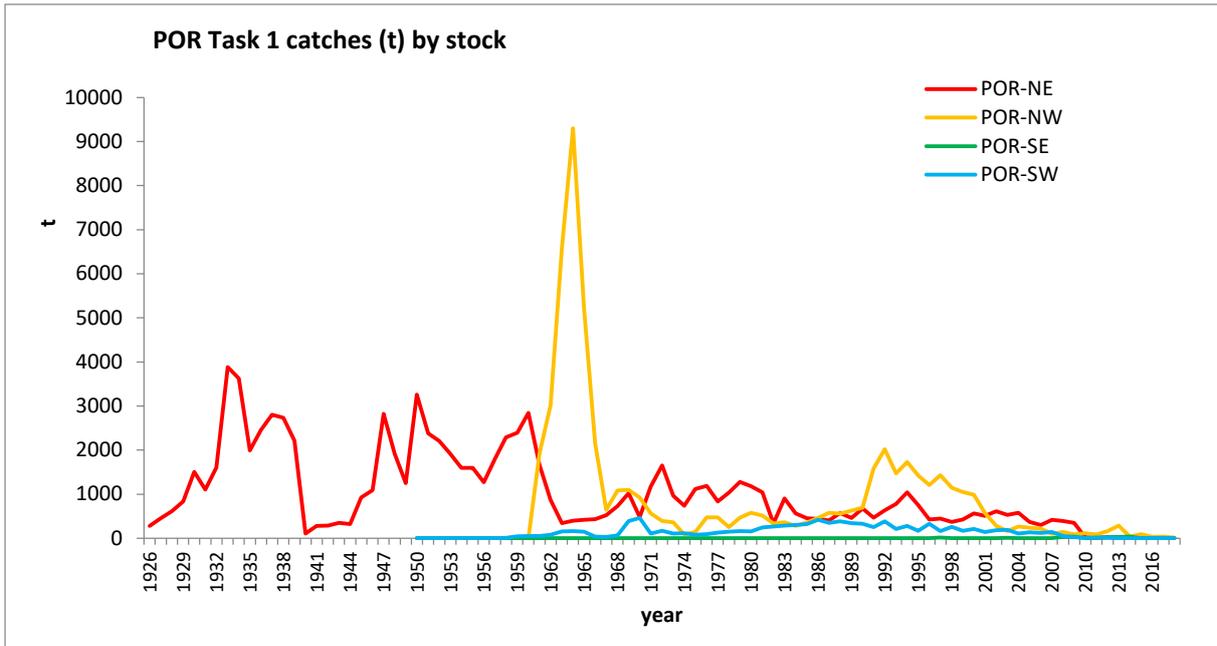
			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			
TOTAL			1702	2311	3043	2465	3054	2343	1971	2055	1779	1649	1769	1223	1075	887	954	740	642	671	619	496	152	121	225	323	78	104	41	48	27	29			
ANE			679	467	637	777	1045	749	428	444	371	424	567	506	610	527	578	367	302	421	391	349	21	14	25	10	5	8	9	8	4	0			
ANW			696	1586	2021	1475	1726	1424	1212	1432	1144	1047	988	574	282	164	264	237	217	101	141	84	114	85	162	284	35	93	30	39	19	28			
ASE			0	0	0	0	0	0	3	19	1	6	0	1	1	9	3	1	0	5	30	37	6	7	26	29	38	3	1	0	4				
ASW			328	256	385	213	284	170	327	159	261	172	214	141	181	187	105	133	122	143	55	26	10	14	12	0	0	0	0	0	0	0			
MED			0	1	0	0	0	0	1	0	1	0	1	1	0	0	3	2	1	0	2	1	1	0	1	0	0	0	0	1	1	0	0		
Landings	ANE	Longline	28	48	15	23	101	64	55	39	33	28	33	41	83	142	275	63	62	301	229	143	9	2	1	1	0	5	3	1	0	0			
		Other surf.	650	419	622	754	943	685	373	405	338	396	533	465	527	385	303	305	240	120	162	206	13	12	24	9	5	3	6	7	4	0			
	ANW	Longline	695	1585	2019	1475	1724	1422	1206	1420	1126	1034	985	566	269	151	253	226	209	91	131	67	83	68	134	248	14	15	10	10	6	0			
		Other surf.	1	1	0	0	0	2	6	12	19	12	3	8	13	13	12	12	8	11	9	13	20	16	23	30	7	9	5	8	3	12			
	ASE	Longline	0	0	0	0	0	0	3	15	1	2	0	1	1	9	3	1	0	5	30	36	6	7	25	29	13	3	1	0	4				
		Other surf.	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0			
	ASW	Longline	328	256	384	213	282	170	326	159	259	170	213	141	181	187	105	133	122	143	55	26	10	14	12	0	0	0	0	0	0	0			
		Other surf.	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	MED	Longline	0	0	0	0	0	0	1	0	1	0	1	1	0	0	2	2	0	0	2	1	0	0	1	0	0	0	0	0	0	0	0		
		Other surf.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0		
	Discards	ANE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			Other surf.	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	11	2	5	6	14	67	13	19	7	13
ANW		Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	3		
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
ASE		Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
ASW		Longline	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings		ANE	CP	EU.Denmark	46	85	80	91	93	86	72	69	85	107	73	76	42	21	20	4	3	2	1	0	0	2	0	0	0	0	0	0	0		
				EU.España	26	47	15	21	52	19	41	25	25	18	13	24	54	27	11	14	34	8	41	77	0	0	0	0	0	0	0	0	0	0	0
				EU.France	551	300	496	633	820	565	267	315	219	240	410	361	461	303	413	276	194	354	311	228	0	2	4	0	0	3	0	1	0	0	
				EU.Germany	0	0	0	1	0	0	0	0	2	0	17	1	3	5	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EU.Ireland			0	0	0	0	0	0	0	0	0	0	8	2	6	3	11	18	3	4	8	7	3	0	0	0	0	0	0	0	0	0	0	
	EU.Netherlands			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.Portugal			2	1	0	1	1	1	1	1	1	1	0	7	4	10	101	50	14	6	0	3	17	7	0	0	0	0	0	0	0	0	0	
	EU.Sweden			2	2	4	3	2	2	1	1	1	1	1	1	1	1	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	EU.United Kingdom			9	0	0	0	0	0	0	0	1	6	8	12	10	25	24	24	11	26	15	11	0	0	0	0	0	0	0	0	0	0	0	
	Iceland			0	0	1	3	4	6	5	3	4	2	2	3	2	1	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	
	Japan			0	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	0	0	12	0	3	2	1	1	0	0	0	2	0	0	0	
	Korea Rep.			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Liberia			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	Maroc			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	
	Norway			43	32	41	24	24	26	28	17	27	32	22	11	14	19	24	8	27	10	12	10	12	11	17	9	5	4	6	6	3	0	0	
	Russian Federation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NCO			Faroe Islands	0	0	0	0	48	44	8	9	7	10	13	8	10	14	5	19	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANW			CP	Barbados	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	3	13	1	2	1	1	1	
					Canada	78	329	813	919	1575	1353	1051	1334	1070	965	902	499	237	142	232	202	192	93	124	62	83	30	33	19	9	4	2	2	1	0
					FR.St Pierre et Miquelon	0	0	0	0	0	7	40	13	20	0	13	2	1	2	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Japan		63	62		54	35	29	15	10	9	19	41	47	52	21	7	20	27	18	5	10	10	11	13	48	98	0	0	0	0	0	0			
Korea Rep.		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	13	20	3	0	0	0	0	0	0			
Norway		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
U.S.A.		2	5		1	50	106	35	78	56	13	3	1	1	1	1	0	1	0	0	1	1	2	9	19	27	6	8	4	8	3	12			
Venezuela		2	1		2	2	4	1	7	2	8	9	6	2	0	0	0	0	0	0	1	3	3	9	19	69	4	6	4	8	4	0			
NCC		Chinese Taipei	0		0	0	4	10	12	27	18	13	27	19	18	22	12	8	7	5	3	2	2	3	7	15	50	1	5	4	0	0	0		
NCO		Cuba	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Faroe Islands	550	1189	1149	465	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

2020 ADVICE TO THE COMMISSION

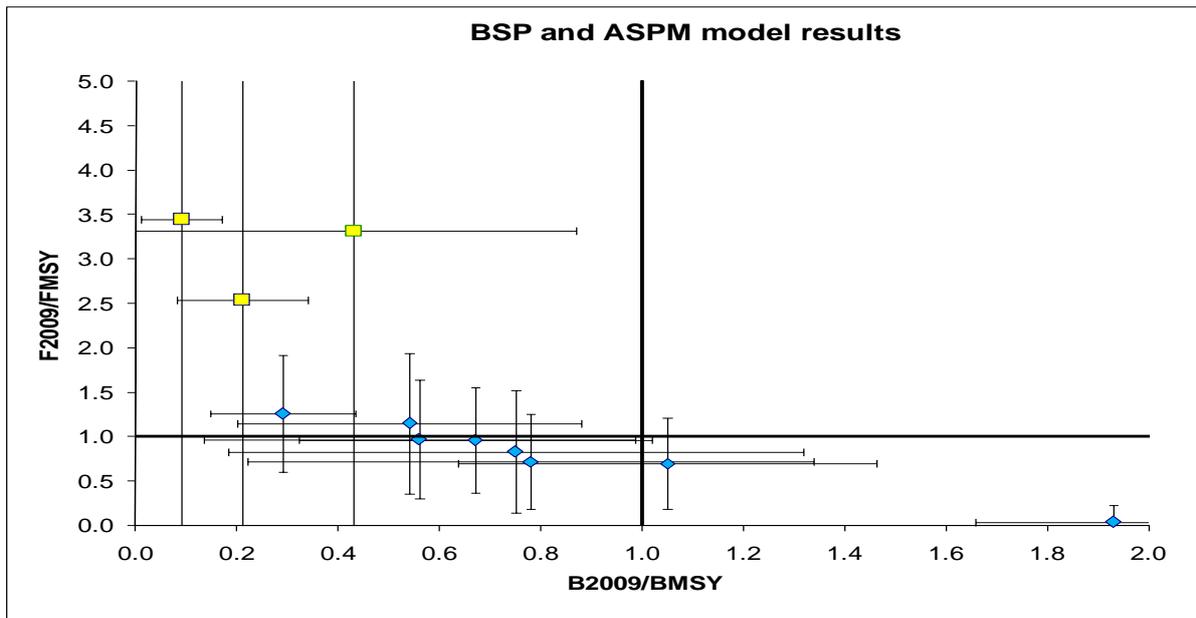
			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
ASE	CP	EU.España	0	0	0	0	0	0	0	2	1	2	0	1	1	9	3	0	0	0	1	11	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	0	0	0	0	0	0	0	3	13	0	0	0	0	0	0	0	0	0	5	29	25	6	7	25	15	13	3	1	0	0	
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	4	
	NCC	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		
	NCO	Benn	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ASW	CP	Brazil	95	81	128	60	32	49	33	36	38	58	60	67	74	49	37	52	32	23	0	0	0	2	0	0	0	0	0	0	0		
		China PR	0	0	0	0	1	0	0	0	0	13	36	4	0	5	4	2	2	6	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.España	1	13	12	32	35	43	28	25	1	12	7	13	1	0	0	0	3	5	3	2	0	0	0	0	0	0	0	0	0	0	
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Poland	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	0	0	0	0	0	0	0	1	0	0	0	1	1	1	4	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	37	48	12	13	14	6	6	1	1	2	7	4	3	2	11	3	3	4	12	10	2	0	0	0	0	0	0	0	0	0	
		Korea Rep.	3	3	1	1	2	1	6	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	8	14	2	6	24	4	21	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Uruguay	27	18	24	7	5	3	19	5	13	2	4	20	8	34	8	28	34	3	40	14	6	12	12	0	0	0	0	0	0	0	
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			NCC	Chinese Taipei	142	73	192	85	146	57	168	65	170	73	84	29	93	95	39	43	47	99	0	0	2	0	0	0	0	0	0	0	0
			NCO	Argentina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chile	0	0		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Cuba	1	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Falklands	0	0		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NEI (Flag related)	13	8		14	10	22	8	46	23	37	11	15	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Seychelles	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MED	CP	EU.Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	2	0	0	0	0	0	0	0	1	1	0	0	
		EU.Malta	0	1	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	
Discards	ANE	CP	Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	ANE	NCC	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
ANW	CP	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	1	1		
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	3		
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	1	1	1	5	1	1	0		
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		
		U.S.A.	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	1	2	7	34	1	9	1		
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	1	3	14	4	7	4			
	NCC	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	1	11	4	0	0		
ASE	CP	Curaçao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NCC	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
ASW	CP	El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Uruguay	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NCC	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

**POR-Table 2.** Kobe II strategy matrix showing the probability of being above the overfished reference point (a proxy for  $B_{MSY}$ ) by 5-year time period for removals scenarios ranging from 0 to 24,000 individuals (0-734 mt) for porbeagle in the Northwest Atlantic.

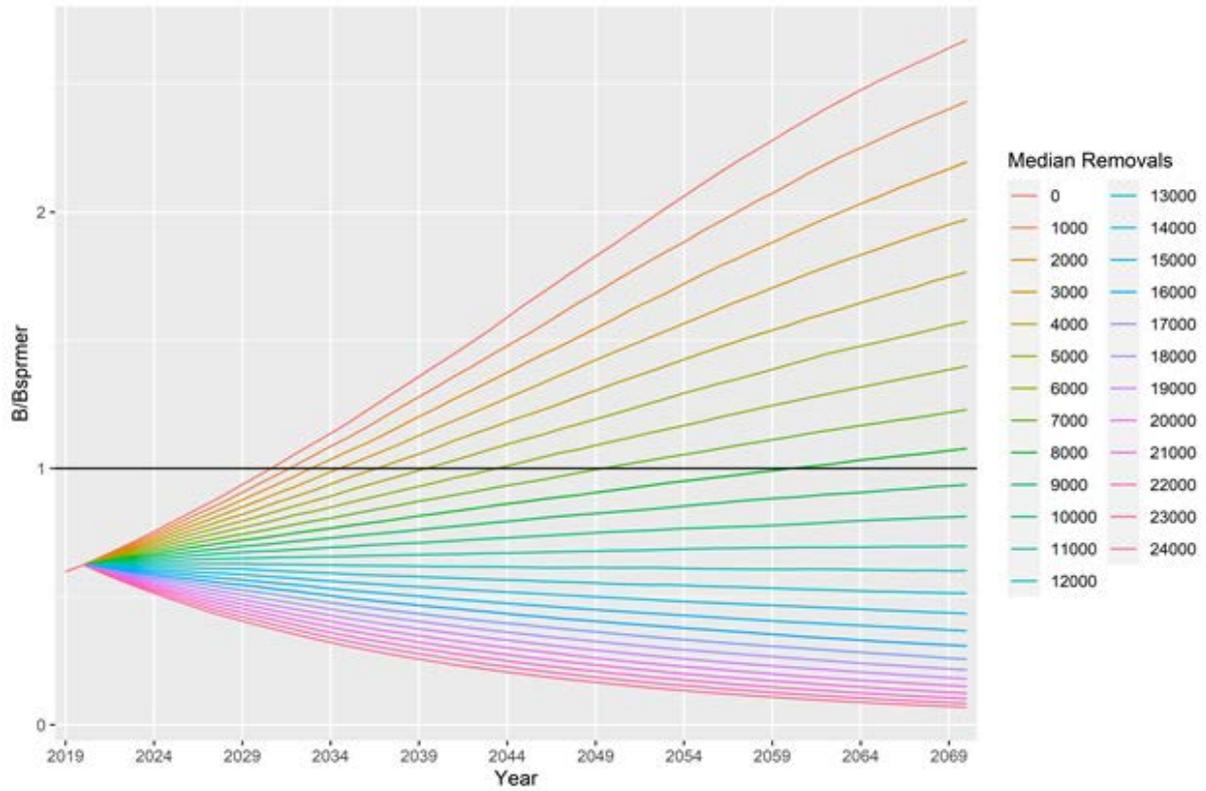
Animals (#)	Ton (mt)	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070
0	0	2%	21%	47%	68%	83%	92%	96%	98%	99%	99%	100%
1000	31	3%	21%	44%	63%	77%	87%	92%	95%	97%	98%	99%
2000	61	2%	19%	40%	57%	71%	81%	87%	91%	94%	95%	96%
3000	92	1%	16%	35%	50%	62%	72%	79%	85%	88%	90%	92%
4000	122	2%	15%	32%	47%	58%	66%	73%	78%	82%	84%	87%
5000	153	2%	13%	27%	41%	50%	58%	64%	68%	72%	76%	78%
6000	183	1%	12%	25%	37%	45%	52%	57%	62%	65%	67%	70%
7000	214	2%	10%	22%	32%	39%	46%	50%	54%	57%	60%	62%
8000	245	2%	10%	19%	27%	34%	39%	44%	47%	50%	53%	55%
9000	275	2%	8%	17%	23%	30%	34%	38%	41%	43%	45%	47%
10000	306	2%	8%	14%	20%	25%	29%	31%	34%	36%	38%	39%
11000	336	1%	6%	13%	17%	21%	25%	27%	29%	31%	32%	33%
12000	367	2%	7%	11%	15%	18%	21%	23%	24%	26%	27%	28%
13000	398	2%	5%	9%	12%	14%	16%	18%	19%	20%	21%	22%
14000	428	2%	5%	7%	9%	12%	13%	14%	15%	16%	17%	18%
15000	459	1%	3%	5%	6%	8%	9%	10%	11%	11%	12%	12%
16000	489	2%	3%	4%	5%	6%	7%	8%	9%	9%	10%	10%
17000	520	2%	2%	3%	4%	5%	5%	6%	6%	6%	7%	7%
18000	550	2%	2%	2%	3%	3%	4%	4%	4%	5%	5%	5%
19000	581	2%	1%	2%	2%	3%	3%	3%	3%	3%	3%	4%
20000	612	2%	1%	1%	2%	2%	2%	2%	2%	2%	3%	3%
21000	642	2%	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%
22000	673	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
23000	703	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
24000	734	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%



**POR-Figure 1.** Porbeagle estimated catches by management unit.



**POR-Figure 2.** Phase plot showing current status (for 2008) of northeast Atlantic porbeagle for the BSP model (diamonds) and the ASPM model (squares). Error bars are plus and minus one standard deviation.



**POR-Figure 3.** Predicted relative abundance for annual removals ranging from 0 to 24,000 animals, expressed as the biomass/biomass at  $SPR_{MER}$  ratio (a proxy for  $B_t/B_{MSY}$ ) for the base case of the ICM. The horizontal line shows the reference point and the projections extend for 50 years. Average removals from 2016-2018 were assumed for 2019 and 2020 and the projection starts in 2021.

## 6. Reports of Research Programmes

### 6.1 Atlantic-Wide Research Programme for Bluefin Tuna (GBYP)

The activities of the GBYP officially started in March 2010. Phase 9 started on 1 January 2019 with initial duration of 12 months, but later it was extended for 4 months (until 30 April 2020) in order to better adjust to the period of bluefin fishing and harvesting operations. Phase 10 started on 1 January 2020 with an initial duration of 12 months.

The most relevant research activities carried out during this reporting period (October 2019-October 2020) have been:

**a) Data recovery** – During Phase 9 there were no tasks related to data recovery requiring contracts. The activities in this line consisted in in-house desk work focused on compiling and reformatting data from stereo-cameras which had already been reported to ICCAT in previous years, in relation to the study on ABFT growth in farms. This in-housework is continuing through Phase 10, which will also encompass collection and evaluation of relevant data not previously available to SCRS.

**b) Aerial survey on bluefin tuna spawning aggregations** – In 2019 a seventh aerial survey was carried out in 4 spawning areas in the Mediterranean. In addition, a re-analysis of the whole aerial surveys data set was performed to remove any potential bias in the results and, consequently, provide a more accurate aerial survey index time series. Due to Coronavirus pandemic, in 2020 aerial survey and all related activities were suspended. Considering that in spite of the improvements in field operations and data analysis there are still some uncertainties related to this index, a thorough revision will be carried out by external experts, to allow a well informed decision on the way in which this line of research could continue in following years,

**c) Tagging** – Conventional tagging continued as a complementary activity, providing support to national teams. Although the tag reporting has slightly improved, the recovery rate remains low. The deployment of electronic tags conducted since 2011 has further enhanced the knowledge on bluefin tuna behaviour and helped address several previous hypotheses. These data have been used within the framework of MSE development. In 2019 a total of 34 electronic tags have been deployed, in different areas in the North Atlantic. Due to the pandemic, tagging in 2020 will be done in cooperation with existing national programmes in the North Atlantic, where it is planned to deploy 25 archival and 36 satellite tags. The broad Tagging Workshop scheduled for March 2020 has been indefinitely postponed.

**d) Biological studies** - Biological sampling was focused on collecting tissue samples and otoliths for the purpose of better determining the population structure and mixing and improving the accuracy of the age length key, used for the stock assessment and MSE. The results from otolith microchemistry continue to show important interannual variations in mixing proportion of West and East stock individuals in the East Atlantic. The results of genetic and integrated analyses show that BFT present more complex population dynamics than previously thought. These analyses also suggest that individuals with Mediterranean genetic background can be found within the Gulf of Mexico and that the Slope Sea constitutes a genetically intermediate population. The analysis also provided further evidence on BFT spawning in the Bay of Biscay, although in unknown amount or frequency. The ongoing studies will focus on combining genetic and microchemical analyses on the same sample and will continue analysing the individuals from the mixing zones, and especially from the Slope Sea. The calibration of otolith age estimates has been carried out in 2019 between 6 laboratories and a bluefin otoliths reference collection has been created. A set of 2000 otoliths that were read in 2019 will be revised this year within further calibration exercise. With the aim of improving the coherence within the bluefin growth rates derived from the eBCD, to address the Commission's request in Rec. 18-02, in 2019, the GBYP initiated several studies on growth in farms, implemented in five farming facilities, including two studies based on tagging for determining individual growth trajectories and 5 studies relying on intensive monitoring with stereoscopic cameras, food supply and environmental conditions to determine the seasonal growth rates by size group and its environmental drivers. Further activities will include the continuation of previously initiated experiments, as well as the development of new pilot studies using acoustic and IAS techniques.

**e) Modelling** – The work on MSE development continued, to ensure that the OM scenarios agreed by the CMG can be run; that third parties can use the OM to evaluate candidate MPs (CMPs) with their own specifications; and providing a set of agreed summary statistics that can be used by decision makers to identify the MP, including data and knowledge requirements, that robustly meets the management objectives. In addition, GBYP has continued providing financial support to various experts for their attendance to MSE Technical Group meetings.

The report is attached as **Appendix 3**.

### **6.2 Atlantic Ocean Tropical tuna Tagging Programme (AOTTP)**

ICCAT-AOTTP has reached the majority of its final targets since it last reported to the SCRS Plenary in 2019. AOTTP has been successful and the 'objectively verifiable indicators' in the original logical framework of the Grant Contract have either been met or are on course to be achieved. The project was recently evaluated by a team of independent consultants and the outcome and conclusions were positive. Inevitably, however, the COVID-19 pandemic has caused problems. Only two contracts were evaluated and awarded during this period (and 46 since the project began) with a total value of €11,046,621. Overall, at least 2034 days at sea have been spent on 511 tagging cruises throughout the Atlantic. Tagging targets (120,000) have almost been met. Currently *ca* 119,218 fish (99% of the target) have been tagged (R-1) with conventional tags in the EEZs of more than 20 different countries in addition to many tagged in the High Seas. 594 electronic tags (pop-ups and internals) have been deployed and are already providing new scientific information on tuna migrations. Scientists and technicians, including women, from developing countries have tagged over two-thirds of all the fish. Formal tag-recovery and awareness raising infrastructures are now in place in 13 countries, with less formal arrangements in another 5 locations, including Japan and the People's Republic of China. Over 16,816 tags have been recovered (overall recovery rate is 14%) for which incentives (t-shirts, caps, lottery entry, cash, and mobile phone top-ups) have been paid. Tag-seeding experiments are ongoing, and reporting rates for the most important purse-seine fleets are: 72.6%, 79.3%, and 68% for BET, SKJ, and YFT respectively. So far 21,388 have been double-tagged, allowing tag-shedding rates to be estimated, and 9,100 chemically tagged which is improving our ability to age recaptured fish. ICCAT-AOTTP partners from Brazil and Senegal have created a pan-Atlantic Otolith Reference Set to standardize age-determination of tropical tunas and routine ageing has begun. Otolith ring deposition rate validation and training work is ongoing. Contractors are currently working on mortality, movement/migration, and growth. The YFT tuna stock was assessed in July 2019 by SCRS and age and mark-recapture data collected by AOTTP proved important. The Final Symposium, organised for June 2020, was unfortunately postponed due to the pandemic. ICCAT-AOTTP has received a 3-month no-cost extension until end of February 2021. An online Symposium will be held tentatively during the first half of January 2021.

The report is attached as **Appendix 4**.

### **6.3 Small Tunas Year Programme (SMTYP)**

Between 2018 and 2020, SMTYP continued the collecting biological samples aiming growth, maturity and stock structure studies on small tunas species (little tunny, LTA, *Euthynnus alletteratus*; Atlantic bonito, BON, *Sarda sarda*; and wahoo, WAH, *Acanthocybium solandri*). In that regard, a single contract was issued to a consortium of 12 institutions (11 CPCs) by the ICCAT Secretariat in 2018 that ended on 31 March 2019. In July 2019 a new contract was signed with the same consortium, whereas in 2020 a new Consortium was set involving 12 entities from 7 CPCs, and a new contract signed. The objective of latter contract is to: i) fill spatial-temporal gaps in sampling noticed in the second contract report; II) estimate growth and maturity parameters for LTA and BON, and provide preliminary results for WAH; and, III) continue with the study of the stock structure for BON, LTA and WAH.

A number of documents and presentations were provided during meeting of the Small Tunas Species Group, which presented results of the research conducted in the previous years within SMTYP. In addition, the Group identified the priorities that should be taken into account in terms of the species and areas to be sampled and revised the biological data to be collected under the SMTYP biological collection contract in 2020-2021. These priorities are presented in the small tunas workplan for 2021 (point 12.1.7), which also contains details on other relevant research activities that has been developed throughout 2019-2020 including: updating the biological meta-database, estimation length-weight relationships representative the stocks/regional level; and, further investigating and applying of Data Limited methods to be used for the provision of management advice to these stocks.

The SMTYP report is attached as **Appendix 5**.

#### **6.4 Shark Research and Data Collection Programme (SRDCP)**

The Shark Species Group (SSG) continued work on the age and growth of the South Atlantic shortfin mako stock with the incorporation of samples from Japan, Namibia, and Brazil. A study aimed at improving the knowledge of porbeagle reproductive biology found a biennial cycle for the western North Atlantic stock. The population genetics study to estimate stock structure and phylogeography of shortfin mako continued through the use of next generation sequencing (NGS) to clarify stock delimitation, particularly between the southwest and southeast Atlantic stocks. A post-release mortality study of shortfin mako caught on pelagic longline fisheries continued with the deployment of new Survivorship Pop-up Satellite Archival Transmitting Tags (sPATs). A total of 43 tags (14 sPATs and 29 miniPATs) have been deployed to date for this project in the northwest, northeast, tropical northeast and equatorial region, and southwest Atlantic. Data available from 35 of the 43 tagged specimens revealed a 22.9% rate of post-release mortality. Of the 43 tags deployed, 41 data sets were also available for the satellite telemetry study to gather and provide information on stock boundaries, movement patterns and habitat use by the shortfin mako shark. A total of 1,656 tracking days have been recorded to date with results showing that shortfin makos moved in multiple directions and travelled considerable distances. In addition, porbeagle electronic tagging continued by teams from EU-France, EU-Portugal and Norway in the North Atlantic to better understand the movement patterns, stock boundary, and habitat use of this species in the Atlantic. A total of five tags have been deployed by EU-Portugal and EU-France in the Northeast Atlantic, Bay of Biscay/Celtic Sea area, and central North Atlantic. Additionally, since 2018, a total of 15 miniPATs have been deployed to date on silky (7), oceanic whitetip (6), smooth hammerhead (1), and scalloped hammerhead (1) sharks, which were deemed by the Group to be priority species. However, multiple tags acquired during 2019 and 2020 had to be returned to the manufacturer due to battery failures and could not yet be deployed as originally planned in 2020.

The report is attached as **Appendix 6**.

#### **6.5 Enhanced Billfish Research Programme (EBRP)**

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) and Ms. Karina Ramírez López (Mexico) remaining as 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.

In July 2019 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 months period (until June 2020). 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). A total of 273 samples have been collected from those species both by artisanal and industrial fleets, and sampling processing and analysis is ongoing. Soon a new contract shall be signed to continue the activities throughout the second semester of 2020.

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* (Mexico) to develop a Reproductive biology study on Atlantic blue marlin in the Gulf of Mexico. Unfortunately, albeit 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 to implement this study as soon as possible.

The EPBR report is attached as **Appendix 7**.

### **6.6 Other research activities**

Research Programmes are used by ICCAT as a mechanism to help focus, coordinate and complement national research activities. The programmes usually center on improving biological knowledge and fishery data for a particular species, and usually last several years.

Currently there are ongoing Research Programmes for several Species Groups in ICCAT, namely bluefin tuna, tropical tunas, sharks, marlins and small tunas. Besides those, in the past years, significant scientific work carried has been carried out for other species groups, such as albacore and swordfish, even though the two latter Groups do not yet have established Research Programmes. This matter was discussed during the SCRS Process and Protocol meeting (see item 4.1).

As such, the Committee agreed that during next year (2021) both the Albacore and Swordfish Species Groups should develop Research Programmes, which in both cases should include the Atlantic and Mediterranean stocks. Such proposals should include descriptions of the various research activities that the Groups are proposing, and timeframes for such work to be carried out. Updates of the work carried out should be provided regularly to the SCRS.

## **7. Report of the Meeting of the Sub-committee on Statistics**

The meeting of the 2020 Sub-committee on Statistics was conducted online on 4 September 2020. Dr. Guillermo Díaz, acted as Convener of the Sub-committee. The Sub-committee acknowledged the Secretariat's work and all the support it provides to this Sub-committee, and to the SCRS in general. In the report, the Convener referenced the Secretariat report on Statistics which has detailed explanations of the work done by Secretariat including current CPCs reporting status (using the SCRS Report Cards which used the filtering criteria to validate 2019 Task 1 Task 2 data submissions), improvements made in statistics (historical revisions and recoveries) and related data handling tools (databases, infrastructure, technologies, etc.), and progress made in various Secretariat ongoing projects (historical data recoveries, IOMS, etc.). The SCRS "scorecard on Task 1/2 data availability", approved by the SCRS in 2019, was also presented (for the second year) covering the period 1990 to 2019.

Special emphasis was given once again to the failure of most CPCs to comply with the mandatory reporting of both dead and live discards in Task 1, as required by the Commission, and the important need to improve this aspect in the short term.

The Convener also summarised the status of addressing the 2019 Sub-committee's recommendations, reiterating the need to continue advancing on those that have not been fully addressed, and the need for active participation of Species Group rapporteurs and CPC statistical correspondents in the Sub-committee. It was recalled that many decisions made by this Sub-committee usually affect the entire ICCAT community, such as the set of proposals aiming to improve and normalise the ICCAT coding system, as well as important changes made to statistical and tagging forms. These forms, revised every year, always contain important updates (e.g. since 2016, all the Task 2 information must be reported by month, Task 1 and Task 2 forms allow submissions of data from multiple years at once, etc.). Since 2020, the Task 1 nominal catches form (ST02-T1NC) have included two additional columns that aim to report the raising factors used to obtain the live/round weight catches equivalent to both the landings and the discards. The outcome of this inclusion was not fully addressed during the meeting (Table 1 of the SC-STAT report) but plans to revise the conversion factors reported by the ICCAT CPCs should be properly addressed in near the future.

The progress made on the ICCAT Online Managing System IOMS (Phase 1 (one year): started in May 2019 and ended in April 2020; Phase 2 (two years): started in May 2020 and is planned to end by April 2022) was highlighted and the Convener informed of the Commission's Online Reporting Technology Working Group workplan and the Commission support for its development in 2019. The Sub-committee reiterates the importance of the IOMS project and continues to encourage its development and support from the Commission and the CPCs.

Finally, the Sub-committee presented to the SCRS its 2020/2021 workplan (see details in section 12 of this document).

The Report is attached as **Appendix 9**.

## **8. Report of the Sub-committee on Ecosystems and By-catch**

In conjunction with the proposal to develop an Ecosystem report card for ICCAT, the Sub-committee met online May 4-6, 2020 to review progress on the inter-sessional exercise to update the status of the 11 ecosystem components that were identified. The indicators described in the assessments were to form the basis for a revised prototype report card that was to be presented to the Commission in 2020. It was discussed on the need to make the Ecosystem report card more functional and it was agreed to form a small group to work intersessionally on examining the scope of each ecosystem component and their interactions. As in 2019, the Sub-committee aimed to continue the work required to assess the feasibility of and provide information towards implementing ecosystems-based fisheries management (EBFM) in agreement with Resolution 15-11 and Article IV of the recently amended ICCAT Convention.

Good progress was made in the development of methods for screening and validating models and in the development of empirical status indicators for assessed and unassessed stocks and their habitat. In addition, a new method was presented to impute total (reported and unreported) effort using ICCAT's Task II catch and effort data. A lack of data to support the monitoring of the impact of ICCAT fisheries on marine mammals was identified as needing to be redressed. The Sub-committee's progress in implementing an EBFM approach for ICCAT was reviewed and it was noted that despite the progress, there was a need to operationalize EBFM as a formal mechanism within ICCAT to better integrate ecosystem considerations, or signals identified by ecosystem report cards into the operations of the SCRS Working Groups and communicate these considerations and advice to the Commission for their inclusion into management decisions. The importance of these concerns was recognized by the SCRS Chair and it was suggested to form a small working Group to initiate and move this process forward.

Pertaining to *by-catch* the Sub-committee reviewed the final product of the collaborative work related to seabirds; presented progress of collaborative work on sea turtles; and developed indicators for the ecosystem report card. Importantly, collaborative work on seabirds showed that if correctly applied the current mitigation practices are effective in reducing seabird bycatch under various conditions. Of these the combination of night setting and use of Tori lines produced the best mitigation result

The detailed report is available [here](#).

## **9. Considerations of implications of the Intersessional Meeting of Panel 2**

The GBYP Coordinator updated the Panel on progress achieved in its study to review bluefin tuna growth rates in farmed fish, which will form the basis for the SCRS to review and update the 2009 growth table and the growth rates utilised for farming bluefin tuna caught in the Adriatic Sea. In accordance with paragraph 28 of Rec. 19-04, the results of this work are to be presented to the 2020 annual meeting of the Commission. The GBYP multiannual Work Programme included the analysis of growth of individual fish through tagging experiments to provide individual growth trajectories of juvenile and adult fishes, intensive monitoring of representative cages in selected areas, and the building-up of a global database integrating all stereoscopic camera and harvesting data.



Since 2018, the peer review requested in Rec. 17-04 has been conducted, the recommendations by the peer reviewer have been addressed and the single consolidated report has been produced and updated. The variants of the interim HCR have also been tested and their merits described in the Executive Summary.

In view of adopting a long-term MP, the Committee has specified the elements of the current stock assessment approach, that could be used to specify the MP to be adopted. Alternative ways to conduct the stock assessment (with varying number of indices) have also been simulation tested. Regarding exceptional circumstances, the Albacore Species Group considered comments from Panel 2 and expanded the list of indicators that could be used to judge whether exceptional circumstances had occurred.

In 2020 (three years after the implementation of the interim HCR) the TAC advice for 2021-2023 is provided based on the interim HCR, after determining that no exceptional circumstances are occurring.

### **10.3 Work conducted for northern swordfish**

Work on North Atlantic swordfish MSE started in 2018. ICCAT awarded a contract for operating model and management procedure development to an expert team. In 2019 a new contract was awarded to a different contractor and most of the work in 2019 was devoted to conditioning the Operating Model (OM). The Swordfish Species Group agreed to use the Base Case stock synthesis assessment from 2017 to set up the initial OM design based on a factorial design (i.e. grid) to develop scenarios that represent the main uncertainties identified by the Group. This grid was constructed and provided following the MSE workshops/courses organized by ICCAT in 2018, that resulted in a paper presented to the SCRS (Rosa *et al.*, 2018a). The current OMs are composed of an uncertainty grid of 288 SS3 models with alternative assumptions including a range of assumed values for natural mortality, variance in recruitment deviations, and steepness of the stock-recruitment relationship, and other assumptions such as degree of observation error in the indices of abundance.

For 2020, the ICCAT MSE roadmap requested completing the work on conditioning the OM and start the development of candidate management procedures (cMP). The same contractor from 2019 was awarded the 2020 contract to continue this work. Much of the work conducted in 2020 has been related to exploration and validation of the OM grid of models and the development of a framework with examples of development of cMPs. In 2020, besides having some time dedicated to MSE issues at the SWO intersessional meeting, an additional 2-day online meeting (4-5 June 2020) was scheduled to further discuss in more detail issues related with the OM grid of models and start the development of cMP. There was additional discussion on robustness OMs, advice and assessment intervals, and development of criteria for identifying exceptional circumstances. The report of that N-SWO MSE dedicated meeting is available as document SCRS/2020/114.

For 2021, the workplan is to continue the work with the current contractor, mostly to continue cMP development, as defined in the ICCAT MSE roadmap. Ideally, preliminary results would be presented to the Commission at an intersessional meeting of Standing Working Group on Dialogue between Fisheries Scientists and Managers (SWGSM) or Panel 4 (if one takes place in 2021).

### **10.4 Work conducted for tropical tunas**

In 2020, the Committee reviewed the progress on the tropical tunas MSE process. At the July meeting it was discussed that there was a priority for defining the major uncertainties to be considered in the multispecies MSE (bigeye, yellowfin and eastern skipjack stocks) and also, the phases that remain from the project initiated in 2018. It was clarified that the MSE plan should be linked to the revised stock assessment schedule. It was agreed that a technical workshop for the MSE would be necessary to advance in the identification of uncertainties and has been included for the 2021/22 workplan.

Most of the work developed related to the stand alone MSE for the Western stock of skipjack as detailed in SCRS/2020/140, which provided a demonstration of a management strategy evaluation for Western Atlantic skipjack tuna using the MSEtool R package and catch data from the Brazilian baitboat and handline fleets in the Southwest Atlantic Ocean. Starting from a base OM, additional OMs were generated to incorporate uncertainty in natural mortality, growth, maturity, selectivity, and steepness to create a reference set of OMs. A suite of example management procedures (MPs), including fixed TACs, index-slope MPs, and harvest control rules (HCRs) was tested in closed-loop simulation. Future work will include additional OM scenarios and consultation with managers and stakeholders, to identify candidate management procedures and performance metrics for adopting a management procedure.

It was noted that the western skipjack MSE could be developed independently to the other tropical tunas. In practice, western skipjack can be considered a single species fishery. The Committee discussed the possibility of including this MSE in a multispecies MSE for the other three tropical tuna stocks and it was clarified that the software would be available for a multi-specific context, as well as FLBEIA, the model used during the project in 2018.

Due to time constraints and impact of the COVID-19 pandemic, the Committee was not able to develop additional work on the multispecies Tropical tunas MSE (bigeye, yellowfin and eastern skipjack stocks) yet in 2020, or carry out the revision of the roadmap adopted by the Commission in 2019. Therefore, it was decided that the roadmap will be revised during the April meeting of the tropical tuna Species Group.

### **10.5 Review of the Roadmap for the ICCAT MSE processes adopted by the Commission in 2019**

In 2019 during the Annual meeting the Commission a new roadmap for ICCAT MSE processes was adopted and a request was made to the SCRS to review it. In 2020 the SCRS discussed and reviewed the document during the SCRS Process and protocol meeting and changes were incorporated. Additional reviews were expected from the Bluefin Tuna, Albacore, Swordfish and Tropical Tunas Species Groups. However, due to limited time available, neither the Bluefin tuna nor the Tropical Tunas Species Groups could devote time to this task. The updated version of the MSE roadmap is available in **Appendix 10**.

## **11. Report on the implementation of the Science Strategic Plan for 2015-2020 in 2020 and workplan for 2021, which includes the update of the stock assessment software catalogue**

The SCRS developed its first 2015-2020 Science Strategic Plan (SSP) through a process of consultation which involved many SCRS scientists and the Secretariat. The process lasted over two years and culminated in the presentation of the SSP to the SCRS and Commission in 2014. The Commission adopted the SSP that year and the plan has been used by the SCRS since then. The 2015-2020 SSP required that the SCRS periodically review progress towards reaching the objectives of the plan, but also recommended a progress review by independent reviewers.

The SCRS has had a standing item on the SSP in its annual plenary agenda and the SCRS annual report since 2016. Moreover, the SCRS conducted a mid-term review of the plan in 2017 (refer to section 17 of the *Report for Biennial Period 2016-2017, Part II (2017), Vol. 2*). To date, the SCRS has not organized an independent review of the plan.

At the Officers meeting in September 2019 it was agreed to develop an update of the SSP. It was also agreed that a group of Officers (Drs Amande, Cass-Calay, Coelho, Die and Melvin) would initiate the work for the final review of the 2015-2020 SSP and gather information to develop a new SSP. At the 2020 SCRS process and Protocol meeting it was reported that the above group had not advanced in its work of the review of accomplishments of the 2015-2020 SSP. The Chair of the SCRS provided his preliminary comments on the 2015-2020 SSP to the participants of the aforementioned meeting. Although some participants suggested the update of the plan may have to be delayed until 2021 unless more effort in its development be put in place, the Group agreed to plan activities to complete the new SSP draft by late September 2020. Unfortunately, due the current workload of the SCRS and the difficult condition in which the Committee has been working due to the COVID-19 pandemic, the work has not progressed. Therefore the SCRS Chair suggested the work to be delayed until 2021, taking into consideration a number of suggestions that were made during the SCRS Process and Protocol meeting to help the process of updating the SSP (see section 2 of the meeting report).

Following the Committee recommendation from 2019, the Secretariat created a table of the stock assessment models used for the management recommendations by species with the year, and the version of the software for the assessment. It was further requested to add the list of software with its link to the current webpage for the ICCAT software catalogue ([here](#)), while maintaining the GitHub site (<https://github.com/ICCAT/software/wiki>).

## 12. Consideration of plans for future activities

### 12.1 Annual workplans and research programmes

#### 12.1.1 SC-ECO and By-Catch workplan

##### ***Pertaining to Ecosystems:***

Since the ICCAT Ecosystem Card activity started in the year 2017, the different ecocard groups had the chance to work on their respective ecosystem components. As the ecocard groups have advanced their work, there has been a general realization that the scope of each ecosystem component has not been clearly defined (in some cases), and that some components might be overlapping with the scope and work of other components, creating some potential confusion on how to proceed forward. The Sub-Committee recommends a small group is formed to work intersessionally to examine the scopes of each ecosystem component, and their interactions, and consider ways to make the ecosystem report card more functional. A small report will be presented at the next Sub-Committee meeting.

Consistent with the ongoing exercise of developing an Ecosystem report card the Sub-committee drafted the following workplan. The plan indicates specific tasks to be completed by the ecosystem report card working groups prior to the 2021 Sub-committee on Ecosystems meeting.

##### *Short to medium term plan*

<b><i>Date</i></b>	<b><i>Component</i></b>	<b><i>Task</i></b>	<b><i>Who</i></b>
2020 SCRS meeting		Produce Report Card for Annual Report	Sub-committee
July 2020	Marine Debris, Food webs and Trophic Relationship	Informal discussion of the elements of the plans and potential indicators	Committee participants
May 2020 to April 2021		Update prototype report card components with new indicators	
	Retained Species: Assessed	Update $B_{RATIO}$ and/or $F_{RATIO}$ values from recent assessments and deal with F0.1 issue	Committee participants
	Retained Species: Not assessed	Perform PSA for select retained unassessed species	Committee participants By-catch Coordinator
	Non-Retained Sharks	Increase the scope of the data used in the analysis. Include other gear types	Committee participants
	Turtles	Perform risk assessment for loggerhead and leatherback turtles and indicator development	Committee participants
	Seabirds	Create indicator based on the total interactions, total mortality or alternatives	Committee participants
	Mammals	Discuss collaborations with IWC and ICES	Committee participants
	Trophic structure, Community and diversity indicators	Create diversity indicator. Create indicator reflective of the trophic restructuring using size-based indicators	Committee participants
	Habitat	Create an indicator of preferred habitat size by stock	Committee participants
	Socio economic	Develop a process to extract the socio-economic data	Committee participants By-catch Coordinator
	Fishing pressure	Develop an indicator based on fishing effort or capacity.	Committee participants

		Develop indicator based on Marine debris	Secretariat
	Environmental pressure	Develop indicators that are generic	Committee participants
May 2020 to April 2021	Case Studies	NW Atlantic Ocean indicators for Habitat, Environmental Pressures, Fishing Pressure. Develop Atlantic Ocean tropical area indicators.	Committee participants
2021		Review updated report card at SC-ECO	Sub-committee

***Pertaining to by-catch:***

1. Continue the ongoing collaborative work related to marine turtles.
2. To develop sustainable activities that would allow the collection of data for species that are accidentally by-catch in ICCAT fisheries, that are currently not covered by any of the SCRS Species Groups (e.g. Oil fish, *Ruvettus pretiosus*; Sunfish, *Mola mola*; Dolphin fish, *Coryphaena* spp.; etc.).
3. Collect information to start multispecies approaches that include incidental by-catch.

*12.1.2 SC-Statistics workplan*

The following tasks represent continuous database improvements and maintenance that will continue during 2021 and beyond. The priority tasks (including the ones postponed in 2019/20) for 2021 include:

- Replace the stand-alone MS-ACCESS Task 2 databases on the web by SQLite equivalent ones.
- Improve the “client applications” that manage the databases of ICCAT-DB system.
- Continue the tagging database redesign, including the addition of the model structure for electronic tagging, TG forms standardization, and automatic data integration of TG forms.
- Continue the development of the GIS project (create a PostGIS server and geo-reference all the ICCAT data available in ICCAT-DB).
- The standardization of electronic forms of compliance and statistics for automatic data integration.
- The adaption of all the databases of ICCAT-DB to the ICCAT IOMS system.

### 12.1.3 Albacore workplan

The Mediterranean, Southern and Northern albacore stocks were assessed in 2017, 2020 and 2020, respectively. Between 2018 and 2020 advice was provided for adoption of a long-term Management Procedure for North Atlantic albacore.

In 2021, the Albacore Species Group plans to assess the Mediterranean stock and prioritize future research activities for this stock. As for the Northern stock, the Group will start preparing data for a future Stock Synthesis reference case and will evaluate exceptional circumstances. The Group will also continue the research activities for the Atlantic stocks. One intersessional meeting is envisaged (6 days in late June or early July) for both the Mediterranean and Northern stocks.

#### **North Atlantic Stock Proposed Workplan**

##### a) Exceptional Circumstances:

- Prepare T1 dataset including 2019. Responsibility: Secretariat. Deadline: one month before the meeting.
- Update (up to 2019) the following yearly standardized CPUEs, in weight (if possible). Deadline: one month before the meeting. Deliverable: SCRS documents, following the standards provided by the WGSAM. *Responsibility: CPCs.*
  - Japanese longline
  - Chinese-Taipei longline
  - US longline
  - Venezuela longline
  - Spanish baitboat
- Determine whether Exceptional Circumstances occur, according to the indicators developed. Responsibility: EU-Spain. *Deadline: one week before the Intersessional meeting.* Deliverable: SCRS document.

##### b) Stock Synthesis reference case:

- A webinar meeting will be held by a subgroup to consider options for the structure of the model (building upon earlier models), including main relevant aspects of the stock and fleet dynamics, and the available data. Likely issues to be discussed at the webinar meeting include: time step (whether annual or quarterly), spatial structure (whether one or more regions), fleet structure, data available (catch, effort, size composition, age composition, tagging and other data that could be available).
- Possible date for the webinar meeting: between November 2020 and February 2021.
- Update (using data up to 2019) the following quarterly and yearly standardized CPUEs. Deadline: one month before the intersessional meeting. *Deliverable: SCRS documents, following the standards provided by the WGSAM.* Responsibility: CPCs.
  - Japanese longline (whole period)
  - Chinese-Taipei longline (whole period)
  - US longline
  - Venezuela longline
  - Spanish baitboat
  - Spanish troll
  - Irish mid-water trawl
  - French mid-water trawl

- Following from the indications of the webinar meeting, the Secretariat will prepare available information on catch, effort, size, age and tagging to be screened during the intersessional ALB meeting. The intersessional meeting will examine the data and evaluate their ability to inform on stock and fishery dynamics. No SS work will be presented in this meeting, which will be solely focus on data examination. The meeting will identify main hypotheses to be considered in the subsequent work.
  - After the intersessional meeting, first attempts by the subgroup to fit SS models to the data. Model structure could be reconsidered based on the findings on the intersessional meeting and the results from the initial SS runs. The subgroup will work by correspondence, including webinar meetings, as needed.
- c) Research:
- The Group reiterates the need for a comprehensive Albacore Research Programme (see **Addendum 1** to Albacore workplan). For 2021, the priority is to complete the reproductive biology and electronic tagging studies, and to start working on a Stock Synthesis model as part of the MSE activities. *Deadline:* one week before the Species Group meeting. *Deliverable:* SCRS documents. *Responsibility:* V. Ortiz de Zarate (reproductive study) and H. Arrizabalaga (e-tagging study).

#### ***South Atlantic Stock Proposed Workplan***

The Group stressed the need to start incorporating research activities for this stock into the Albacore Research Programme (see **Addendum 2** to albacore workplan). Consistent with the north Atlantic albacore workplan, the priority is to start activities on reproductive biology and electronic tagging. *Deadline:* one week before the Species Group meeting. *Deliverable:* SCRS documents. *Responsibility:* Brazil, Uruguay and South Africa.

#### ***Mediterranean Albacore Stock Proposed Workplan***

An intersessional assessment meeting should be held. This meeting is high priority and all CPCs involved in Mediterranean albacore fisheries need to be involved. The meeting should cover the following topics:

- Review of available data with emphasis in historical series.
- Updated standardized CPUE indices for the most important fisheries. All data needs to be ready at least one month before the meeting to allow for bringing a preliminary assessment ready by the start of the meeting.
- Updated information on species biology
- Identification of appropriate stock assessment approaches, including data poor methods, to increase confidence in the Jabba assessment.
- Exploration of the potential of using alternative indicators and reference points (Lopt, measures based on reproductive potential, etc.).
- Identifying research priorities (with a view to incorporating these in the ICCAT Albacore Research Program).

**Addendum 1 to the Albacore Workplan****North Atlantic Albacore tuna Research Programme**

The Albacore Species Group proposes to pursue a coordinated, comprehensive four-year research programme on North Atlantic albacore to advance knowledge of this stock and be able to provide more accurate scientific advice to the Commission. This plan is based on the plan presented in 2010, which was based on a document by Ortiz de Zárate (2011) that has been revised according to new knowledge, reconsidering the new priorities and reducing the total cost.

The research plan will be focused on three main research areas: biology and ecology, monitoring stock status and management strategy evaluation, over a four-year period (2021-2024).

**Biology and Ecology**

The estimation of comprehensive biological parameters is considered a priority as part of the process of evaluating northern albacore stock capacity for rebounding from limit reference points. Additional biological knowledge would help to establish priors for the intrinsic rate of increase of the population, as well as the steepness of the stock recruitment relationship, which would facilitate the assessment. Among the key biological parameters are ones related to the reproductive capacity of the northern albacore stock, which include sex-specific maturity schedules (L50) and egg production (size/age related fecundity). In order to estimate comprehensive biological parameters related to the reproductive capacity of the northern albacore stock, an enhanced collection of sex-specific gonad samples need to be implemented throughout the fishing area where known and potential spawning areas have been generally identified. The collection of samples need to be pursued by national scientists from those fleets known to fish in the identified areas and willing to collaborate in the collection of samples for the analysis. Potential CPCs that could collaborate with the sampling programme may include (but not limited to): Chinese-Taipei, Japan, USA and Venezuela. Expected results will include a comprehensive definition of sex-specific maturity development for albacore, spatial and temporal spawning grounds for northern albacore, estimate of L50 and size/age related fecundity.

The Group also recommended further studies on the effect of environmental variables on CPUE trends of surface fisheries. The understanding of the relationship between albacore horizontal and vertical distribution with the environment will help disentangle abundance signals from anomalies in the availability of albacore to surface fleets in the North East Atlantic.

It is also proposed to conduct an electronic tagging experiment to investigate the spatial and vertical distribution of albacore throughout the year. Given the typically high cost of these experiments, and the difficulties tagging albacore with electronic tags, it is proposed to deploy 50 small size pop-up tags in different parts of the Atlantic where albacore is available to surface fisheries (to guarantee good condition and improve survival), namely the Sargasso Sea and off Guyanas, off USA/Canada, Azores-Madeira-Canary Islands, and the Northeast Atlantic. Internal archival tags will also be considered for multiyear tracks.

Finally, the existence of potential subpopulations in the North Atlantic has been largely discussed in the literature. While recent genetic studies suggest genetic homogeneity (Lacsoncha *et al.* 2015), otolith chemistry analyses (Fraile *et al.* 2016) suggested the potential existence of different contingents, which could also have important management implications. Thus, in order to clarify the existence of potential contingents, the Group proposes expanding the studied area in Fraile *et al.* (2016) to the entire North Atlantic, as well as to address inter-annual variability through multiyear sampling and analysis of otolith chemistry.

**Monitoring of stock status**

The Group recommended that the joint analysis of operational catch and effort data from multiple fleets be undertaken, following the example of other SCRS Species Groups. This would provide a more consistent view of population trends, compared to partial views offered by different fleets operating in different areas. The analysis is suggested for both longline fleets operating in the central and western Atlantic, and surface fleets operating in the northeast Atlantic. However, this task has lower priority since the iteration of the Management Procedure requests using individual indices.

Finally, given the limitations of the available fishery dependent indicators, the Group mentioned the need to investigate fishery independent abundance indices. Although the Group is aware that, in the case of albacore, there are not many options to develop such fishery independent indices of abundance, it is proposed to conduct a feasibility test using acoustics during baitboat fishery operations to improve the currently available indices. A fine scale analysis for surface fisheries catch of albacore recruits (Age 1) is suggested to analyze the feasibility of designing some transect-based approach for a recruitment index.

### **Management Strategy Evaluation**

The Albacore Species Group recommends that further elaboration of the MSE framework be developed for albacore, considering the recommendations by the 2018 external review, the Methods and the Albacore tuna Species Groups, as well as the guidance of the Commission and the Joint t-RFMO MSE Group initiative. Now that a HCR is in place and advice for adopting a long term MP has been provided, the Group realizes that the OMs were conditioned with data up until 2011, so it is time to start working towards reconditioning them using more recent data. The Group decided to start working towards a Stock Synthesis based reference case and use this as a basis to reconditioning the OMs after reconsidering the axes of uncertainty. The process to adopt a new grid of OMs and reference tests will take several years. Once this is achieved, it is important to improve observation error models (e.g. by considering the statistical properties of CPUE residuals in future projections) and to test alternative management procedures (e.g. empirical harvest control rules, alternative stock assessment models such as Jabba or Delay Difference models).

The total requested funds to develop this research Programme have been estimated in €842,000, with €600,000 to cover priority 1 tasks. The research Programme will be an opportunity to join efforts from an international multidisciplinary group of scientists currently involved in specific topics and fisheries.

### **Budget**

<b>Research aim</b>	<b>Priority</b>	<b>Approximate 4-year cost (€)</b>
<b>Biology and Ecology</b>		
Reproductive biology (spawning area, season, maturity, fecundity)	1	100,000
Environmental influence on NE Atlantic surface CPUE	2	20,000
Distribution throughout the Atlantic (e-tags)	1	350,000
Population structure: contingents	3	100,000
<b>Monitoring stock status</b>		
Joint Atlantic longline CPUE	3	30,000
Joint NE Atlantic surface CPUE	3	12,000
Feasibility of fisheries independent survey	3	180,000
<b>Management Strategy Evaluation</b>		
Development of MSE framework	1	150,000
	<b>Total</b>	<b>942,000</b>

### **Timeline**

<b>Research aim</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
<b>Biology and Ecology</b>				
Reproductive biology (spawning area, season, maturity, fecundity)	x	x	x	
Environmental influence on NE Atlantic surface CPUE	x	x		
Distribution throughout the Atlantic (e-tags)	x	x	x	x
Population structure: contingents	x	x	x	x
<b>Monitoring stock status</b>				
Joint Atlantic longline CPUE	x	x		

Joint NE Atlantic surface CPUE	x	x		
Feasibility of fisheries independent survey		x	x	x
<b>Management Strategy Evaluation</b>				
Operating models:				
- Stock Synthesis based reference set	x	x	x	
- New OM reference grid and robustness tests		x	x	x
Observation error:				
- Project CPUEs with error structures			x	
Management Procedures:				
- Jabba, Delay difference, empirical			x	x
Communication:				
- Determine additional minimum standards for performance metrics (currently only prob(Green)>0.6)	x	x	x	x

*Addendum 2 to the Albacore Workplan***South Atlantic albacore tuna research programme*****Background information***

Despite the Southern Atlantic albacore being an important resource to fleets from several countries, it is perhaps one of the tuna stocks within ICCAT that has the least information available on its bio-ecology parameters and more data deficiencies for monitoring stock status, even if this information is essential for management measures. Thus, this proposal's main objective is to improve the current knowledge on the bio-ecology and fisheries for the South Atlantic albacore, providing important information and more accurate scientific advice to the Commission.

The project proposal follows that already underway for the North Atlantic stock, so as to avoid discrepancies in scientific information between the South and North Atlantic. The research plan will be focused on two main research areas: biology and ecology, and monitoring stock status, during a four-year period (2021-2024).

***Biology/Ecology and Stock Structure***

Important gaps on basic biological parameters such as size of first sexual maturation, fecundity, age-growth, among others, still persist for this stock, bringing considerable uncertainty to stock assessments as well as to the implementation of fisheries management and species conservation measures. Therefore, to estimate these different biological parameters a broad biological sampling should be implemented in different areas of the South Atlantic (east and west sides and high and low latitudes), taking into account the knowledge of potential breeding and feeding areas.

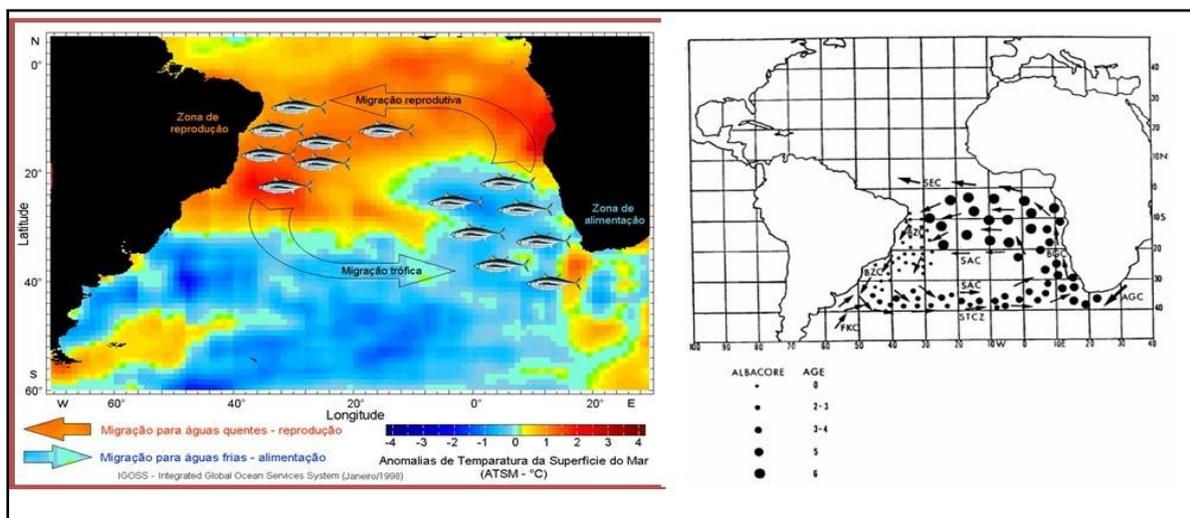
Sampling would be carried out by national scientists from the countries that actively fish the species in the southern Atlantic in the different areas. Potential CPCs that could collaborate in this sampling effort would be (but not limited to): Brazil, Uruguay, Namibia, South Africa, Chinese-Taipei and Japan.

Similar knowledge gaps exist with regards to the ecology of the species, particularly the effects of oceanographic conditions on the space-time distribution, migration, definition of areas and periods of reproduction and feeding, as well as the vertical habitat of the albacore. This is also very relevant information to better understand the availability of the species for surface (bait-boat) and sub-surface (longline) fisheries and the trends in its abundance indexes.

In this case, information from fisheries (gear, catch and effort) and environment (temperature, chlorophyll, currents, climate indices and others) would be used in the analyses to assess possible effects of climate variability on the distribution and fishing conditions of albacore in the Southern Atlantic Ocean.

It is intend implementing electronic tagging experiments (pop-up archival tag/miniPAT) to evaluate and better understand the migration processes undertaken by the species between breeding (West) and feeding (East) areas (Figure 1) and also to determine the vertical movements, behavior, and habitat use in the light of environmental conditions. Due to the difficulty of tagging albacore tuna and the costs of such study, miniPAT tags will be used (n=50) in two areas where bait-boat fishery can guarantee fish in good conditions for tagging. One in Brazil (Rio de Janeiro), where the target species of this fishery is the skipjack (SKJ), but it also catches a certain amount of albacore, and another in South Africa, where historically the species is caught by this fishing method.

As a complement to these tagging experiments, a preliminary investigation into the West-East connectivity of the South Atlantic Albacore stock will be implemented based on analysis of parasitic communities and parasite genetics from fish sampled offshore Brazil and South Africa. Fish that undertake lengthy migrations within their life, such as tuna species, expose themselves to areas with various parasites which ultimately increases their chances of parasite transmission (Lester and MacKenzie, 2009). Parasites can be used as biological tags. The idea is that fish can only become infected with a particular parasite if the fish moves into the endemic area of that parasite (Lester and MacKenzie, 2009). Thus, parasites can be used to distinguish between stocks through behavioral differences such as migration. Parasites have been considered as biotags for bigeye tuna (*Thunnus obesus*) and yellowfin tuna (*Thunnus albacares*) in Indonesian waters (Lestari *et al.*, 2017).



**Figure 1.** Representative scheme of albacore West-East connectivity in the Southern Atlantic Ocean through migratory processes (Travassos, 1999a, 1999b) and the spatial distribution of catches by age (Coimbra, 1999).

### **Monitoring of stock status**

To improve methods of evaluating status of the southern Atlantic albacore stock, we intend to perform joint analysis of catch and effort of different fleets, generating joint standardized series of abundance indexes according to work already done on other species groups. This analysis should be considered both for longline fleets operating in different regions in the South Atlantic (e.g. Brazil, Uruguay, Chinese Taipei, Japan) and for surface fleets (baitboat) operating in the Southeast Atlantic (e.g. Namibia, South Africa).

### **Budget**

The total requested funds to develop this research plan have been estimated at €605,000, with €450,000 to cover priority 1 tasks. The research programme will be an opportunity for international collaboration between CPC scientists with multidisciplinary expertise and experience in specific topics and fisheries.

<b>Research aim</b>	<b>Priority Tasks</b>	<b>Approximate 4-year cost (€)</b>
<b>Biology / Ecology and Stock Structure</b>		
Reproductive biology (spawning area, season, maturity, fecundity)	1	100,000
Age-growth	3	50,000
Environmental influence on CPUE	4	30,000
Migration / vertical movements (e-tags)	1	350,000
Analysis of parasitic communities (biotag) and parasite genetics	3	30,000
<b>Monitoring stock status</b>		
Joint South-Atlantic longline CPUE	2	30,000
Joint South Atlantic surface CPUE	2	15,000
	<b>Total</b>	<b>605,000</b>

**Timeline**

<b>Research aim</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
<b>Biology / Ecology and Stock Structure</b>				
Reproductive biology (spawning area, season, maturity, fecundity)	X	X	X	
Age-growth	X	X		
Environmental influence on CPUE	X	X		
Migration / vertical movements (e-tags)	X	X	X	
Analysis of parasitic communities (biotag) and parasite genetics	X	X	X	
<b>Monitoring stock status</b>				
Joint South Atlantic longline CPUE	X	X		
Joint South Atlantic surface CPUE	X	X		
<b>Availability of information and results</b>			<b>X</b>	<b>X</b>

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#### 12.1.4 Billfish workplan

The Group considered the following workplan elements:

##### **Catch and Effort Data (Task 1 and 2)**

Important white marlin 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. Catch and effort statistics for Billfish species remain incomplete for many of the coastal and industrial fishing countries. Therefore, all countries catching billfishes (directed or by-catch) should report species-specific catch, catch-at-size, and effort statistics by as small area as possible, and by month.

- The Group suggested the Secretariat work with the experts hired to review the billfishes artisanal fisheries in the Eastern Atlantic and Caribbean regions to develop the Terms of Reference, agenda and list of participants to be invited to workshops for developing CPCs to improve the collection, analysis and the transmission of data in order to improve data collection and statistics of Billfish. The first of these workshops shall be organized in 2021 in the Caribbean region. In addition, it was recommended to engage WECAFC in this process, particularly to address the issues raised in Rec. [19-05] paragraph 16.
- Efforts should be made by all CPC fishing in the Mediterranean Sea to improve the collection of catch data of billfishes in this region.

##### **Discards**

The Group noted that to date only a few countries have ever reported billfish discards and using such limited information the estimates of dead discards are around 2-3%. Having the total catches, including dead and live discards, and estimates of post-release mortality is important for stock assessment purposes. As such, the Group emphasized the need for all CPCs to comply with the mandatory requirements to report discards (both dead and alive) for billfishes. The Group supports the recommendation made in 2020 by the by the Sub-Committee on Ecosystems on discards and to endorses the participation of this Group if the workshops take place in 2021.

In response to Rec. [19-05] paragraph 20, in collaboration with the Tropical Tuna Species Group, begin work to develop minimum standards for electronic monitoring of ICCAT fisheries as a supplement to the human observer program.

##### **CPUE**

- *Sports fisheries CPUEs*: Conduct the work to collect and incorporate any data which informs on the historical evolution of fishing practices which could affect catchability. There may still be issues related with increasing catchability in sports fisheries over time that are not fully taken into account in the CPUE standardization.
- *Joint CPUE*: Noting the joint CPUEs for longline fleets which use fine scale operational data have improve the assessment models for other species, investigate the possibility for doing these analyses for billfishes together with other SCRS species and SCRS Species Groups.
- *Compare observer and logbook data CPUEs indices*: National scientists are encouraged to develop both observed data and logbook CPUEs indices within their fleets.

##### **Life history parameters**

Continue the sampling of hard part for the growth studies on billfish caught off West Africa:

- Organize a workshop on age reading of billfish to enhance current expertise in the Eastern Atlantic and to standardize processing and reading protocols between laboratories in February 2021 (if possible).
- Continue the research and biological sampling of blue marlin from the Gulf of Mexico Mexican longline fisheries.

### 12.1.5 Bluefin tuna workplan

The Bluefin Tuna Species Group gives priority to the MSE process but also recommends focused research efforts from specified Technical Groups to address key uncertainties identified in the 2020 update assessments. The Species Group recommends conducting East and West assessments in 2022 on the basis of targeted investigations conducted by the Technical-Groups. These Technical-Groups will be tasked with addressing specific issues outlined under (4, *below*) and possibly funded through specific calls for tenders. The Technical-Groups will present scientific papers on the subjects to the BFT Species Group at 2021 meetings however the actual implementation of the work for assessment advice will occur in 2022 and will be conducted by the full BFT Species Group.

Given the priority placed upon the MSE process the SCRS recommends three meetings: (1) a 5 day in person (physical) bluefin tuna intersessional meeting; (2) a 5 day in person candidate management procedure developers workshop; and, (3) a 3-day in person meeting prior to the Species Group meeting to compile CMP recommendations and results. While the meetings are open to all participants it is envisaged that only the intersessional meeting and the 3-day meeting prior to the BFT Species Group would require full participation of the BFT Species Group. This workplan assumes that TAC advice for 2021 and 2022 will be adopted.

The workplan follows the remainder of the workplan for 2020:

- a) 28-30 September 2020. BFT Technical Group MSE meeting (online)
- b) December MSE webinar, and additional as needed

#### **The workplan for 2021 is as follows:**

1. Update indicators used in the MSE and the stock assessment to 2019 (or the most recent year) by March 2021.

Hold three meetings:

- a) Bluefin intersessional meeting (5-day meeting in about March/April);
- b) MSE CMP developers small meeting (about 5 days June); financed by GBYP for developers (exact same terms as was planned for 2020; 1 per group CMP group, Chairs, MSE Chair, 2-3 Experts)
- c) Extended Bluefin Species Group meeting (6 days total, 3-days prior to September SCRS and 3 days during the species group week).

2. Work and dialogue related to the MSE

- a) CMP developers continue work to refine CMPs. BFT MSE Technical Group and BFT Species Group continue MSE work.
- b) Dialogue with Panel 2, commissions, once sufficient progress on MSE has occurred.
  - a. Panel 2 February (present MSE update and CMP/indicators)
  - b. Panel 2 October/November (present update on CMP results)

3. In addition to the aforementioned SCRS meetings, other workshops organized directly by GBYP will require the involvement of bluefin tuna Species Group

- a) October 2020, workshop for the design of GBYP e-tagging plans (online)
- b) November 2020, workshop on application for Close kin methodology to BFT Eastern Stock (online)
- c) December 2020, meeting for defining GBYP 2021 work-plan, considering outputs from Close-kin and e-tagging workshops and results from GBYP Aerial surveys external review (online).

4. Task Technical Groups. The purpose of these are to create focused research teams to address specific issues. The teams can operate under their own timing and meeting schedule but will need to report back to the BFT Species Group in September 2021 with their findings and are free to report electronically at any time deemed appropriate. Each Technical Group has an appointed coordinator and will be tasked with developing a workplan (which may be part of a call for tenders for specific funding if necessary). Each group will be tasked with the following topics:
- a) Technical Group 1 (Indices, Coordinator Matt Lauretta, membership to be determined but will consist of assessment lead modelers, possibly external experts, however the meetings will be open to all CPC scientists. TORs to be drafted by coordinator in consultation with the BFT rapporteurs):
    - a. Evaluate whether the current indices can be improved including through more explicit incorporation of environmental or ecosystem factors. Noting the potential role of ecosystem factors in affecting the interpretation of many indices, the Committee recommends that effort be directed towards both identifying environmental factors that affect catchability at basin and local scales and incorporating these factors in the index standardization or modeling. The Committee recommends that the bluefin tuna Species Group index analysts attend the Working Group of Stock Assessment Methods (WGSAM) workshop focused on incorporating habitat modeling and environmental considerations into indices and surveys;
    - b. Examine the potential effect of recent changes in management and adequacy in representatively sampling the fishery for fishery dependent indices.
    - c. Building on the joint CPUE modeling workshop continue to develop joint indices for WBFT (e.g. the Gulf of Mexico between Mexico and United States and for the Northwest Atlantic between United States and Canada);
  - b) Technical Group 2 (Models, Coordinator Tristan Rouyer, membership to be determined but will consist of assessment lead modelers, possibly external experts, however the meetings will be open to all CPC scientists. TORs to be drafted by coordinator in consultation with the BFT rapporteurs.
    - a. Research to further develop alternative assessment models or to improve existing models. The focus will be on development of reliable models for the East stock, deal with mixing, and prepare for the availability of new data types (e.g. close kin).
      - i. ASAP
      - ii. Stock Synthesis
      - iii. M3 (for both East and West, possibly)
      - iv. Improvements to VPA
        1. Extension of plus group
        2. Address issues related to the catch at age for the East

#### 5. Responses to the Commission work

- a) Continue Sub-Group on Growth in Farms
- b) Continue the catch rate analysis (*National scientists and Secretariat staff*)

### 12.1.6 Sharks workplan

In preparation for the planned blue shark stock assessment in 2021, the Group will conduct the following activities:

- Hold two intersessional meetings to assess the status of the blue shark in the North and South Atlantic. The first meeting will be a five-day Data Preparatory (DP) meeting to collate and analyze all existing information required for stock assessment, whereas the second meeting will be a five-day Stock Assessment session\*. The following tasks will be required, in some cases prior to the DP meeting, and in others during or immediately after the DP meeting:
  - Estimate catches for time periods where sufficient data were not available, but only for fleets with significant catches
  - National scientists and ICCAT Secretariat to use observer data and other potential techniques to estimate historical catches of fleets with significant catches where that information is missing
  - Continue to gather and analyze available size information for BSH by sex and region
  - Identify fleets based on spatial/selectivity considerations
  - National scientists to update analyses of CPUE indices for BSH up to 2019
  - Identify appropriate CPUE indices for use in BSH stock assessment models
  - Review any new life history information for BSH in the Atlantic
- Review of the SRDCP activities and progress
- Allocated time to discuss the possibility of a plan for large-scale circle hook vs. J hook study.

\*If in person meetings are not possible, then web-based assessment meeting lasting more days will be needed.

### 12.1.7 Small tunas workplan 2021–2023

This workplan foresees both short and long-term objectives (see specific timeframes below).

#### *Progress on the Small Tunas Year Programme (SMTYP):*

- *Background/objectives:* The SMTYP started in 2016-2017 with the initial aim of recovering small tunas historical data (statistical and biological data) from the main ICCAT fishing areas. A consortium led by Univ. Girona was set in 2018 for the collection of samples aiming biological studies (reproduction and aging) and stock differentiation studies. The programme is ongoing and currently covers different activities, namely collection of fisheries statistics and biological studies.
- *Priority:* High (1<sup>st</sup> priority with financial implication)
- *Leader/Participation:* In 2020, the new consortium led by Brazil (FADURPE) was set to continue biological studies (reproduction and aging) and stock differentiation studies.
- *Timeframe:* Ongoing work with annual updates scheduled to be provided to the SMT Species Group.
- *Costs:* Costs are estimated at €75,000 for 2021.

#### *Revision of small tunas L/W relationships at stock level:*

- *Background/objectives:* There are several L/W equations available for small tunas at local level, and several more are being currently developed by various CPCs/national scientists. The Group recommends that joint analyses are carried out using detailed data collected by observer, so that L/W relations representative of the stocks at regional level can be presented and adopted by ICCAT.
- *Priority:* High
- *Leader/Participation:* EU-Spain, with collaboration of CPCs willing to participate/share observed L/W data from observer and sampling programmes. EU- Spain and Portugal, Morocco and Brazil have already committed to participate. Other CPCs are expected to join this collaborative effort.
- *Timeframe:* The leader (Pedro Pasqual, EU-Spain) will circulate data template by October 2020. CPCs should submit data up to January 2021. A SCRS paper will be presented to the Intersessional meeting in 2021.

#### *Updating the biological meta-database:*

- *Background/objectives:* The SMT Group started in 2016 a biological meta-database. The Group recognized the importance to continuously update this database as new biological information becomes available, also developing criteria for replacing existing parameters when available. Such information is then provided to update the SMT executive summaries and will eventually be used for both qualitative and quantitative assessments for the different species and stocks.
- *Priority:* High
- *Leader/Participation:* EU.PRT, with collaboration of CPCs willing to participate, will continue to update the meta-database and provide updated information (in the form of SCRS papers) to the Species Group. The next update is planned for 2021 Intersessional meeting. Scientists that have access to recent literature on SMT biology that can inform this database are encouraged to send that information to the coordinator and the SMT chair. Leaders: Pedro G. Lino and Rubén Muñoz-Lechuga (EU-Portugal)
- *Timeframe:* A SCRS paper will be presented annually to the Species Groups or Intersessional meeting.

#### *Updating and/or applying the Data-Limit Models:*

- *Background/objectives:* The SMT Group started applying Data Limited methods in 2016 and, although the Group has improved in applying a range of models, the robustness still needs to be evaluated before they can be used to provide management advice. In 2021 the Group will develop the specifics ToRs and an agenda for the proposed workshop on Data-limit models.
- *Priority:* High (2<sup>st</sup> priority with financial implication)

- *Leader/Participation:* Brazil and Morocco will continue to update the application of Data-Limited methods to SMT, with collaboration of CPCs willing to participate.
- *Timeframe:* A workshop in Data-Limit models could be held immediately after (back-to-back) the 2021 intersessional meeting of the Small Tunas Species Group, which would allow the reduction of travel related costs. This workshop should be updated in 2023, also in the format back-to-back the 2023 intersessional meeting of the Small Tunas Species Group. Also, SCRS papers to be presented annually to species Group meetings or Intersessional meeting.
- *Costs:* Costs are estimated at €25,000 per workshop, which would allow for participation of 2 experts and 8-10 national scientists.

*Calibration and adopting internationally agreed Maturity scales:*

- *Background/objectives:* During 2020 ICCAT Workshop, studies on small tunas on growth and reproduction, including drafting protocols and training of sample processing and analysis of maturity stage, were carried out. However, the Group feels that further work still needed as regards the calibration and adopting internationally agreed maturity scales for small tunas.
- *Priority:* High (3<sup>st</sup> priority with financial implication)
- *Leader/Participation:* Spain will continue to lead the reproduction studies, with collaboration of CPCs willing to participate.
- *Timeframe:* A workshop on maturity could be held in 2022. Also, SCRS papers to be presented annually to species Group meetings or Intersessional meeting.
- *Costs:* Costs are estimated at €20,000 for the 2022 workshop, which would allow for participation of 1 expert and 8-10 national scientists.

### 12.1.8 Swordfish workplan

#### North and South Atlantic

Assessments for North and South Atlantic swordfish were conducted in 2017. The next assessment is scheduled for 2021. The Group requests to conduct a total of three meetings in 2021, namely two intersessional meetings (data preparatory (4 days in-person) and stock assessments sessions (5 days in-person) plus one MSE technical meeting (3 days in person). The intersessional meetings (data-preparatory and stock assessment session) will be dedicated mainly to the Atlantic (North and South stocks) assessments. Within the data-preparatory meeting, some time will be allocated to updates on the progress of the swordfish biological and stock structure projects. The third requested meeting is of a more technical nature and will be dedicated mainly to discussion and progress on the MSE work.

The Committee noted that having in-person meetings would be more productive and participative, but that, if needed, online meetings are also possible to advance this type of technical work. A significant additional number of days would be needed if online meetings are required.

If the Commission prefers that the MSE work advances more quickly that would require postponing the stock assessments.

A list of recommended work for the swordfish Working Group was identified as high priority areas where continued efforts are required for North and South Atlantic swordfish. The list is organized in such a way that priorities for 2021 work are listed first, followed by other tasks that are part of other ongoing work.

#### Priorities for completion in 2021

##### **Life history Project:**

- *Background/objectives:* An understanding of the species biology, including age, growth and reproductive parameters is crucial for the application of biologically realistic stock assessment models and, ultimately, for effective conservation and management. Given the current uncertainties that still exist in those biological parameters, the Group recommends more studies on swordfish life history are carried out. Those should be integrated with an ICCAT swordfish research plan that is provided in the recommendations with financial implications.
- *Priority:* High priority.
- *Leader/Participation:* A consortium led by Canada (currently with 2 institutes and 20 sub-contractors; 15 countries, both Atlantic and Mediterranean) started this work in 2018. The work progressed during 2019 and 2020, and is scheduled to continue in 2021.
- *Timeframe:* Started in 2018 and currently ongoing; request for funds to continue in 2021 (see **Table 1** at the end for detailed estimated costs).

##### **Size/Sex distribution study:**

- *Background/objectives:* The Group recommends that a detailed size and sex distribution study is started in order to better understand the spatial and seasonal dynamics of swordfish in the Atlantic. This study should be carried out in a cooperative manner between scientists, involving as many fleets as possible and preferably using detailed fishery observer data. This is particularly important if future alternative management measures are considered, for example when considering spatial/seasonal protection areas for juveniles. Additionally, such a study would also provide a contribution for the stock delimitation work, and has been used in the previous stock assessments using integrated models (SS3). Preliminary work was conducted in 2018. A data call using a template similar to the one used in 2018, will be circulated (by late 2020) to CPC scientists interested in participating in this collaborative work, that will provide important inputs for the 2021 SWO Atlantic assessments.
- *Priority:* High priority.
- *Leader/Participation:* EU-Portugal, with the collaboration of CPCs willing to participate/share data on size/sex/location from observer programmes.
- *Timeframe:* Started in 2018. Deadline for the next stock assessment (2021). An ICCAT paper is planned to be presented with the results at the 2021 SWO data-preparatory meeting.

**Update the North Atlantic combined CPUE index**

- *Background/objectives:* Previous North Atlantic SWO assessments have used a combined CPUE index using operational data provided by several CPCs (Spain, Canada, Japan, USA, Portugal, Morocco). Specifically, previous stock assessments from 2006, 2008, 2012 used this index in the production models used for scientific advice, while in the last assessment (2017) it was used in production models for continuity runs, as well as verification with the SS3 model used for advice. This index can also be useful for the ongoing MSE work.
- *Priority:* High Priority
- *Leader/Participation:* Data should be provided by the following CPCs that have contributed with data for this work in the past (Spain, Canada, Japan, USA, Portugal, Morocco). The Secretariat will carry out the CPUE standardization, updating the previous works (see SCRS/2017/137)
- *Timeframe:* Data (terminal year = 2019) should be submitted to the Secretariat in early 2021 (end of Feb 2021), so that a preliminary analysis can be carried out, shown and discussed at the data preparatory meeting.

**Larval index work:**

- *Background/objectives:* An initial swordfish larval index was presented in the swordfish data preparatory meeting, in the last stock assessment in 2017. The Group recognized the value of adding fishery-independent indexes to the stock assessment, but there were still concerns about the surveyed area. Therefore, the Group recommended including this work in the swordfish workplan to determine if those issues can be solved and this or other fishery independent indices can be improved and used in the future.
- *Priority:* High priority.
- *Leader/Participation:* Led by the United States.
- *Timeframe:* Should be completed for the next stock assessment (2021), if possible. An ICCAT paper should be presented at the SWO data-preparatory meeting in 2021.

**Improvements on input data to the South Atlantic assessment:**

- *Background/objectives:* Given the uncertainties with regards to CPUE inclusion in the assessment models noted in the previous South Atlantic assessment (Anon. 2017f.), the Group strongly encourages national scientists to progress on CPUE development. Additionally, other data (e.g., sizes, biology) that can improve the assessment should also be provided.
- *Priority:* High priority.
- *Leader/Participation:* CPC scientist and stock assessment modellers.
- *Timeframe:* In 2021, for the next South Atl SWO stock assessment.

**Complete N&S-Atlantic stock assessment processes:**

- *Background/objectives:* Assessments for N&S-Atlantic SWO are scheduled for 2021. If possible the group should take into account emerging SWO-SWG work on stock structure, growth and maturity and environmental effects, as well as historical life history parameters.
- *Priority:* High priority.
- *Leader/Participation:* Stock assessment modellers.
- *Timeframe:* A data preparatory meeting in March 2021 and an assessment meeting in June 2021. Assessment modellers must prepare abundance indices and select candidate assessment modelling frameworks (e.g. SS3, JABBA, etc.) in late 2020/early 2021 and present initial results at the data preparatory meeting.

**Priorities for ongoing work (ongoing past 2021)****PSAT tag data request for joint analysis:**

- *Background/objectives:* The Group continues to encourage all CPCs to provide their swordfish PSAT tag data to an *ad hoc* study Group. As a minimum the data should include the temperature and depth by hour, date and one-degree latitude\*longitude square. This will contribute to support the improvement of CPUE standardization through the removal of environmental effects as well as the better definition of stock boundaries. This activity is linked with another from the WGSAM workplan.
- *Priority:* High priority.
- *Leader/Participation:* Led by US, with the participation of CPCs with PSAT tag data.
- *Timeframe:* Started in 2018, ongoing in 2019 and 2020; to continue in 2021.

**Continuing work on environmental effects:**

- *Background/objectives:* Given the possibility of spatial and environmental effects being partially responsible for the conflicting directions of some of the influential indices of abundance, the Group should further study this hypothesis during the coming years, use existing PSAT data to compliment this work, and determine how best to formally include these environmental covariates into the overall assessment process. The USA has taken a lead role in this investigation and likely collaborators would include scientists from Canada, Japan, and the EU (Spain and Portugal) as their indices were the most appropriate for this work. Expected deliverables would include quantified reduction in the conflicting indices of abundance from the temperate and tropic regions, which in turn should lead to a more stable assessment. Other products could include an increased understanding of the distribution of swordfish and perhaps a revisiting of the geographic structure of the data and the assessment. Ideally, this work should be done before the next stock assessment.
- *Priority:* High priority.
- *Leader/Participation:* Lead by US, with participation of other CPCs.
- *Timeframe:* Ongoing, to be considered at the next stock assessment.

**Continue N-Atlantic MSE process:**

- *Background/objectives:* The Group agreed to take a more in-depth look at the base case SS3 model through more extensive diagnostics, so that the model is configured most appropriately for the MSE work and to continue the MSE development.
- *Priority:* High priority.
- *Leader/Participation:* Stock assessment and MSE modellers.
- *Timeframe:* MSE work started in 2018 and is ongoing in 2020. It is planned to continue in 2021, with one technical meeting devoted to MSE requested for 2021. The table in item 13.1.8 of this report provides the roadmap adopted by the SCRS in 2019 on this work, with some more details provided below.

*Activities related with MSE to complete until the end of 2020(see SCRS/2020/114 for further detail). Issues to addressed in a late 2020 MSE technical group meeting*

1. Finalize the OM grid (inputs from Swordfish Species Group, including the SS3 modeler and grid developers);
2. Produce diagnostic reports for OMs – for OM selection/weighting. Identify key OMs spanning range of uncertainty axes (e.g., 8 OMs) and produce pair-wise OM comparison reports;
3. Report impact of OM uncertainty to MSE results, i.e. MP performance and selection. Uncertainty in:
  - a) Gear selectivity
  - b) Length composition effective sample size
  - c) Steepness
  - d) Natural mortality
  - e) Catchability increase (historical)
  - f) Environmental effects
4. Report impact of uncertainty scenarios in OM projection for MP performance/selection;
  - a) Impact of hypothesized spatial structure/mixing (requires hypothesized spatial structure/movement rates)
  - b) Environmental considerations – cyclic trends or regime shift in recruitment
  - c) Effect of minimum size recommendation – discard mortality & implementation options
  - d) Future increases in catchability
  - e) Implementation error in TAC overages
5. Update Shiny app with new OMs, performance metrics;
6. Update SWOMSE with additional example MPs (e.g., surplus production MP,  $F_{MSY}$  reference MPs)
7. Attend and provide an update at a Species Group meeting in September 2020
8. Attend and provide updates at a technical meeting that will be held in later 2020
9. Reporting and SCRS drafting/submissions;
10. Misc: Webinars, contingencies, individual calls/support with MSE package;

*Activities related with MSE proposed for 2021 (following the detailed roadmap developed at the late 2020 MSE technical group meeting).*

1. Finalize OM Reference grid with improvements identified in previous phase
2. Identification of Robustness OMs
3. Formalize red-face tests for OMs
4. Development of CMPs & selection of index
5. Tuning of proposed CMPs
6. Determine how CMP performance will be evaluated (reference & robustness OMs)
7. Evaluation of CMPs against performance metrics
8. Prepare updates/inputs for the Dialogue with Commission Panel 4 on management objectives
9. Contractor to attend and provide updates at both the Dialogue, Intersessional and Species meetings
10. Contractor prepares reporting and SCRS drafting/submissions;
11. Misc: Webinars, contingencies, individual calls/support with MSE package;

*Remaining activities from 2018 Species Group report (Items not likely in current MSE framework or uncertain of best approach, so need further discussion).*

1. Environmental considerations: for example: oxygen minimum zone – vertical displacement, cyclic movement of adult swordfish;
2. Seasonal dynamics;
3. Spatial sexual segregation of the stock;
4. Consider CPUE conflicts by area.

**Activities pertaining to the 2017 External Assessment Reviewer (specific work for progressing MSE for N-Atl SWO and other activities to take in consideration in the next stock assessment)**

***MSE work***

- *Background/objectives:* MSE needs to be able to incorporate AMO effect and spatial distribution and changing catchability in the operating model. From this, it seems feasible to test whether a simple combined CPUE could be an accurate indicator of stock trends. MSE could either take a detailed and technical approach (e.g. spatial and oceanographic effects on the CPUE indices and subsequent effect on the assessment), or it could take a management-oriented approach to investigate possible changes in the HCR. While both goals could be done at the same time, it might be better to tackle these as different projects in order to have high client engagement in the HCR project. With regards to the management-oriented approach which has been requested by the ICCAT Commission, the work has started in 2018 with an initial development of an MSE framework. A new contract (new contractor) was awarded in 2019, and the work continued mostly to develop the framework for the conditioning of the Operating Model. The work planned for 2020 is to finalize the conditioning of the Operating Model and start testing alternative management procedures. The full and detailed documentation of the MSE framework and a Trial Specifications document should be produced.
- *Priority:* High priority.
- *Leader/Participation:* A Contractor started this work in 2018. A new contract (different contractor) was awarded in 2019, which should continue this work in 2020.
- *Timeframe:* Process started in 2018. Funds requested to continue in 2020, taking into account the ICCAT Commission schedule regarding swordfish MSE work (see **Table 1** at the end of this document and the table in item 13.1.8 of this report for estimated costs).

***Clear presentation on CPUEs***

- *Background/objectives:* The reviewer encouraged more explicit, clear presentation and comparison of CPUE trends by fleet and area and season. Outliers need to be identified and potentially down-weighted in combined indices and assessments.
- *Priority:* High priority.
- *Leader/Participation:* All CPCs that present CPUE series for the next assessment.
- *Timeframe:* Next stock assessment.

***Sensitivity analysis for catches/discards***

- *Background/objectives:* Conduct sensitivity analysis with estimated total catch, including plausible degree of discard/retained catch ratio changing over time.
- *Priority:* High priority.
- *Leader/Participation:* Stock assessment modellers and scientists involved in the assessment
- *Timeframe:* Next stock assessment.

**Mediterranean**

For the Mediterranean stock, the last assessment was conducted in 2020. The next assessment should take place not before 2024 but, in order to monitor stock trends, essential fisheries indicators (e.g. catch, indices of abundance), it should be reviewed in 2022.

Given the above needs and taking into account the questions raised during the latest assessment a workplan should be developed aiming to:

- Review relevant fisheries and biological data
- Update estimates of standardized CPUE indexes for the most important fisheries
- Obtain estimates of discard misreporting

Additionally, the Group should develop a workplan aiming to better identify the effects of the environment on swordfish biology, ecology and fisheries. Future CPUE analyses should evaluate the benefits of taking into account important oceanographic changes that have occurred recently in the Mediterranean Sea (e.g., eastern Mediterranean transient) and may have impacted the availability of the stock to some fisheries, and/or the recruitment success of the population.

- *Time-frame:* by the next stock assessment (2024)
- *Priority:* medium
- *Participation:* all CPs

**References**

Ortiz, M., Mejuto, J., Hanke, A., Ijima, H., Walter, J., Coelho, R., Ikkiss, A.I., 2017. Updated combined biomass index of abundance of North Atlantic swordfish stock 1963-2015. Atlantic swordfish stock assessment, 3-7 July 2017, Madrid, Spain. Collect. Vol. Sci. Pap. ICCAT, 74 (3): 1275-1294.

**Table 1.** Details of the funds requested for 2021 to continue the biological and stock structure work on Atlantic and Mediterranean swordfish, as well as the North Atlantic MSE development.

Project	Task	Leader	Participating CPCs	Requested budget	Notes
<b>Sampling and Biology Project/consortium</b> (Proj. leader: Canada; Med. coord: Univ. Genova, Italy)	Sampling collection, shipping and consumables	Atl: Canada; Med: Italy	Consortium (participating CPCs/Institutes)	€20,000	Ongoing consortium work for continuing collection and shipping of age and growth, reproduction and genetic samples.
	Biology - Age and growth	EU-Portugal		€60,000	Continue consortium work on spine and otolith processing and provide updated results. Processing of structures being carried out by FAS (Fish Ageing Services)
	Biology - reproduction	EU-Spain		€25,000	Continue consortium work on processing samples and provide updated results
	Biology - Genetics	EU-Italy		€100,000	Continue consortium work on processing genetic samples and provide updated results
<b>ICCAT/CPCs directly</b>	Workshop on Ageing and Histology Reference Set	ICCAT Secretariat with the Consortium	Consortium labs working on biology and experts on SWO biology	€20,000	Workshop organization (including attendance of external experts on SWO biology) to establish an ageing reference sets (both spines and otoliths) and creating reference sets reproductive stages (histology).
<b>ICCAT/CPCs directly</b>	Satellite tagging	Managed by SWO SG (represented by the Chair)	Any CPC with possibility to deploy satellite tags in the stocks mixing areas	€30,000	Purchase PSAT tags and satellite transmission. Deploying PSAT. Reserve 5,000 for released fish payments and 500 for tagging equipment (poles, applicators, etc.)
<b>N-Atl SWO MSE project</b>	Continue N-SWO MSE work	MSE contractor	Inputs and dialogue with the SWO SG and CPCs on MSE development	€90,000	Continue the work started with the 2019 contractor, that is currently ongoing.

### 12.1.9 Tropical tunas workplan for 2021

#### **Stock assessment schedule**

The Committee's plan developed in 2019 included a data preparatory meeting for skipjack in 2020, an assessment of skipjack and data preparatory meeting for bigeye in 2021 and an assessment of bigeye in 2022. Because of the Commission request for an assessment of bigeye in 2021, the inability to conduct assessment meetings of tropical tunas in 2020 due to the pandemic, and the lack of capacity to conduct simultaneous assessment in the same year for skipjack and bigeye tunas, the Committee has decided to modify its assessment schedule.

The Committee proposed holding a data preparatory and an assessment meeting for bigeye in 2021 (in April and July) and an equivalent meeting for skipjack in 2022.

The Committee will attempt to include data up to 2020 during the 2021 assessment of bigeye tuna. For that to occur, sufficient data will need to be provided by CPCs prior to the data preparatory meeting in April 2021. This data needs to be available two weeks prior to the data preparatory meeting. If such data is not available then the assessment will proceed with data up to 2019 and any data obtained for 2020 will only be used in projections. The same assessment model type (SS3) and uncertainty grid used in the 2018 assessment will be used in 2021. Updates of relevant biological parameters and relative abundance indices not used during the 2018 assessment will be considered. However, at a minimum, the relative abundance indices used during the 2018 assessment will need to be updated. There will be little time and few resources to make large modifications to the model structure and nature of data inputs in the period between the data preparatory meeting and the assessment meeting.

#### **2021 Research program**

The highest priority for this group is to support the research for the stock assessment of bigeye tuna in 2021.

The second highest priority for the Committee is to continue their support for the AOTTP programme (SCRS/P/2020/062), including taking advantage of the data generated by the programme and enhancing its value by conducting further analyses that can support stock assessments, MSE and responses to the Commission. To facilitate this, the AOTTP has developed a web-based data dashboard to help visualize the various data products on conventional and electronic tags and has worked with the secretariat and the Committee to adopt a new data sharing protocol.

An equally important priority is to participate and present analyses of AOTTP data at the AOTTP symposium (2020/2021). The format and date of such a symposium will depend on the programme's final funding decisions and the situation of the COVID-19 pandemic.

The Committee notes that data on tagged fish, including biological samples, should continue to be obtained in the future, provided there is the appropriate infrastructure and resources to collect it. As such data will represent fish with longer stays at sea, these data will be particularly valuable to scientists and the Commission.

The Committee will focus the 2021 Tropical Tuna MSE work on:

1. Identifying the major sources of uncertainty to be considered for the Multispecies Tropical Tuna MSE (BET, YFT and East SKJ stock).
2. Continuing to make progress on the stand alone MSE for the Western stock of skipjack as detailed in SCRS/2020/140. Additionally, exploring an OM which includes catches other than from Brazil.

The Committee will update the combined bigeye tuna longline combined index of abundance for the upcoming assessment in 2021. Such work will be led by Japan.

Finally, the Committee will need to support through their research responses to the Commission on the outstanding questions identified by the Committee and detailed in section 14 of this report.

*12.1.10 Methods workplan (WGSAM)*

- 1) To explore how to measure and quantify catchability increases over time that currently cannot be easily captured in the CPUE standardization. Recommendation to establish a programme for data that need to be collected and how to model time varying catchability in the CPUE standardization or assessment process.
- 2) Complete the swordfish Species Distribution Model as a stand-alone model, as well as to add a simulated directed fishery to the Longline Simulator tool.
- 3) A document outlining the recommended standard diagnostics for stock assessment models.

**12.2 Intersessional meetings proposed for 2021**

Taking into account the assessments mandated by the Commission and the Committee's recommendations for research coordination, the proposed intersessional meetings for 2021 are shown in **Table 12.2**. The Committee noted that the schedule needs to maintain some flexibility in order to account for any changes that may result from the deliberations held by the Commission, the meetings scheduled by other RFMOs and mostly due to the unknown evolution of the COVID-19 pandemic that might not allow in-person meetings. It is worth noting that some CPCs have already commented they have travel restrictions in place until the end of March 2021.

The Committee noted that having in-person meetings would be more productive and participative, but that, if needed, online meetings are also possible to advance the SCRS work. However, a significant additional number of days would be needed if online meetings are required.

Due to the COVID-19 pandemic that has precluded in-person meeting throughout most of 2020 and the unknown evolution of the pandemic in the coming months, for the time being no CPCs have yet expressed their willingness to host any of the schedule intersessional meetings in 2021.

The Committee reiterated the importance of ensuring a wide participation of scientists on its meetings, and requested the Commission to allocate the necessary funds to allow delegates from developing CPCs to attend the SCRS meetings.

**Table 12.2.** Calendar of the Inter-sessional meetings for 2021, based on in-person meetings. If online meetings are needed, this schedule will necessarily be modified to account for the number of days assigned to each meeting particularly in the case of those Species Groups that will carry out stock assessments.

	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE		
January					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
February								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28				
March	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								
April				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30						
May					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
June		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30								
July				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
August							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
September			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30							
October					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
November	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30									
December			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						

(\*) Meetings of ALB, BFT, BIL, SHK, SMT, SWO, TRO and SC-STATS      Free day in ICCAT  
 (+) SC-STATS will be on 27 Sep 2021      Meeting of technical nature      ++ No funding to be provided

### **12.3 Date and place of the next meeting of the SCRS**

The next meeting of the Standing Committee on Research and Statistics (SCRS) will be held in Madrid, Spain, from 4 to 8 October 2021; the Species Groups will meet from 27 September to 1 October 2021 at the ICCAT Secretariat (Madrid, Spain).

## **13. General recommendations to the Commission**

### **13.1 General recommendations to the Commission that have financial implications**

#### *13.1.1 Sub-committee on Ecosystems and By-catch*

- The Sub-committee requested financial assistance to assist five to eight CPC scientists to attend a collaborative workshop to continue the evaluation of the impact of ICCAT fisheries on sea turtles, with the use of detailed fishery observer data. This is in support of an ongoing process that will continue over the coming years.
- The Sub-committee requests financial assistance to support the attendance of five to seven CPC scientists at a collaborative workshop to discuss the relevance and the methodology used to delineate candidate ecoregions within the ICCAT convention area to foster discussion on operationalizing the EBFM. The Sub-committee recommends that a report be prepared documenting their process and to present it in the 2021 meeting.
- The Committee recommends that in response to ICCAT Rec. 19-05 on how CPCs estimate discards, the Secretariat in close coordination with the SCRS organize separate workshops with the goals of: a) characterizing the current state of discard estimation methodologies and the supporting data collection, b) evaluating if existing approaches are statistically sound and developing improvements if necessary, and/or recommending the implementation of discard estimation approaches, and c) if necessary, training national scientists in discard estimation techniques. The workshops should not be conducted as part of any regular species Group or Sub-committee meetings.

Sub-Committee on Ecosystems	2021
Workshop on ICCAT fisheries impact on sea turtles	€15,000
Workshop to discuss the relevance and the methodology used to delineate candidate ecoregions	€10,000
TOTAL	€25,000

#### *13.1.2 Sub-committee on Statistics*

In recent years, there has been an increased workload in the Science and Statistics Department, which has led two crucial long-term projects recommended by the SCRS to be postponed for more than 6 years. Accordingly, a new database developer shall be hired to: i) geo-reference all the fisheries statistics; ii) develop and maintain electronic tagging and biological sampling databases. This position is essential for the Secretariat to provide high-quality information available on electronic tagging and biological sampling to the SCRS, otherwise this will be detrimental for scientific advice. To overcome this issue, the Sub-Committee recommends that the Commission provide the Secretariat with the necessary means to hire a database expert.

#### *13.1.3 Albacore*

- The Committee recommends continued funding of the albacore research programme for North and South Atlantic stocks. As for the Mediterranean stock, although there are still considerable gaps in knowledge on the species biology, fisheries and statistics, to date, the Committee has not set research priorities; therefore, no funding is currently requested under the framework of the ICCAT Albacore Research Project. However, there is one recommendation with financial implications for this stock (the larval studies).

- The Committee recommended that for the next four-years, research on the North and South Albacore stocks be focused on three main research areas: biology and ecology, monitoring of stock status, and management strategy evaluation (the latter is specific to the north Atlantic stock). For 2021 the Committee recommended to continue electronic tagging activities in the north Atlantic, to start tagging in the Southern Atlantic, to conduct reproductive biology studies in both stocks, and to progress on the north Atlantic albacore MSE. These are all considered to be high priority tasks, with an estimated cost of €120,000. More details of the proposed research and economic plan are provided in the Albacore 2021 Workplan (item 12.1.3 of this report).
- The Committee request funds for a short term-contract to support advances in larval studies in the Balearic Sea and other spawning areas (e.g. central and eastern Mediterranean), namely investigating the spatio-temporal distribution of larval habitats and dependencies with local mesoscale oceanography, and investigating the ecology of early life stages and the factors determining larval survival. In addition, it shall include tools for developing habitat standardized larval abundance indices
- During some of the recent scientific meetings of the Albacore Species Group, it was noted the absence of several CPCs with important albacore fisheries. This fact limited the ability of the Group to properly revise and interpret the basic fishery data and relative indices of abundance. This continues to result in unquantified uncertainties, which negatively affects the achievement of meeting objectives. To overcome this issue, the Committee continues to recommend that CPCs make additional efforts to participate in the meetings. Moreover, whenever necessary developing CPCs may request financial assistance to the Secretariat through the ICCAT Meeting Participation Fund (MPF), to attend and contribute to Albacore Species Group meetings. This recommendation is pertinent for the 2021 Mediterranean albacore assessment.
- Following the ICCAT MSE roadmap adopted by the Commission, which is currently under review by the SCRS, the Committee recommends that the Commission provide the necessary financial means for the continuity of N-ALB MSE work.

Species: ALB	2021	2022	2023
Tagging <sup>1</sup>	60,000	40,000	30,000
Biological studies:			
Reproduction <sup>1</sup>	35,000	35,000	25,000
Other (Larval studies)	33,000	33,000	33,000
MSE	20,000	30,000	30,000
Sample collection and shipping	5,000	5,000	5,000
<b>TOTAL</b>	<b>153,000</b>	<b>143,000</b>	<b>123,000</b>

#### 13.1.4 Billfish

- *Enhanced Programme for Billfish Research:* The Committee recommends continuing funding for the EPBR research activities for future years, to further improve knowledge gaps for the species and areas prioritized: [Priority 1]
  - Initiate/continue reproduction study of blue marlin in the Gulf of Mexico;
  - Continue the growth study of the three priority billfish species in the eastern Atlantic;
  - Organize a workshop on growth and ageing techniques for billfish with teams from eastern and western Atlantic teams.

<sup>1</sup> Funds to be evenly split between North/South stocks. In the event of a budget reduction, the southern stock has priority.

- To fund one regional workshops in West Africa or Caribbean for CPC statistical correspondents on artisanal fisheries data collection. The objective is collecting detailed information describing their fishery(ies) and sampling programmes, aiming to improve the collection and submission of billfish fisheries data in these regions (€25,000).
- To carry on with the development of an app for mobile phone to collect and report fisheries data on artisanal fisheries in collaboration with local scientific institutions.

Breakdown of the requested Billfishes estimated budget for the period 2021 - 2023.

Activity:	2021	2022	2023
Tagging			
Biological studies:			
Reproduction	5,000		
Age and growth	15,000	15,000	15,000
Genetic [WHM/RSP kits]	5,000	5,000	5,000
Other (identify)			
Other fisheries related studies (including data recovery and collection of fisheries statistics in the field in West Africa)	10,000	10,000	10,000
Sample collection and shipping	10,000	10,000	10,000
Consumables	5,000	5,000	5,000
Workshops [Age-growth 2021] + [Data Artisanal fisheries 2021, 2022]/stock assessment expert [SAI Stock Assessment 2022]/reviewer	55,000	30,000	25,000
<b>Total</b>	<b>105,000</b>	<b>75,000</b>	<b>70,000</b>

#### 13.1.5 Bluefin tuna

- Meetings devoted primarily to MSE development (two Bluefin tuna MSE Technical Group meetings, coordinated by GBYP, and a Joint BFT/MSE intersessional meeting).
- Continued funding to support the essential work of GBYP, including funding of the MSE development process, biological studies and the full GBYP workplan, including an external review of MSE.
- Support by the GBYP for the specified sub-groups (SG) which will address key uncertainties identified in the 2020 update assessment, including:
  - Habitat and environmental variables represent an important source of variability in existing indices of BFT relative abundance, the Committee recommends continued explorations of factors that may account for differential availability or catchability.
  - Continuation of the Joint CPUE Standardization work group.
  - Continued work in developing alternative assessment models for E-BFT, notable statistical catch at age/length models.
- The Committee recommends support for workshops in statistical techniques for index standardization and to develop a working network for analysts to facilitate the future sharing of knowledge and tools.

### 13.1.6 Sharks

- Provide funding for the SRDCP for Year 7 (€100,000) to complete work on South Atlantic shortfin mako age and growth, shortfin mako genetics (a one-year extension is requested to conduct additional nuclear DNA analyses to better understand the reasons for the inconsistency between genetic population structures predicted from mitochondrial and nuclear DNA approaches and thus provide a more accurate picture of the genetic population structure of Atlantic shortfin mako), and continue work on movement and habitat characterization of silky, oceanic whitetip, and hammerhead sharks through satellite tagging.

Activity:	2021
Tagging (FAL, OCS, SPZ, LMA)	65,000
Biological studies:	
Age and growth (S.Atl. SMA)	10,000
Genetic [SMA]	25,000
<b>Total</b>	<b>100,000</b>

### 13.1.7 Small tunas

To consider requesting the Commission to develop a process which could support funding of research programmes for periods longer than usual biannual budget period, since SMTYP, as well as other ICCAT research programmes, require multiannual and multiregional initiatives that are difficult to handle based on annual budgets. The ICCAT Strategic Research Plan recognizes that such long-term commitment is essential for improving scientific advice.

The Committee recommended the following activities which will have financial implications in the period of 2021 to 2023:

- Continuing support to the SMTYP: The Committee recommends continuing with the ICCAT SMTYP research programme activities in 2021-2023 (see table below) to further improve the biological information (improving geographical coverage for growth, maturity and stock identification) for the species/areas prioritized, such as WAH (including the Northwestern region), FRI and BLT. Costs in 2021 are estimated at €55,000.
- Regional workshop on the application of data-limited methods to assess small tunas stocks. These models include integrated, length and catch based models. With such tools it is possible to know the status of the population and, depending on the method used, provide reference point to the fishery. Such approaches require inputs from biologists and fisheries experts. As such, the Committee recommended a workshop to be held to advance with the data-limited models applied for some small tunas species. For 2021 the Committee will develop the specifics ToRs and agenda for the proposed workshop on Data-limit models. This workshop could be held immediately after (back-to-back) the 2021 intersessional meeting of the Small Tunas Species Group, which would reduce traveling costs. This workshop should be updated in 2023, also in the format back-to-back the 2023 intersessional meeting of the Small Tunas Species Group. Costs are estimated at €25,000 per workshop, which would allow for participation of 2 experts and 8-10 national scientists.
- Regional workshop on the maturity staging in 2022 to small tunas stocks. This workshop would allow for calibration and adopting internationally agreed macroscopic and microscopic maturity scales for the new studied small tunas species. Costs are estimated at €20,000, which would allow for participation of 1 expert and 8-10 national scientists.
- Funding for additional tagging of wahoo and little tunny. The Committee recommends that financial support for further conventional tagging of wahoo in the Canary Islands and little tunny in the Gulf of Cadiz and the Alboran Sea (Portugal and Spain), that corresponds to areas where AOTTP did not promoted tagging campaigns of these species. The Committee estimates that the costs to conduct such work in 2021 would be €20,000.

- Revision of the ICCAT manual for small tuna species. The Committee recommends to extend the species description chapter(s) of the ICCAT Manual for other small tuna species that are under the ICCAT mandate including wahoo (*Acanthocybium solandri*), serra Spanish mackerel (*Scomberomorus brasiliensis*), West African Spanish mackerel (*Scomberomorus tritor*), BOP (*Sinopsis unicolor*) and CER (*Scomberomorus regalis*), and update all other species chapters which were last updated in 2006, except for *Thunnus atlanticus*, which was updated in 2013. The Committee estimates that the costs to conduct such work would be €5,000, in addition to the work completed in 2020.
- The Committee recommends continuing the support and funding for the recovery activities of the AOTTP in subsequent years.

The table below synthesizes the required budget with financial implication for the SMT in the short and medium term (2021-2023).

Small tunas	2021	2022	2023
Tagging and rewards	20,000	5,000	5,000
Biological studies:			
Reproduction	15,000	25,000	25,000
Age and growth	15,000	25,000	25,000
Genetic	15,000	25,000	25,000
Other fisheries related studies (including data recovery)		5,000	5,000
Sample collection and shipping	10,000	25,000	25,000
Revision of the ICCAT manual for small tuna species:	5,000		
Workshops on Data-Limit stock assessment (in 2021 and 2023) + Workshop on the maturity staging (in 2022)	25,000	20,000	25,000
<b>TOTAL</b>	<b>105,000</b>	<b>130,000</b>	<b>135,000</b>

#### 13.1.8 Swordfish

- *Research funding for biology and stock structure* (this recommendation applies to both the *North and South Atlantic and Mediterranean Stocks*). An understanding of the species biology, including age, growth and reproductive parameters, as well as stock structure and mixing is crucial for the application of biologically realistic stock assessment models and, ultimately, for effective conservation and management. Given the current uncertainties that still exist, the Committee recommends as high priority to continue biological studies on swordfish. An ICCAT project on swordfish biology, genetics and satellite tagging started in 2018 and the Committee recommends that the project continues for at least the next year (2021), possibly extending further than that, and is provided with financial support. The costs for continuing such work are detailed in Table 1 of the Swordfish workplan (item 12.1.8).
- *MSE work and funding*: Delivering MSE results for Northern SWO according to the schedule agreed upon by the Commission will be very challenging and require time and resources. Funding to start this work was provided in 2018, and a contractor was hired to start the work. The Committee recommended funding for continuing the SWO MSE work at least over the next 2-year period. Funds requested for 2021 and the following years are described in Table 1 of the Swordfish workplan (item 12.1.8).
- *Data recovery plan (Mediterranean swordfish)*: The Committee has noted important improvements in historical T1 and T2 data when comparing to the information available in the 2016 assessment (Anon., 2017). However, the available CPUE data for the earlier period are still limited. Therefore, the early period of the fisheries cannot be fully accounted in the stock assessment models. As such, the Committee recommended conducting a recovery of historical data, so that the entire history of the fishery is taken into account when assessing the stock. Particular effort should be dedicated to collecting available information from the major fisheries of the early years, with focus in fisheries with limited data.

Activity	2021	2022	2023
Tagging	€30,000	€30,000	€30,000
Biological studies:			
Reproduction	€25,000	€25,000	€25,000
Age and growth	€60,000	€50,000	€30,000
Genetic	€100,000	€100,000	€100,000
Other fisheries related studies (including data recovery)	€10,000	€10,000	€10,000
Sample collection and shipping	€20,000	€15,000	€15,000
Consumables	€5,000	€5,000	€5,000
Workshops/stock assessment expert/reviewer	€15,000	€15,000	€15,000
MSE	€90,000	€90,000	€90,000
<b>Total</b>	<b>€355,000</b>	<b>€340,000</b>	<b>€320,000</b>

### 13.1.9 Tropical tunas

- *Support the continuation of the AOTTP activities in 2021:* There is an urgent need to support some essential AOTTP activities in 2021 including the continuation of recovery efforts, tag seeding, and ageing of collected samples. It is estimated that such support will have to be of €63,000 in 2021, €55,000 in 2022 and €49,000 each year from 2023 until 2025. [priority 1, if no Exit Strategy fund be provided]
- *External expert:* to be hired to assist on the bigeye tuna 2021 stock assessment (including attendance to data preparatory and stock assessment meetings). [estimated cost €10,000, priority 2]
- *Funding Tropical tuna MSE:* The Committee recommends that an agenda item is included in the Commission's next Panel 1 meeting to continue to highlight to the Commission the need to have a funding plan to support the continued development of the tropical tuna MSE. The MSE work will require €125,000 of funding from the Commission in both 2021 and 2022. [priority 3]

### 13.1.10 Working Group on stock assessment methods (WGSAM)

- The Committee recommended the use of the longline simulator (LLSIM) datasets as capacity building for training methods in CPUE standardization. Further addition of detailed CPC fleet information would increase the utility of the LLSIM datasets as a tool for CPUE standardization best-practice work. Therefore, the Committee recommend an expert to be contracted to further develop this tool (€60,000).
- The Committee recommends that the Secretariat develop a specific budget line in the ICCAT regular budget for the 2022/23 cycle, independent of the Science budget. This budget item shall include the funds needed for developing the entire ICCAT MSE processes, including fulfilling the Commission request for an MSE Independent Peer Review (IPR) composed of a panel of at least three independent reviewers, as well as the funds for other MSE processes activities developed by the SCRS. The products of this IPR would be a review of past and current practices, recommendations for improvements and a subsequent design of a generalized framework for the MSE process suited to the ICCAT process.

WGSAM	2021
Other fisheries related studies (Further development of the longline simulator -LLSIM)	€60,000
<b>TOTAL</b>	<b>€60,000</b>

## **13.2 Other general recommendations**

### *13.2.1 Sub-committee on ecosystems*

Regarding the Ecosystems component:

- The Committee recommends that the Commission develop an informal meeting format for the SCRS to work with managers to progress on SCRS-advisory processes that need more involved input from managers. The Sub-committee, currently developing the ecosystem report card, needs more working-level feedback from managers in order to provide the Commission with valuable strategic advice and continue developing advice on EBFM implementation options for ICCAT (i.e. in the development and implementation of assessments and management frameworks that incorporate species interactions, fleets interactions, habitats, environmental drivers and climate change into fisheries management). Specifically managers' feedback is needed on the identification of priorities among different ecosystem components aligned to management objectives, on the mechanisms for operationalizing signals identified from the report card into management decisions, and the types of trade-offs among objectives to be considered in the context of fisheries management.
- The key to this working Group being successful would be an informal structure, allowing more fluid back and forth discussions between all attendees. These types of discussions are not possible in the more formal panel and Standing Working Group on Dialogue between Fisheries Scientists and Managers (SWGSM) meetings. A more open meeting format with managers and scientists of different expertise would allow more nuanced information from both scientists and managers to be expressed, discussed, and built on; this would better inform managers on what can/could be delivered by SCRS and for scientists to better understand from managers what advice/information is needed to draft management decisions. The need for this type of Group is not unique to the Sub-committee, and the SCRS should consider including other functional uses of this requested informal SCRS-Managers working Group (for example this exact same Group could be used to advise on MSE processes).
- Given the lack of data to support the monitoring of the impact of ICCAT fisheries on marine mammals, it is recommended that a definition of "marine mammal interactions" be discussed and adopted at the 2021 meeting of the Sub-Committee on Ecosystems. Based on this definition, CPCs should explore the availability of information on these interactions between marine mammals and ICCAT fisheries.

Regarding the By-Catch component:

- The Committee recommends that the SCRS develop improved mechanisms for SC-Eco to work across all species Groups of the SCRS on the issues related with multi-species (e.g. environmental impacts, multi-species trade-offs, integration of ecological considerations into management procedures) similar to the Working Group on Stock Assessment Methods or the Sub-committee on Statistics.
- The Sub-committee reviewed the progress made by the Secretariat in the development of the new EFFDIS and it concurred that the new estimation of total effort is a significant improvement over the previous methodology. Therefore, the Committee recommends that the Secretariat present the results of the new EFFDIS estimation to the next meeting of the Sub-committee on Statistics for its review and potential approval.

### *13.2.2 Sub- committee on statistics*

- The Committee recommends that the Secretariat publish Major Shark and Major Tuna as well as Major Small Tuna species' data catalogues for CPCs on the ICCAT website using the same data publication procedure and frequency as for Task 1 and 2.
- The Committee recommends that CPCs recover historical catch and effort data and apply the proper units of effort (i.e., number of hooks) and provide information on the type of longline gear deployed (i.e., American style or mesopelagic).

### 13.2.3 Albacore

- The Committee recognized the lack of standardized CPUE data from the eastern Mediterranean as a potential source of uncertainty when assessing the Mediterranean albacore stock. The Committee recommended that CPCs predominantly fishing in this area (EU-Greece, EU-Cyprus and Turkey) should make a concerted effort to generate, and submit, standardized CPUE data.
- The Committee recommends conducting a review and collation of all the available data on age-length from the various studies that have estimated age from spines with the view to update the estimate of the growth curve for Mediterranean albacore. It is also recommended that methods of accounting for selectivity in the year 1 cohort in von Bertalanffy growth function (VBGF) be explored to ensure accurate parameter estimation.

### 13.2.4 Billfish

- The Committee emphasized the need for all CPCs to comply with the mandatory requirements to report discards (both dead and alive) for billfishes. It was noted that to date only 7 CPCs (out of 68 CPCs or fishing entities) have ever reported billfish discards and using such limited information the estimates of dead discards are around 2-3%. On the other hand, by using statistical analysis within the stock assessment models it was noted that unaccounted IUU catches, including dead discards may reach values of around 27% of the reported catches. Having the total catches, including dead and live discards, and estimates of post-release mortality is important for stock assessment purposes.,
- *Develop estimates of billfish discard mortality:* The Committee recommended that national scientists collaborate in a study of the effect of time, area and gear configuration variations for discards using observer data to improve discard estimates. Furthermore, the Committee supports the Sub-Committee on Ecosystems recommendation in response to ICCAT Rec. 19-05 on how CPCs estimate discards. The Secretariat, in close coordination with the SCRS, will organize separate workshops with the goals of:
  - a) characterizing the current state of discard estimation methodologies and the supporting data collection,
  - b) evaluating if existing approaches are statistically sound and developing improvements if necessary, and/or recommending the implementation of discard estimation approaches,
  - c) if necessary, training national scientists in discard estimation techniques.
- To resume and enhance the collection of fishery data on Mediterranean spearfish and other billfish which are present in the Mediterranean.

### 13.2.5 Bluefin tuna

- Review of CAS, CAA (especially from 2009 onwards), and direct aging information, for improved characterization of associated uncertainty and incorporation into the modelling framework.
- The Secretariat's work in collaboration with national scientist to carefully review the Task 2 stereo-camera size data submitted by the fleet Mediterranean OTHERS purse seine (Anon., 2017a, Table 3) for the 2017-18 period and confirm the correct size distribution of their catch.

### 13.2.6 Sharks

- Considering the need to improve stock assessments of pelagic shark species impacted by ICCAT fisheries and bearing in mind Rec. 12-05 as well as the various previous recommendations which made the submission of shark data mandatory, the Committee strongly urges the CPCs to provide the corresponding statistics, including discards (dead and alive), of all ICCAT fisheries, including recreational and artisanal fisheries, and to the extent possible non-ICCAT fisheries capturing these species. The Committee considers that a basic premise for correctly evaluating the status of any stock is to have a solid basis to estimate total removals.

- The Committee reiterates that the CPCs provide estimates of shark catches in both ICCAT and non-ICCAT fisheries for species that are oceanic, pelagic, and highly migratory within the ICCAT Convention area. The magnitude of shark entanglements in FADs should be investigated. Methods for mitigating shark by-catch in fisheries also need to be investigated and applied.

### 13.2.7 Small tunas

The Committee recommended:

- Statistical Correspondent and/or national scientists should revise, update, complete and submit their small tuna T1NC series to the Secretariat. This revision should take into account Appendix 5 (SCRS catalogues), the split of “unclassified” gear catches to specific gear codes, and the completeness of Task 1 gaps identified. The Statistical Correspondent and/or National scientists of CPCs should correct inconsistencies identified in T2SZ series. For the 13 species of small tuna, the T2SZ revision should have as reference, the stratification of the samples by gear, month, 1°x1° or 5°x5° squares, and, SFL size classes of 1 cm (lower limit). CPCs should further improve their estimates of total catches, as there are still important gaps in the basic data available. These data are essential inputs for most of the data limited stock assessment methods. The Secretariat should continue its work on the data recovery and inventory process of tagging data for small tuna species. This process will require active participation of the national scientists that hold such data. Further, the Committee recommends that CPCs that carry out fisheries for small tunas in the Black Sea and Mediterranean Sea to specify the source of the catch in the current task 1 and 2 report requirements.
- The Committee recommends that the narrow-barred Spanish mackerel (*Scomberomorus commerson*, Lacépède, 1800) to be included in the ICCAT list of tuna and tuna-like fishes and elasmobranchs that are oceanic, pelagic, and highly migratory, due to the importance of this small tuna species fisheries in the Mediterranean Sea.

### 13.2.8 Swordfish

Atlantic Swordfish

- *To the WGSAM on CPUE standardisation methods.* For the WGSAM to provide guidelines on best practices on CPUE standardization, such as on how and when to include interactions between years and other factors in the CPUE standardization; how to account for targeting effects (e.g. catch ratios, clustering of catch composition and other alternatives); and how to take into account environmental effects. To ask for guidance on how to interpret measures of variance associated with the index in the presence of different model structures, especially in the context of the use of these measures of variances in the process of population modelling (e.g. in the weighting of different CPUEs).
- *To the CPCs on size data submissions:* Given that sometimes size data are reported at relatively low resolution (e.g., 5cm size classes) even when it is collected at higher resolution (e.g., 1cm), which may substantially impair the conversion of CAS to CAA, the Committee recommends that size measurements are reported at the highest resolution available.

### Mediterranean Swordfish

*Recommendations on research and statistics*

- *To the Secretariat on updating the ST-09 form:* The Committee agreed that data from the domestic observer programmes are essential for assessment and management purposes, as they can provide fine resolution information on undersized catches and discard rates by fishery. Regarding the reporting ST09 form for domestic observer programme data the Committee recommends: (a) including the mesopelagic and American style longline in the gear selection list, (b) better clarifying the selection of depth range for the fishing operations, (c) having all forms to be completed without exclusion (remove the “optional” from sub-form C in ST09) and this data should be used exclusively for scientific purposes in line with Rec. 16-14.

- *To the WGSAM:* The Committee noted that projections for different assessment models may differ in at what point of the year estimates of relative biomass are calculated (i.e. beginning of year, mid-year, end of year). This may cause a mismatch when projection results from different models are combined, or counterintuitive results when even one model is used, such as is observed in the 2020 Mediterranean SWO Kobe II strategy matrix (prob of  $B > B_{msy}$ ), where in 2021 relative biomass is shown as being the same regardless of TAC selected for 2021. The Committee requests that the Working Group on Stock Assessment Methods recommend a standard practice for displaying projection figures and the Kobe II strategy matrix results in a way that reconciles this problem.

### 13.2.9 Tropical tunas

- The Committee reiterates its conclusion as mentioned in the preamble of Rec. 16-01 that the current level of scientific observers (5%) seems to be inappropriate to provide reasonable estimates of total by-catch, and recommended increasing the minimum level to 20%.
- The Committee recommends that Panel 1 include the development of a set of indicators of fishing capacity as a point in the next agenda.

### 13.2.10 Working Group on stock assessment methods (WGSAM)

- The Committee recommends the development of a Tropical Tuna Science Plan to define and direct strategic research needs, including support for essential activities of the AOTTP after the existing programme is completed. The Committee also notes that this recommendation is consistent with previous recommendations of the Tropical Tunas species group, and the ICCAT Strategic Plan (Section 1.4.3) to improve stock assessments by "incorporating improved information on life history characteristics: fecundity, age composition of catch, growth, stock structure, and spatial distribution patterns."

## 14. Responses to Commission's requests

The Committee noted that the Commission has been increasing substantially the number of requests to the Species Groups and suggested prioritising them due to the limited time available to properly address the responses annually.

### 14.1 The SCRS shall annually advise on the TAC. Rec. 19-04, paragraph 4

**Background:** *The TAC shall be reviewed annually on the advice of the SCRS.*

The update assessment of the eastern BFT stock undertaken in 2020 was not robust and neither the short-term catch advice based on it. The inspection of the updated biomass indicators and the projections of 2017 assessment did not provide any evidence to alter the current management advice. No change in the current TAC advice of 36,000 t is recommended for 2021 and also for 2022. However, 2022 TAC advice should be reviewed in 2021 based on updates of the abundance indicators. A summary of the stock assessment and the TAC advice are presented in the SCRS 2020 report to the Commission.

### 14.2 The SCRS should review catch rates each time that a stock assessment for eastern bluefin tuna is performed, including specific rates for gear type and fishing area. Rec. 19-04, paragraph 18/19

**Background:**

(para. 18) *Each CPC shall adjust its fishing capacity to ensure that it is commensurate with its allocated quota by using relevant yearly catch rates by fleet segment and gear proposed by the SCRS and adopted by the Commission in 2009. Those parameters should be reviewed by the SCRS no later than 2019 and each time that a stock assessment for eastern bluefin tuna is performed, including specific rates for gear type and fishing area.*

(para. 19) *For that purpose each CPC shall establish, when appropriate, an annual fishing capacity management plan to be analysed and, as appropriate, endorsed by Panel 2 intersessionally. Such plan shall adjust the number of catching vessels to demonstrate that the fishing capacity is commensurate with the*

*fishing opportunities allocated to the catching vessels for the same quota period. Regarding small-scale coastal vessels, the minimum quota requirement of 5 t (catch rate defined by the SCRS in 2009) shall no longer be applicable and sectorial quotas may alternatively be applied to those vessels as follows”.*

During 2020, regarding the request to provide specific catch rates for eastern Bluefin tuna fleets, the SCRS has received only one document from a CPC (Norway, SCRS/2020/017) providing information on their fleet(s) catch rates.

The Committee once again requests a clarification of the definition of “catch rates” from the Commission. Meanwhile the Committee is interpreting the definition of catch rate as catch per unit of effort (CPUE), e.g. catch per day per vessel type. This definition makes the results of the analysis proposed not compatible with the Table of catch rates provided in 2009 by the SCRS. The Committee, in coordination with the Secretariat, has started an additional review and update of the BFT CPUE; for this task information from the eBCD, BFT weekly reports, the VMS and Vessels registration data is being compiled by the Secretariat and will be analyzed and reported in 2021.

**14.3 The SCRS, on the basis of a standardized protocol to be established by the SCRS for the monitoring of recognizable individual fish, shall undertake trials to identify growth rates including in weight and size gains during the fattening period. Rec. 19-04, parag. 28**

**Background:** *The SCRS, on the basis of a standardized protocol to be established by the SCRS for the monitoring of recognizable individual fish, shall undertake trials to identify growth rates including in weight and size gains during the fattening period. Based on the result of the trials and other scientific information available, the SCRS shall review and update the growth table published in 2009, and the growth rates utilized for farming the fish referred to under paragraph 35 c, and present those results to the 2020 Annual meeting of the Commission. In updating the growth table, the SCRS should invite independent scientists who have appropriate expertise to review the analysis. The SCRS shall also consider the difference among geographic areas (including Atlantic and Mediterranean) in updating the table. Farm CPCs shall ensure that the scientists tasked by the SCRS for the trials can have access to and, as required by the protocol, assistance to carry out the trials.*

The Commission has requested that the SCRS update the growth table published in 2009, with particular emphasis on the maximum growth rates. In this request, the use of individual fish to determine growth was stressed, as well as the consideration of differences between geographical areas. As a result, the GBYP launched a series of studies in 2019, which will continue during 2020 and 2021, and established a Sub-Group on growth of BFT in farms within the BFT Species Group in 2020. This Sub-Group was created to ensure that the best scientific data would be provided to the Commission. The Sub-Group has held a number of online meetings to discuss using different approaches and assessing their limitations, so that a scientifically sound updated growth table or tables can be provided. Limitations identified so far by the Sub-Group (financial, logistical and representativeness) affect the feasibility of providing sufficient results based on individual growth to elaborate a complete and fully representative new maximum growth reference table, whilst also considering the impact of physically weighing and tagging on subsequent growth, especially in larger fish. Consequently, the Sub-Group concluded that different methodological approaches, from individual growth studies based on tagging to broader analyses based on the available L/W data from stereo-camera measurements at caging and harvesting data from eBCD, should be combined to address the Commission’s request. There are also concerns that the current L-W relationships (needed to convert stereo-camera length measurements to RWT) does not represent the L-W relationship applicable to certain geographical areas and/or certain size classes.

These and other issues were grouped into five study areas: tagging of individual fish to determine growth; regional L-W equations; modal analysis of available data for the determination of growth and possible correlations with environmental factors and feed supply; analysis of stereo-camera and harvest data held by the Secretariat as well as other datasets; and new methods for determining growth (acoustics and image analysis and AI). Analyses within the individual study areas have been initiated, but considering the current situation and the work required, sufficient results to enable an update of the growth table are not expected to be available before 2021 or, more realistically, 2022. More details and the workplans are presented in SCRS/2020/129. Results from the GBYP ongoing studies are available on the [GBYP webpage](#).

**14.4 The SCRS should provide advice on the possibility of extending or modifying fishing seasons for different gear types and/or fishing areas. Rec. 19-04, parag. 33.**

**Background:** *Not later than 2020, the Commission shall decide to what extent the fishing seasons for different gear types and/or fishing areas might be extended and/or modified based on the SCRS advice without negatively influencing the stock development and by ensuring the stock is managed sustainably.*

The Committee has never provided advice on the appropriate length or timing of fishing seasons in relation to stock development, and the length of current fishing seasons was determined without the Committee's input.

This request is broad in scope considering the diversity of fleets, spatial coverage and seasonality. No information was provided to the Committee on this issue. The Committee requests more details on the questions to be addressed in order to undertake the appropriate data compilation and analysis. Specific objectives of the request would be helpful given that some CPC fleets could not fill their quota during the fishing season. Assuming clarification is provided by the Commission to the SCRS in 2020 a response could be available for 2021.

**14.5 National observer programmes - The SCRS shall report on the coverage level by CPC, and provide a summary of the data collected and any relevant findings associated with that data. The SCRS shall provide any recommendations to improve the effectiveness of CPCs' observer programmes. Rec. 19-04, parag. 83.**

**Background:** *For the scientific aspect of the programme, the SCRS shall report on the coverage level achieved by each CPC, and provide a summary of the data collected and any relevant findings associated with that data. The SCRS shall also provide any recommendations to improve the effectiveness of CPCs' observer programmes.*

*Each CPC shall ensure coverage by observers, issued with an official identification document, on vessels and traps active in the bluefin tuna fishery on at least:*

- 20% of its active pelagic trawlers (over 15 m),
- 20% of its active longline vessels (over 15 m),
- 20% of its active baitboats (over 15 m),
- 100% of towing vessels,
- 100% of harvesting operations from traps.

*CPCs with less than five catching vessels of the first three segments defined above authorized to fish actively for bluefin tuna shall ensure coverage by observers 20% of the time the vessels are active in the bluefin tuna fishery.*

*No later than 2020, CPCs shall present to the SCRS the statistical methodology used to estimate dead and live discards. CPCs with artisanal and small-scale fisheries shall also provide information about their data collection programmes. The SCRS shall review these methodologies and if it determines that a methodology is not scientifically sound, the SCRS shall provide relevant feedback to the CPCs in question to improve the methodologies.*

Given the limitations imposed by the worldwide crises no new work was initiated/provided in 2020 by the Committee to review the methodologies used to estimated dead and live discards. This very important issue will hopefully be picked up in 2021.

**14.6 Measures and programmes to estimate the number and weight of bluefin tuna to be caged – The SCRS should evaluate such procedures and results and report to the Commission by the Annual meeting. Rec. 19-04, parag. 99.**

**Background:** A programme using stereoscopic cameras systems or alternative methods that guarantee the same level of precision and accuracy shall cover 100% of all caging operations, in order to refine the number and weight of the fish. This programme using stereoscopic cameras shall be conducted in accordance with the procedures set out in Annex 9. In case of the use of alternative methods, those methods should be duly analysed by the SCRS, who should present its conclusions regarding their precision and accuracy for endorsement by the Commission during its Annual meeting before an alternative methodology can be considered valid for the purpose of monitoring the caging operations.

The results of this programme shall be submitted by 15 September annually to the SCRS by all farming CPCs. The SCRS should evaluate such procedures and results and report to the Commission by the Annual meeting.

No new information was presented to the Committee on this matter in 2020. A programme to estimate number and weight of the minimum sample size that is representative of the bluefin tuna being caged could possibly be implemented under GBYP activities in Phase 11. This task will require the analysis of the complete transfer records of several farms. The SCRS requests the full raw data from the stereo camera videos be provide to the Secretariat.

**14.7 Safeguards – The SCRS shall provide new advice on the TAC for the following year when the goal of maintaining the biomass around  $B_{0.1}$  (to be achieved by fishing at or less than  $F_{0.1}$ ) is not achieved and the objectives of this plan are in danger. Rec. 19-04, parag. 114.**

**Background:** When, as a result of a scientific evaluation, the goal of maintaining the biomass around  $B_{0.1}$  (to be achieved by fishing at or less than  $F_{0.1}$ ) is not achieved and the objectives of this plan are in danger, the SCRS shall provide new advice on the TAC for the following year.

The Committee could not provide advice based on  $F < F_{0.1}$  for the eastern BFT stock due to uncertainty in the assessment and short-term projections. However, the Committee concluded that there is no evidence to recommend a change in the current TAC advice for 2021. Details are provided in the 2020 SCRS advice Eastern BFT Executive Summary (see item 5.2).

**14.8 The SCRS shall review the specifications and, if necessary, provide recommendations to modify them. Rec. 19-04, Annex 9, item 6**

**Background:** The report on the results of the stereoscopic programme should include details on all the technical specifications above, including the sampling intensity, the sampling methodology, the distance from the camera, the dimensions of the transfer gate, and the algorithms (length-weight relationship). SCRS shall review these specifications, and if necessary, provide recommendations to modify them.

No new information was provided to the Committee on the validation or review of technical specifications of the stereoscopic length measurements prior to each caging operation. The SCRS indicated that to properly review minimum sampling, it is required that full raw data from the stereo camera videos be provided to the Secretariat.

**14.9 The SCRS shall annually advise on the TAC. Rec. 17-06, paragraph 4**

**Background:** The annual TACs in paragraph 3 shall be reviewed annually by the Commission on the advice of the SCRS, which would include the review of updated fishery indicators. In support of this work, CPCs shall make special efforts to update abundance indices and other fishery indicators annually and provide them to the SCRS.

An update assessment of the western BFT stock was undertaken in 2020. A summary of the stock assessment and the TAC advice is presented in the Western Bluefin Executive Summary (see item 5.2).

**14.10 The SCRS shall advise on appropriate management measures, approaches, and strategies, including, inter alia, regarding TAC levels for those stocks for future years, on potential impacts due to uncertainties. Rec. 17-06, paragraph 17, 18**

**Background:**

Para. 17) *In 2020, the SCRS will conduct a stock assessment for bluefin tuna for the western Atlantic stock and for the eastern Atlantic and Mediterranean stock and provide advice to the Commission on the appropriate management measures, approaches, and strategies, including, inter alia, regarding TAC levels for those stocks for future years.*

Stock assessments were undertaken for both the eastern and western bluefin tuna stocks in 2020.

Para. 18) *By 2020, the SCRS shall provide the Commission with advice on any potential impacts due to uncertainties (including regarding the spawner-recruit relationship) of implementing an F0.1 strategy, and, for any identified risks, advise how they could be addressed in future management decisions.*

Due to time constraints the Committee was not able to address this request.

**14.11 The SCRS shall review the statistical methodologies used by the CPCs and provide relevant feedback to the CPCs in case it determines that a methodology is not scientifically sound. The SCRS shall also determine if one or more capacity building workshops are warranted to help CPCs to comply with the requirement to report total live and dead discards. Rec. 19-05, paragraph 16**

**Background:** *The SCRS shall also determine if one or more capacity building workshops are warranted to help CPCs to comply with the requirement to report total live and dead discards. If so, the Secretariat in coordination with the SCRS should begin organizing the SCRS-recommended workshop(s) in 2021 with a view to convening them as soon as practicable.*

The Committee has not received the statistical methodologies for estimating billfish discards from the CPCs. The Committee is not in a position to address this request until CPCs have submitted their estimation methods.

**14.12 The SCRS should provide advice. Rec. 19-06, paragraph 11**

**Background:** *The Commission, at its 2020 annual meeting, shall adopt a new management recommendation for North Atlantic shortfin mako, taking into account the scientific advice from the SCRS and the results of the 2020 Panel 4 intersessional meeting, in order to establish a rebuilding plan with a high probability of avoiding overfishing and rebuilding the stock to  $B_{MSY}$  within a timeframe that takes into account the biology of the stock.*

Given that there was no intersessional meeting of the Panel 4 and the Sharks Species Group focused on the Porbeagle stock assessments in 2020, no additional information can be provided.

The Committee reiterates previous advice provided to the Commission by the SCRS in 2019.

**14.13 Updated assessment of the state of the Mediterranean swordfish stock on the basis of the most recent data available. Rec. 16-05, paragraph 45**

**Background:** *The SCRS shall provide in 2019 an updated assessment of the state of the stock on the basis of the most recent data available. It shall assess the effectiveness of this Recovery plan and provide advice on possible amendments of the various measures. SCRS shall advise the Commission on the appropriate characteristics of the fishing gear, the closure period for sport and recreational fisheries, as well as the minimum size to be implemented for Mediterranean swordfish.*

An updated Mediterranean Swordfish stock assessment has been carried out in 2020 and the new advice is provided in the Executive Summary. Recent studies from 2019 suggest that the adopted minimum size results in a high number of undersized dead discards. The Committee showed concern that such discards are not being fully reported and reiterated that all dead discards should be reported in Task 1 NC for all fisheries.

### **Tropical tunas - Responses to the Commission (14.14-14.22)**

In the context of reviewing fishing capacity, the Committee briefly reviewed Task 1 catch from CPCs for tropical tunas. The 2019 preliminary catch of BET was 74,091 t while that of YFT was 132,158 t, both of which are at a similar level with recent years. The Committee noted, with concern, that BET harvests increased in 2019 compared to 2018 exceeding the TAC (65,000 t) by 14%. YFT catches were slightly lower than 2018 but still exceeded the 2019 TAC (110,000 t) by 20%. These preliminary catches (for BET and YFT) are expected to be revised upwards somewhat once the few missing data are reported and the SCRS estimates *faux poisson* catches for 2019. Detailed catch information can be found in **Addendum 1 to Appendix 8**.

#### **14.14 Discards in purse-seine fisheries - the SCRS shall assess the effectiveness and recommend potential improvements. Rec. 17-01, paragraph 4**

**Background:** In 2020, the SCRS shall assess the effectiveness of this Recommendation and submit recommendations to the Commission regarding potential improvements.

The Committee is unable to provide a response this year.

#### **14.15 Discards in purse-seine fisheries - SCRS shall examine the benefits according to the objectives defined above of retaining non-targeted species catches and present its recommendations. Rec. 17-01, paragraph 5**

**Background:** In 2020, the SCRS shall also undertake work to examine the benefits according to the objectives defined above of retaining non-targeted species catches and present its recommendations to the Commission. The work should take into account all species that are usually discarded on all major gears (i.e., purse-seines, longlines and gillnets), and should look at fisheries that take place both on the high seas and in waters under national jurisdiction and the feasibility of both retaining on-board and processing of the associated landings.

The Committee is unable to provide a full response this year.

Some SCRS scientists are conducting research on discards on tuna fisheries, including purse-seine fisheries, however, the results of that work will not be ready before the end of 2020. Furthermore, although there is currently an obligation of 100% observer's coverage for purse seines such data is not yet available to the Committee. As sufficiently representative data becomes available for the entire Atlantic purse seine fleet the Committee will be able to provide a thorough analysis of discards for such gear. The Committee, however, has already indicated in the past that, in order to provide reliable estimates of discards for the other major gears a minimum 20% observed coverage is recommended. As the current observer coverage for such gears is less than such minimum, the Committee will have reduced ability to put the estimates of by-catch in the context of total discards for all tuna fleets.

#### **14.16 SCRS should provide advice on fishing prohibited with FADs, taking into account monthly trends in free school and FAD-associated catches and the monthly variability in the proportion of juvenile tuna in catches. Rec. 19-02, paragraph 28**

**Background:** Fishing prohibited with FADS from 1 January to 28 February for 2020 and 1 January to 31 March in 2021, throughout the Convention area. This should be reviewed and, if necessary, revised based on advice by the SCRS taking into account monthly trends in free school and FAD-associated catches and the monthly variability in the proportion of juvenile tuna in catches. SCRS should provide this advice to the Commission in 2020.

The Committee determined that it is premature to respond to this Commission request this year. The Committee, however, conducted some work on this topic during 2020, including defining the type of data that will be necessary to develop this advice, reviewing the available data on monthly catches for 2020, analyzing the historical spatiotemporal distribution of juvenile catches and evaluating the efficacy of the FAD seasonal closures in reducing the mortality of juvenile tunas during the closure period.

In order to evaluate the current FAD prohibition and any potential modifications to it, the Committee needs to also take into account the spatial resolution of the available data. The Committee noted such information needs to be aggregated by gear and fishing mode (e.g. FAD, Free Schools) and month. The Committee considered that, at a minimum, a 20-year history of monthly and 1°x1° Lat-Long catches by purse seine fishing mode need to be developed by relevant CPCs for consideration by the Committee in 2021. Such history could then be compared to the monthly catches from 2020, as these become available in 2021.

The ICCAT Secretariat compiled the available data on monthly purse seine catches reported for 2020 for the purposes of compliance with Rec [19-02]. Such data represents partial catches until the end of August 2020 as not all CPCs have provided such data. Furthermore, these catches do not have any information on fishing mode, so they cannot be used for the purposes of evaluating any reduction associated with the prohibition of FADs in paragraph 28 of Rec [19-02].

Additionally, given that one of the objectives of the FAD prohibition is to reduce juvenile mortality, it would also be necessary to aggregate the above data by size so as to allow the catch of juvenile tuna to be identified in the analysis. The Committee, however, is aware that it can be difficult to use historical data to make inferences about the future, because spatio-temporal changes in fisheries operations, and on the fraction of effort allocated to FADs have strong effects on the size and species composition of the catch, and thus on mortality of juvenile tropical tuna. For instance, SCRS/2020/138 examined the spatio-temporal dynamic of the proportion of juvenile yellowfin and juvenile bigeye tunas on catches of the EU-France and Spain purse seine fleet over the last 30 years. Proportions of juveniles are greater in certain seasons and several areas of the eastern Atlantic. High proportions of juveniles are found year-around in the equatorial offshore zone and the Gulf of Guinea. Although this seasonal pattern has been stable since the 1990s, the proportion of juveniles in schools associated with floating objects have tended to increase for both yellowfin and bigeye tunas.

Tagging data from the AOTTP was used to evaluate the efficacy of prior closures in reducing juvenile catches (SCRS/2020/139). This work uses a new method to reduce the estimation bias caused by the uneven distribution of tag tuna releases among areas (outside and inside the closures) and school type (free school, dFAD or anchored FAD associated) achieved during the AOTTP. Such analysis concluded that the closures defined in Rec. 98-01 and Rec. 15-01 were effective at reducing catches of skipjack and yellowfin juveniles during the closure period. The AOTTP data, however, are not appropriate to evaluate the closures defined in Rec. 04-01 and Rec. 11-01, nor were they sufficient to evaluate the efficacy of any closure on bigeye catches. Further work is being conducted to evaluate the efficacy of these closures beyond the closure period.

**14.17 On the impact of support vessels on the catches of juvenile yellowfin and bigeye tuna. Rec. 19-02, paragraph 33**

**Background:** Further analysis shall be conducted by the SCRS on the impact of support vessels on the catches of juvenile yellowfin and bigeye tuna to be considered in 2020.

The Committee cannot provide a detailed response to this request in 2020. The Committee noted that it needs to define the type of information necessary to conduct desired analysis in the future.

The Committee will review the information provided in form ST-07 and provide a response to the Commission in 2021.

The lack of data on the purse seine vessels working with supply vessels (number, characteristics, link between each support vessel and each PS) is problematic for CPUE standardization analyses. The committee requests that these data be collected by CPCs in the future and recovered from historical data to the extent possible.

The Committee noted that in the Indian Ocean there has been various useful analyses about the use of support vessels in surface fleets. The Committee therefore requests that CPCs with activities in other oceans and other t-RFMO help the Committee in reviewing such analyses for the benefit of ICCAT.

**14.18 The Working Group on Integrated Monitoring Measures (IMM WG), in cooperation with the SCRS, shall make a recommendation to the Commission for endorsement at its 2021 Annual meeting on presence of a human observer on board in accordance with Annex 7 and/or an Electronic Monitoring system. Rec. 19-02, paragraph 55**

**Background:** or longline vessels flying their flag 20 meters length overall (LOA) or greater targeting bigeye, yellowfin and/or skipjack in the Convention area, CPCs shall ensure a minimum of 10% observer coverage of fishing effort by 2022, through the presence of a human observer on board in accordance with Annex 7 and/or an Electronic Monitoring system. For this purpose, the Working Group on Integrated Monitoring Measures (IMM WG), in cooperation with the SCRS, shall make a recommendation to the Commission for endorsement at its 2021 Annual meeting on the following:

- a) Minimum standards for an electronic monitoring system such as:
  - i. the minimum specifications of the recording equipment (e.g. resolution, recording time capacity), data storage type, data protection
  - ii. the number of cameras to be installed at which points on board
- b) What shall be recorded
- c) Data analysis standards, e.g., converting video footage into actionable data by the use of artificial intelligence
- d) Data to be analyzed, e.g., species, length, estimated weight, fishing operation details
- e) Reporting format to the Secretariat

*In 2020 CPCs are encouraged to conduct trials on electronic monitoring and report the results back to the IMM and the SCRS in 2021 for their review.*

*CPCs shall report the information collected by the observers or the electronic monitoring system from the previous year by 30 April to the ICCAT Secretariat and to SCRS taking into account CPC confidentiality requirements.*

The Committee notes that electronic monitoring (EM) can be used to complement and increase observer coverage as contemplated by Rec. [16-14] and detailed in SCRS/2020/142. Although observer on board programs and EM monitoring are commonly perceived as a tool for compliance, the Committee recalls the usefulness of EM in stock assessment for more efficient collection of fishing activities (e.g., refinement in the calculation of the fishing effort unit) and collecting catch data not commonly reported in logbooks (e.g., to evaluate discards, catch of non-tunas species, etc.).

EM can be especially beneficial for the longline fleet. There are a number of reasons for this:

- the observer coverage for this fleet, according to Rec [19-02], has to be increased to 10% by 2022,
- the minimum level recommended by the Committee to obtain the required data for scientific purposes should not be less than 20%.
- longline vessels have less room to accommodate observers than larger purse seiners
- the COVID 19 pandemic has put additional stress on the capacity of nations to implement human observer programs

SCRS/2020/142 provides additional guidance on possible objectives, cost and minimum data collection and transmission standards for the implementation of EM programs on longline vessels.

The Committee was informed that EM has already been initiated for several years in different Atlantic fisheries of some CPCs<sup>2</sup>. Additionally, EM has been implemented on board some individual baitboat vessels and longliners as an initiative of vessel owners in the Atlantic and other RFMOs convention areas. The Committee recognized the benefits of these EM experiences and will use them to define minimum standards for EM in ICCAT fleets.

<sup>2</sup> Reviewed in <https://www.ceaconulting.com/wp-content/uploads/CEA.Roadmap-EM-Report-4.23.20.pdf>

The Committee will work with the Secretariat and the IMM working group in 2021 to provide input to the Commission in regard to items a) to e) above.

**14.19 The SCRS shall refine the MSE process in line with the SCRS roadmap and continue testing the candidate management procedures. Rec. 19-02, paragraph 62**

**Background:** *The SCRS shall refine the MSE process in line with the SCRS roadmap and continue testing the candidate management procedures. On this basis, the Commission shall review the candidate management procedures, including pre-agreed management actions to be taken under various stock conditions. These shall take into account the differential impacts of fishing operations (e.g. purse seine, longline and baitboat) on juvenile mortality and the yield at MSY.*

The Committee completed a preliminary phase of the tropical tuna MSE and a work plan in 2019. In 2019, the Commission allocated 50,000 euros, for continuing the MSE work in 2020. The TORs will be developed for an MSE contract to use these resources during the later part of 2020 and early 2021. This contract will focus on identifying the major sources of uncertainty to be considered in the MSE.

The Committee continues to aim at developing a multispecies MSE for the bigeye, yellowfin and eastern skipjack tuna stocks, and to do so for example with the FLBEIA platform which has been used to date for the tropical tuna MSE. This platform can accommodate several stocks. Nevertheless, the Committee intends to continue progressing the MSE for each individual stock, and only at later stages, to integrate the single stock models into a multispecies MSE. This will potentially allow the Committee to provide some MSE initial outputs to the Commission related to the stocks most in need of effective management (bigeye and yellowfin).

Although initial work on tropical tuna MSE did not include the western stock of skipjack, the Committee made progress in 2020 by conducting an independent MSE initiative for this stock (SCRS/2020/140) using the MSEtool R package. The stock is defined for the purpose of this MSE initiative using catches from the Brazilian baitboat and handline fleets in the southwest Atlantic Ocean. This work explicitly assumes that this stock can be managed separately from the rest of the tropical tunas stocks because the majority of the catch of western skipjack is made by a fleet that catches relatively few bigeye and yellowfin tuna. Catches, CPUE, and length compositions are used to condition the operating model (OM). The output of a Stock Reduction Analysis (SRA) model fitted to catch, CPUE, and length composition data up to 2018 was used to setup and condition OMs. Starting from a base OM, additional OMs were generated to incorporate uncertainty in natural mortality, growth, maturity, selectivity, and steepness to create a reference set of OMs. A suite of example management procedures (MPs), including fixed TACs, index-slope MPs, and harvest control rules (HCRs), was tested in closed-loop simulation. Future work will include additional OM scenarios and consultation with managers and stakeholders, to identify candidate management procedures and performance metrics for adopting a management procedure.

A number of challenges are facing the Committee that forced it to review the MSE roadmap for tropical tunas:

- Revision to the calendar of stock assessments for tropical tuna, which include postponing the Atlantic skipjack assessment until 2022 and conducting a bigeye assessment in 2021, as requested by the Commission.
- The limited technical capacity within the committee to engage in MSE development during the year when assessments are conducted
- The relative lower priority placed by the Commission on progress on the tropical tuna MSE
- The ongoing challenges of working during the COVID-19 pandemic.

Given these challenges, in 2021, the Committee will:

1. Continue progressing the MSE for the western stock of skipjack;
2. Identify the major sources of uncertainty to be considered for the Multispecies MSE;
3. Request an agenda item on MSE to be included in the next Panel 1 meeting of the Commission to continue to highlight to the Commission of the need to have a funding plan to support the continued development of the tropical tuna MSE.
4. Delay progress on the conditioning of the Operating model for eastern skipjack until the assessment of this stock is completed in 2022.

**14.20 The SCRS shall explore the efficacy that full fishery closures along the lines of those proposed in PA1\_505A/2019. Rec.19-02, paragraph 66a**

**Background:** *The SCRS shall explore the efficacy that full fishery closures along the lines of those proposed in PA1\_505A/2019 might have to reduce the catches of tropical tunas to the agreed levels; and the potential of such scheme to reduce the catches of juvenile bigeye and yellowfin tunas, in line with recommendations from the SCRS.*

The Committee has continued to review progress on the decision support tool to evaluate the efficacy of full fishery closures (SCRS/2020/118).

A subset of the Committee has already reviewed this tool and it is now ready for consideration by the wider membership of the Committee. The Committee notes that the tool is multi-species, intended to replace tropical tuna single stock-TACs by full closures, set to achieve the highest potential reduction in the catches of immature tropical tunas. It also recognises the potential value that the tool could have in assessing how fishery closures can contribute to potential reductions in the catches of other species, such as Endangered, Threatened and Protected species. The tool also makes some explicit assumptions about how full closures result in reductions in catch on the basis of historical data. The Committee notes that historical data may not always be indicative of how such reductions would occur in the future, especially if fleets can adjust fishing capacity and operation efficiency in response to effort limitations, for example by changing the timing of maintenance. For this reason, the Committee agrees that the tool should work in combination with other measures intended to limit increases in fishing efficiency, active FADs, and tools to evaluate future levels of capacity in the ICCAT area. The Committee also noted that IATTC has been using fishery closures to manage tropical tuna stocks for a long time and agreed that its experience provides useful information about how closures could be made operational in the ICCAT area.

Acknowledging the points referred above for the tool, the Committee supported the proposal of the developers of the tool to implement an online platform by the first trimester of 2021 to facilitate a broader and more thorough review. The MS Teams Platform may be a good candidate for this and could allow all Committee scientists to have access to the platform and review the tool. MS teams could also be used as a repository of tool materials and the deliberations of scientists reviewing the tool. The Committee would then aim to complete the review and prepare a response to the Commission to be provided to the Commission prior to its annual 2021 meeting. More details on the possible structure of such response are provided in SCRS/2020/118.

**14.21 SCRS and the Secretariat shall prepare an estimate of capacity in the Convention area, to include at least all the fishing units that are large-scale or operate outside the EEZ of the CPC they are registered in. Rec. 19-02, paragraph 66b**

**Background:** *The ICCAT Secretariat shall work with the SCRS in preparing an estimate of capacity in the Convention area, to include at least all the fishing units that are large-scale or operate outside the EEZ of the CPC they are registered in. All CPCs shall cooperate with this work, providing estimates of the number of fishing units fishing for tuna and tuna-like species under their flag, and the species or species groups each fishing unit targets (e.g. tropical tunas, temperate tunas, swordfish, other billfish, small tunas, sharks, etc.); this work shall be presented to the next meeting of the SCRS in 2020 and forwarded to the Commission for consideration.*

The Committee can only presently report on capacity estimates of large-scale purse-seine vessels (defined as vessels with  $\geq 335$  m<sup>3</sup> of Fish Hold-Volume). The Committee intends to evaluate the capacity and number of other fleet components (e.g. support vessels, baitboat, longliners) in the future.

In 2020, the Committee considered three documents that included capacity estimates for large-scale purse seine fisheries. Documents SCRS/2020/137 and SCRS/2020/136 described the statistics of the French and Spanish purse seine fleets targeting tropical tunas in the Atlantic Ocean. SCRS/2020/123 included estimates of the current fishing capacity of all large-scale purse seiners targeting tropical tunas in the Atlantic, using a combination of data sources including the ICCAT authorized vessel records, ISSF records on purse seiners, AIS data and direct enquiries with some vessel owners. The Committee estimates that at least 68 - and possibly 72 - large-scale purse seiners were operating in the Convention area as of the first half of 2020. The combined Fish Hold Volume (FHV) of the 72 vessels was 106,652 m<sup>3</sup>, which is equivalent to about 83,069 t of fish carrying capacity (**Table 1** below). Given that large-scale purse seiners may make 5-8 trips

a year, this suggests that the current capacity is higher than necessary to meet current catch recommendations. This capacity estimate is also larger than the prior estimate of capacity made by the Committee in 2019 (58 vessels). The Committee notes that these estimates are intended to measure active capacity not potential capacity. As of June 2020, there were 107 large-scale purse seiners authorized to fish for tropical tunas in the ICCAT Convention area, these vessels should be considered the potential capacity.

The Committee wants to highlight to the Commission that there is a need to agree on a set of indicators of capacity which are useful to both the Commission and the Committee. The Committee favours indicators based on fish-hold volume metrics to minimize the influence of different crew operations. In developing indicators of active capacity it will also be necessary to consider the effects of spatial-temporal changes in fishing activity due to fishing access agreements between ICCAT CPCs and ICCAT Recommendations as both can influence and constraint fishing activity. Additionally, movement of fishing vessels from one Convention area to another complicates regional and global estimates of active fishing capacity. It would therefore be useful if tRFMOs joined forces towards the common challenge of managing global fishing capacity.

**Table 1.** Estimated number of large-scale purse seiners operating in the Atlantic Ocean from 2014 to 2018 (left; **Table 2** of the 2019 SKJ Executive Summary, 2019 SCRS report) and minimum and maximum numbers estimated for 2020 (right; SCRS/2020/123).

Flag *	2014	2015	2016	2017	2018	2020 **	
						min	max
Neth. Antilles	2	-	-	-	-	-	-
Belize	3	2	2	3	2	8	8
Brazil	-	-	-	-	-	0	1
Cape Verde	3	4	2	1	1	1	1
Curaçao	-	4	5	5	5	4	4
Cote d' Ivoire	1	0	0	0	0	0	0
El Salvador	0	2	4	4	4	4	4
Maroc	-	-	-	-	-	1	1
EU-Spain	15	12	10	10	10	10	10
EU-France	9	9	11	10	10	9	9
Ghana	12	12	13	13	15	16	16
Guatemala	2	2	2	2	2	2	2
Liberia	-	-	-	-	-	2	2
Panama	2	3	2	2	2	3	6
Senegal	0	3	4	5	7	7	7
Venezuela	-	-	-	-	-	1	1
<b>Total</b>	<b>49</b>	<b>53</b>	<b>55</b>	<b>55</b>	<b>58</b>	<b>68</b>	<b>72</b>

\*Information were estimated during the 2019 species group meeting. The group encourage the CPCs to submit these data in the form ST01FC (2019, SCRS Report page 69)

\*\* SCRS/2020/123

**14.22 SCRS and the Secretariat shall prepare a TOR. to carry out an evaluation of the monitoring, control and surveillance mechanisms in place in ICCAT CPCs. Rec.19-02, paragraph 66c**

**Background:** The ICCAT Secretariat shall identify a Consultant to carry out an evaluation of the monitoring, control and surveillance mechanisms in place in ICCAT CPCs. This work shall primarily focus on the evaluation of data collection and processing systems in each CPC, and the ability to produce estimates of catch and effort, and length frequency for all stocks under ICCAT management, with a focus on stocks for which input and/or output measures are in place; in preparing this work the Consultant shall evaluate how efficient the catch monitoring systems that each CPC has implemented are to achieve robust estimates of catches for the stocks subject to a TAC; the ICCAT Secretariat shall work with SCRS scientists to prepare a TOR for this work as soon as possible.

The Secretariat, in collaboration with the Committee, will prepare the draft TORs.

**15. Other matters**

**15.1 Data policy: dissemination, requests and procedures**

ICCAT has established Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled by the Secretariat. Recently there have been a number of requests to access data collected by entities contracted under ICCAT research and data collection programmes for which the rules and guidelines are unclear. During the process and Protocol meeting the Secretariat has presented a “*Proposal for Amendment of the Rules and Procedures for the protection, access to, and dissemination of data compiled by ICCAT*”, which is contained in Appendix 11 to the Report for Biennial Period 2018-2019, Part II (2019), Vol. 2), aiming to clarify these requests and the related procedures.

During the 2020 SCRS Process and Protocol meeting it was agreed that the document would be circulated to the conveners and rapporteurs of the Sub-Committee and Species Groups and that a new draft incorporating all their inputs should be presented to the 2020 Meeting of the Sub-committee on Statistics for review and adoption by the SCRS at the 2020 plenary meeting.

The Sub-Committee on Statistics reviewed the proposed amendments, made a few minor editorial changes and endorsed the proposal for approval by the Committee. The changes are identified by underlined text in the document that was adopted by the Committee and is attached as **Appendix 11**.

**15.2 Election of the SCRS Chair**

Due to the current circumstances related to the COVID-19 pandemic that precluded the SCRS plenary from taking place in 2020, it is proposed, if there is no objection, that the current SCRS Chair and Vice-chair roll-over their mandate for one more year (until the end of 2021). Since both the SCRS Chair and Vice-chair have informed that they are not available for a second two-year mandate, the election of the next SCRS Chair will take place during the SCRS annual meeting in October 2021. In the event that the current pandemic precludes an in-person SCRS plenary meeting in 2021, a process shall be set for the election of the new SCRS Chair (and nomination of a Vice-chair if that be the case) throughout the 2nd semester of 2021.

**16. Adoption of advice**

The 2020 SCRS advice to the Commission was adopted by correspondence.

**References (contained in the Executive Summaries)**

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Anonymous. 2020b. Report of the 2020 ICCAT Mediterranean swordfish stock assessment meeting (online, 25 May - 2 June 2020). SCRS/2020/007: 90p.

Anonymous. 2020c. Report of the 2020 ICCAT Porbeagle stock assessment meeting (online, 15-22 June 2020). SCRS/2020/008: 40p.

## APPENDICES

## Appendix 1

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## List of SCRS documents and presentations

Reference	Title	Authors
SCRS/2020/001	Report of the Intersessional Meeting of the Bluefin MSE Technical Group	Anonymous
SCRS/2020/002	Report of the Intersessional Meeting of the Bluefin tuna Species Group	Anonymous
SCRS/2020/003	Report of the Swordfish Species Group intersessional meeting	Anonymous
SCRS/2020/004	Report of the Second Intersessional Meeting of the Bluefin Species Group	Anonymous
SCRS/2020/005	Report of the Sub-Committee on Ecosystems intersessional meeting	Anonymous
SCRS/2020/006	Report of the Working Group on Stock Assessment Methods	Anonymous
SCRS/2020/007	Report of the Mediterranean Swordfish Stock Assessment Meeting	Anonymous
SCRS/2020/008	Report of the Porbeagle stock assessment meeting	Anonymous
SCRS/2020/009	Report of the Atlantic Albacore stock assessment meeting	Anonymous
SCRS/2020/010	Report of the Third Intersessional Meeting of the Bluefin tuna Species Group	Anonymous
SCRS/2020/012	Report of the SCRS Process and Protocol meeting	Anonymous
SCRS/2020/013	Report of the Sub-Committee on Statistics meeting	Anonymous
SCRS/2020/015	Scientific reflections from Norway related to the MSE process on Atlantic bluefin tuna	Nøttestad L., Mjørlund R., and Sandberg P.
SCRS/2020/016	Addition of swordfish distribution model to longline simulator study	Forrestal F., and Schirripa M.
SCRS/2020/017	Fishing capacity on Atlantic bluefin tuna by purse seine vessels fishing in the Norwegian EEZ from 2014 to 2019	Nøttestad L., Boge E., and Mjørlund R.B.
SCRS/2020/018	Reference set Operating Models (version 6.5) for Atlantic bluefin tuna assuming priors for area-specific scale and western stock mixing	T. Carruthers
SCRS/2020/019	Review and preliminary analysis of size samples of Mediterranean swordfish ( <i>Xiphias gladius</i> )	Ortiz M., and Palma C.
SCRS/2020/020	Historical recovery of Italian swordfish Task 2 data between 1972 and 1989 in the Mediterranean Sea (Tyrrhenian/Ionian seas, and Strait of Messina)	Celona A., Palma C., Santos M.N., and Ortiz M.
SCRS/2020/021	Updated standardized swordfish catch rates from the Greek surface longline fisheries operating in the E. Mediterranean	Tserpes G., and Peristeraki P.
SCRS/2020/022	Swordfish ( <i>Xiphias gladius</i> ) fishery statistics collected from artisanal fisheries in Côte d'Ivoire, from 1984 to 2018: a review	Bahou L., Amandé A.J., Konan K.J., and Diaha N'G.C.
SCRS/2020/023	Brief update on the satellite tagging of Atlantic swordfish	Rosa D., Santos C.C., Macias D., Ortiz de Urbina J., Forselledo R., Miller P., Domingo A., and Coelho R.

Reference	Title	Authors
SCRS/2020/024	Progress of the age and growth component of the swordfish biology project	Rosa D., Gillespie K., Garibaldi F., Cardoso L.G., Schirripa M., Bezerra N.A., Campello T., Travassos P., Hazin F., Hanke A., and Coelho R.
SCRS/2020/025	Draft final report for phase two of the ICCAT short-term contract: swordfish biological samples collection for growth, reproduction and genetics studies	Gillespie K., and Hanke A.
SCRS/2020/026	Updated catch rates of swordfish ( <i>Xiphias gladius</i> ) caught by Moroccan longline fleet in the Mediterranean Sea, 2012-2019	Abid N., and Idrissi M.M.
SCRS/2020/027	An update of the swordfish fishery in the Ligurian Sea (western Mediterranean) with a preliminary attempt to standardize the mesopelagic longline CPUEs	Garibaldi F., and Tserpes G.
SCRS/2020/028	Estimation of undersize Mediterranean swordfish ( <i>Xiphias gladius</i> ) catches by the main longline fleets between 2008 – 2018	Ortiz M.
SCRS/2020/029	An evaluation of data poor approaches for the evaluation of stock status in large ecosystems using only landings data	Kell L., Sharma R., and Winker H.
SCRS/2020/030	Evaluation of data poor approaches for evaluating stock status and trends: self testing using biomass based assessment models	Kell L., and Sharma R.
SCRS/2020/031	Lack of genetic differentiation in the east Atlantic distribution of wahoo	Ollé J., Pascual-Alayón P.J., Angueko D., Sow F.N., Diaha C. N'G., Lucena-Frédou F., and Viñas J.
SCRS/2020/032	Population genetic of Atlantic bonito in the north east Atlantic and Mediterranean	Viñas J., Ollé J., Hajje G., Macias D., Saber S., Lino P.G., Muñoz-Lechuga R., Baibbat S.A., Habibe B.M., Sow F.N., Diaha C. N'G., and Lucena-Frédou F.
SCRS/2020/033	Deep genetic differentiation in the little tunny from the Mediterranean and east Atlantic	Ollé J., Hajje G., Macias D., Saber S., Lino P.G., Muñoz-Lechuga R., Pascual-Alayón P.J., Angueko D., Sow F.N., Diaha C. N'G., Lucena-Frédou F., and Viñas J.
SCRS/2020/034	Evaluation of data poor approaches for evaluating stock status and trends: cross testing using integrated assessment models	Kell L.T., Sharma R., and Winker H.
SCRS/2020/035	Updated indicators for ICCAT species that are retained and assessed	Hanke A.R.
SCRS/2020/036	A review of incidental cetacean bycatch reporting in EU waters	Hanke A.R., Kell LT., and Fortuna C.M.
SCRS/2020/037	Screening and validation of length-based indicators	Kell L.R., Luckhurst B., Kimoto A., and Minto C.
SCRS/2020/038	Final report of the Short-term contract for ICCAT SMTYP for the biological samples collection for growth, maturity and genetics studies – year #2	Viñas J.
SCRS/2020/039	The effect of circle hooks vs J hooks on the at-haulback survival in the U.S. Atlantic pelagic longline fleet	Diaz G.

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SCRS/2020/040	Trabajo colaborativo para evaluar la captura incidental de tortugas marinas en las flotas de palangre pelágico y cerco (Océanos Atlántico e Índico y Mar Mediterráneo). Taller II, Málaga – España, 27-31 de enero de 2020	Anonymous
SCRS/2020/041	Non-stationarity in productivity of tropical tuna and the implications for ecosystem based fisheries management	Kell L.T., Sharma R., Winker H., Kitakado T., and Mosqueira I.
SCRS/2020/042	Report of the ICCAT Workshop on reproductive and other life history aspects of the Porbeagle and other pelagic sharks in the Atlantic Ocean	Anonymous
SCRS/2020/043	Standardized Catch Rates for Mediterranean Swordfish ( <i>Xiphias gladius</i> Linnaeus, 1758) from the Spanish Longline Fishery: 1988-2018	Saber S., Macías D., García S., Riojax P., Gomez-Vives M.J., Godoy D., Meléndes M.J., Puerto M.A., and Ortiz de Urbina J.
SCRS/2020/044	Environmental variability in three major Mediterranean tuna spawning grounds: updating SST indicators for the Ecosystem Report Card	Alvarez-Berastegui D.
SCRS/2020/045	The development of the seabird component of the ICCAT Ecosystem Report Card	Wolfaardt A., Bogle C., Debski I., Jiménez S., Misiak W., Prince S., Pon J.S., and Small C.
SCRS/2020/046	Reconstructing longline effort time series using reported coverage ratios	Taylor N.G., Palma C., Ortiz M., Kimoto A., and Beare D.
SCRS/2020/047	Validation of productivity analysis for data limited stocks	Laurence T. Kell, Nathan G. Taylor, and Palma C.
SCRS/2020/048	Suggestions for a feasible and simple ecosystem indicator of sea turtles and available data	Ochi D., Ueno S., Okamoto K., and Tsuji S.
SCRS/2020/049	Toward establishing ICCAT specific ecosystem based approach to fisheries management	Tsuji S.
SCRS/2020/050	Progress report of development of ecocard indicator for seabird bycatch	Ecosystem Report Card Seabird WG
SCRS/2020/051	Proposal to develop an ICCAT seabird work plan	Wolfaardt A., and Prince S.
SCRS/2020/052	Progress on a meta-analysis for comparing hook, bait and leader effects on target, bycatch and vulnerable fauna interactions	Santos C.C., Rosa D., and Coelho R.
SCRS/2020/053	Improving Mobulid release methods and survival estimates in purse seiners in the Atlantic Ocean	Murua J., Grande M., Ferarios J.M.1, Lezama-Ochoa N., Martinez U., Onandia I., and Santiago J.
SCRS/2020/054	In support of the ICCAT ecosystem report card: advances in monitoring the impacts on and the state of the “foodweb and trophic relationships” ecosystem component	Andonegi E., Juan-Jordá M.J., Murua H., Ruiz J., Ramos M.L., Sabarros P.S., Abascal F., Bach P., and MacKenzie B.
SCRS/2020/055	In support of the ICCAT ecosystem report card: indicators for marine debris	Zudaire I., Grande M., Murua H., Ruiz I., Basurko O.C., Murua J., Justel-Rubio A., Santiago J., Andonegi E., and Juan-Jordá M.J.
SCRS/2020/056	Review on the effect of hook type on the catchability, hooking location, and post-capture mortality of the shortfin mako, <i>Isurus oxyrinchus</i>	Keller B., Swimmer Y., and Brown C.

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SCRS/2020/057	Additions to the Italian annotated bibliography on bluefin tuna ( <i>Thunnus thynnus</i> , Linnaeus, 1758) and comprehensive overview	Di Natale A.
SCRS/2020/058	Additions to the Italian annotated bibliography on swordfish ( <i>Xiphias gladius</i> , Linnaeus, 1758) and comprehensive overview	Di Natale A.
SCRS/2020/059	Additions to the Italian annotated bibliography on albacore ( <i>Thunnus alalunga</i> , Bonnaterre, 1788) and comprehensive overview	Di Natale A.
SCRS/2020/060	Additions to the Italian annotated bibliography on Mediterranean spearfish ( <i>Tetrapturus belone</i> , Rafinesque, 1810), on other billfish and spearfish species, including a comprehensive overview	Di Natale A.
SCRS/2020/061	The Italian annotated bibliography on small tunas and comprehensive overview	Piccinetti C., Addis P., Di Natale A., Garibaldi F., and Tinti F.
SCRS/2020/062	Fisheries of narrow-barred Spanish mackerel ( <i>Scoberomorus commerson</i> Lacepède, 1800) in the southern and eastern Mediterranean and relevance of the species for ICCAT	Di Natale A., Bariche M., Lahoud I., and El Aweet A.E.A.
SCRS/2020/063	An update and review of the Southern Saint Lawrence acoustic index of Atlantic bluefin tuna abundance (2017-2018)	Minch T.
SCRS/2020/064	Technological and gear changes affecting the capture of billfish 1973-2019	Gibbs B.R., Schirripa M., and Chaibongsai P.
SCRS/2020/065	A method of estimating unreported landings of white marlin ( <i>Kajikia albida</i> ) in the Atlantic Ocean	Schirripa M.
SCRS/2020/066	Report of the workshop III on collaborative work to assess seabird bycatch in pelagic longline fleets (south Atlantic and Indian Oceans)	Anonymous
SCRS/2020/067	Bluefin tuna larval indices in the western Mediterranean, ecological and analytical sources of uncertainty	Alvarez-Berastegui, D., Tugores, M.P., Ottmann, D., Martín-Quetglas, M., and Reglero, P.
SCRS/2020/068	Calibration of the Fish Ageing Services readings, carried out in GBYP Phase 7, to estimate age of bluefin tuna from the eastern Atlantic stock	Rodriguez-Marin E., Addis P., Allman R., Bellodi A., Busawon D., Garibaldi F., Luque P.L., and Quelle P.
SCRS/2020/069	Data and model set-up for the 2020 update stock assessment of the Eastern and Mediterranean Atlantic bluefin tuna stock	Rouyer T., Kimoto A., Zarrad R., Ortiz M., Palma C., Mayor C., Lauretta M., Gordo A., and Walter J.
SCRS/2020/070	Western Atlantic bluefin tuna Virtual Population Analysis updated data inputs and model specifications	Lauretta M., Kimoto A., Hanke A., Rouyer T., Ortiz M., Palma C., Mayor C., and Walter J.
SCRS/2020/071	Incorporating the Atlantic multidecadal oscillation into the Western Atlantic bluefin tuna stock assessment	Hansell A.C., Walter J., Cadrin S.X., Golet W., Hanke A., Lauretta M., and Kerr L.
SCRS/2020/072	Western Atlantic bluefin tuna stock assessment 1950-2018 using Stock Synthesis: PART I. model specification and data	Tsukahara Y., Walter J., Kimoto A., and Ortiz M.

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SCRS/2020/073	distribución de tallas de <i>Lamna nasus</i> en la pesquería española de palangre dirigida al pez espada	Mejuto J., Ramos-Cartelle A., García-Cortés B., and Fernández-Costa J.
SCRS/2020/074	A clarification about stage 2 maturity in female swordfish ( <i>Xiphias gladius</i> , Linnaeus, 1758)	Di Natale A., Garibaldi F., and Corriero A.
SCRS/2020/075	Can the wide range of resource behaviours evident across the ABFT MSE interim grid of OMs be “tamed” by the feedback control provided by a CMP?	Butterworth D.S., and Rademeyer R.A.
SCRS/2020/076	Estimation of catch at size and catch at age for the Mediterranean swordfish ( <i>Xiphias gladius</i> ) assessment 2020	Ortiz M., and Palma C.
SCRS/2020/077	Assessment of the Mediterranean swordfish stock by means of extended survivor analysis (XSA)	Tserpes G., and Mantopoulou-Palouka D.
SCRS/2020/078	Assessment of the Mediterranean swordfish stock by means of assessment for all initiative (a4a)	Mantopoulou-Palouka D., and Tserpes G.
SCRS/2020/079	What do current results using the package indicate regarding which uncertainty axes “matter” regarding CMP performance, and what are the next steps needed in the ABFT MSE process	Butterworth D.S., and Rademeyer R.A.
SCRS/2020/080	Standardized catch rates of albacore ( <i>Thunnus alalunga</i> Bonnaterre, 1788) in the Spanish recreational fishery in the western Mediterranean in the period 2005-2018	Saber S., Macías D., García S., Meléndez M.J., Gómez-Vives M.J., Rioja P., Godoy D., Puerto M.A., and Ortiz de Urbina J.
SCRS/2020/081	Standardized catch rates of albacore ( <i>Thunnus alalunga</i> Bonnaterre, 1788) in the Spanish surface longline fishery in the western Mediterranean in the period 2009-2017	García S., Saber S., Macías D., Gómez-Vives M.J., Rioja P., and Ortiz de Urbina J.
SCRS/2020/082	Developing of Bayesian state-space surplus production models JABBA for assessing Mediterranean swordfish ( <i>Xiphias gladius</i> ) stock	Winker H., Kimoto A., Mourato B.L., Tserpses G., and Ortiz M.
SCRS/2020/083	Albacore ( <i>Thunnus alalunga</i> ) Catch-per-unit-effort standardization: An update based on Brazilian longline fishery fleet data (1998-2018)	Sant'Ana R., Mourato B., Hazin F., and Travassos P.
SCRS/2020/084	Indicator analysis of porbeagle in the northwest Atlantic Ocean based on Japanese longline observer data	Semba Y., and Kai M.
SCRS/2020/085	Standardization of the catch per unit effort of albacore ( <i>Thunnus alalunga</i> ) for the South African tuna pole-line (baitboat) fleet for the time series 2003-2018	Parker D., Winker H., and Kerwath S.E.
SCRS/2020/086	Standardized indices of albacore, <i>Thunnus alalunga</i> , from the United States pelagic longline fishery	Lauretta M.
SCRS/2020/089	Updated standardized catch rates for northern albacore ( <i>Thunnus alalunga</i> ) from the Venezuelan pelagic longline fishery off the Caribbean Sea and adjacent areas of the Western Central Atlantic	Arocha F., Ortiz M., and Marcano J.H.

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SCRS/2020/090	Estimates of vital rates and population dynamics parameters of interest for porbeagle shark in the western north Atlantic and south Atlantic oceans	Cortes E., and Semba Y.
SCRS/2020/091	Review of operation and albacore catch by Japanese Longline Fishery including recent status in the Atlantic	Matsumoto T.
SCRS/2020/092	Standardization of CPUE for North Atlantic Albacore by the Japanese Longline Fishery from 1959 to 2018	Matsubara N., Aoki Y., Kiyofuji H., and Matsumoto T.
SCRS/2020/093	Updating of standardized CPUE for South Atlantic Albacore by the Japanese Longline Fishery	Matsumoto T., and Matsubara N.
SCRS/2020/094	Standardization of albacore CPUE for South Atlantic core area by the Japanese Longline Fishery	Matsumoto T.
SCRS/2020/095	Stock assessment for South Atlantic albacore using a non-equilibrium production model	Matsumoto T.
SCRS/2020/096	An incidental catch model for porbeagle assessment and status evaluation	Bowlby H.D., and Cortés E.
SCRS/2020/097	Size distribution of porbeagle shark in the north and south Atlantic using data from observer programs	Santos C.C., Forselledo R., Mas F., Cortés E., Carlson J., Bowlby H., Semba Y., Kerwath S., da Silva C., Parker D., Jagger C., Rosa D., Domingo A., and Coelho R.
SCRS/2020/098	Standardized catch per unit of effort of albacore ( <i>Thunnus alalunga</i> ) from the Spanish bait boat fleet in North East Atlantic from 1981 to 2018	Ortiz de Zárate V., and Ortiz M.
SCRS/2020/099	Preliminary sustainability assessment for fishing effects (SAFE) of pelagic longline fisheries on porbeagle sharks and identification of f-based biological reference points	Cortés E., Bowlby H., Carlson J., Coelho R., Domingo A., Forselledo R., Jagger C., Mas F., Parker D., Santos C., Semba Y., Taylor N., and Zhang X.
SCRS/2020/100	Quantifying horizontal overlap between longline fleets and porbeagle distribution for ecological risk assessment	Bowlby H.D., Taylor N., and Carlson J.
SCRS/2020/101	CPUE standardization of albacore tuna ( <i>Thunnus alalunga</i> ) for the Chinese Taipei longline fishery in the South Atlantic Ocean.	Su N.J., Cheng C.Y., and Lin W. R.
SCRS/2020/102	CPUE standardization of albacore tuna ( <i>Thunnus alalunga</i> ) for the Taiwanese longline fishery in the North Atlantic Ocean.	Su N.J., and Liu K. M.
SCRS/2020/103	Assessment of North Atlantic Albacore ( <i>Thunnus alalunga</i> ) using a biomass dynamic model	Merino. G., Arrizabalaga H., and Santiago J.
SCRS/2020/104	Preliminary stock assessment of South Atlantic albacore tuna ( <i>Thunnus alalunga</i> ) using the Bayesian state-space surplus production model JABBA.	Winker H., Mourato B., Parker D., Sant'Ana R., Kimoto A., and Ortiz M.
SCRS/2020/105	Estimates of mortality rates from mean length in the fully selected size range for porbeagle	Babcock B.

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SCRS/2020/106	Assessing the applicability of environmental indicators for improving the fisheries assessment of the albacore ( <i>Thunnus alalunga</i> ) under the A4A approach	Alvarez-Berastegui D., Ortiz de Urbina J., Saber S., and Tugores M.P.
SCRS/2020/107	Length composition of albacore tuna collected from the Taiwanese longline fishery in the North Atlantic Ocean.	Su N.J., Liu K.M, and Lin W.R
SCRS/2020/108	Mean sizes and catch-at-size patterns of albacore tuna based on size samples collected from the Taiwanese tuna longline fishery in the South Atlantic Ocean	Su N.J., Lin W.R., Sung Y.F, and Cheng C.Y.
SCRS/2020/109	North Atlantic albacore tuna reproductive biology study: Final Report	Arocha F.
SCRS/2020/110	How fishing strategies and regulations can bias our perception of catch rates and fishing capacities. A discussion paper for bluefin tuna.	Di Natale A.
SCRS/2020/111	VPA models for the 2020 stock assessment update for the eastern and Mediterranean Atlantic bluefin tuna stock.	Rouyer T., Kimoto A., Zarrad R., Ortiz M., Palma C., Mayor C., Lauretta M., Gordo A., and Walter J.
SCRS/2020/112	Projections for the 2020 stock assessment update for the eastern and Mediterranean Atlantic bluefin tuna stock	Rouyer T., Kimoto A., Zarrad R., Ortiz M., Palma C., Mayor C., Lauretta M., Gordo A., and Walter J.
SCRS/2020/113	The Italian annotated bibliography on tropical tuna species	Di Natale A.
SCRS/2020/114	Report of the Swordfish MSE Technical group meeting	Anonymous
SCRS/2020/115	Report of the 2020 ICCAT workshop on small tunas biology studies for growth and reproduction	Saber S., Muñoz-Lechuga R., Macias D., Ortiz de Urbina J., Lino P.G., N'Guessan Diaha C., Medina A., Quelle P., Pascual P., Silva G., Viñas J., Lucena-Frédou F.
SCRS/2020/116	Atlantic Ocean tropical tuna tagging programme (AOTTP) in 2020 – update of progress towards targets	Beare D., Ailloud L., Garcia J., Pastor R., and Kebe S.
SCRS/2020/117	A GLM approach for determining the influence of operating model features on management procedure performance	Hanke A.R., Arrizabalaga H., Andonegi E., and Duprey N.
SCRS/2020/118	Progress report of the group evaluating the Decision Support Tool Presented in Sharma & Herrera (2019) and proposal for further review and discussion by the SCRS	Herrera M., et al.
SCRS/2020/119	Western Atlantic bluefin tuna virtual population analysis base model diagnostics and results	Lauretta M., Kimoto A., Hanke A., Rouyer T., Ortiz M., Palma C., Mayor C., and Walter J.
SCRS/2020/120	Western Atlantic bluefin tuna virtual population analysis stock projections	Lauretta M., Kimoto A., Hanke A., Rouyer T., Ortiz M., and Walter J.
SCRS/2020/121	Western Atlantic bluefin tuna stock assessment 1950-2018 using Stock Synthesis: part II. model diagnostics and results	Tsukahara Y., Walter J., Gillespie K., Kimoto A., and Ortiz M.
SCRS/2020/122	Western Atlantic bluefin tuna stock assessment 1950-2018 using Stock	Tsukahara Y., Walter J., Kimoto A., and Ortiz M.

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	Synthesis: part III projection and fishery status	
SCRS/2020/123	Estimating the capacity of large scale purse seiners fishing for tropical tunas in the Atlantic ocean	Restrepo V., Murua H., and Justel-Rubio A.
SCRS/2020/124	ICCAT Atlantic-Wide Research Programme for Bluefin tuna (GBYP) Activity report for Phase 9 and the first part of Phase 10 (2019-2020)	Aleman F., Tensek S., Pagá García A.
SCRS/2020/125	An update of the 2017 ASAP runs for Atlantic Bluefin tuna	Maguire J.-J., and Cadrin S.X.
SCRS/2020/126	PART 1: Investigation of the impact of spatial distribution of mean available biomass on Operating Model projection outcomes	Carruthers T., Butterworth D., and Rademeyer R.
SCRS/2020/127	Atlantic bluefin tuna constant harvest rate and index-based Candidate Management Procedures; tuning to ABT_MSE package 6.6.14	Lauretta M., and Walter J.
SCRS/2020/128	Recent trends in Eastern and Western Bluefin tuna indices	Walter J., and Gordo A.
SCRS/2020/129	The BFT Farm Growth Sub-Group status of activities	Anon
SCRS/2020/130	Revised time series of U.S. recreational landings 2010-2013	Cass-Calay S.L., and Diaz G.A.
SCRS/2020/131	Report of the international workshop on the ageing of yellowfin and bigeye tuna	Allman R., L. Ailloud, R. Austin, Falterman B., Farley J., Krusic-Golub K., Lang E., Pacicco A., and K. Satoh A.
SCRS/2020/132	Genetic population structure of Atlantic Ocean shortfin mako by using mitogenomics and nuclear-genome-wide single-nucleotide polymorphism genotyping	Nohara K., Takeshima H., Noda S., Yanada R., Coelho R., Santos MN., Cortés E., Domingo A., de Urbina J.O., and Semba Y.
SCRS/2020/133	Review of progress made under the ICCAT short-term contract on Swordfish growth, reproduction and genetics studies: biological samples collection and preliminary analysis	Gillespie, Alex Hanke, Sámar Saber, Josetxu Ortiz de Urbina, François Poisson, Rui Coelho, Daniela Rosa, Miguel Ángel Puerto, Fulvio Garabaldi, David Macías, Oliana Carnevali, Giorgia Gioacchini
SCRS/2020/134	Tradeoffs in near-term management alternatives of West Atlantic bluefin tuna	Lauretta M., Tsukahara Y., Kimoto A., Hanke A., Gillespie K., and Walter J.
SCRS/2020/135	A preliminary analysis of the maturity of ICCAT swordfish stocks	Saber S., Ortiz de Urbina J., Gillespie K., Poisson F., Coelho R., Rosa D., Puerto M.A., and Macías D.
SCRS/2020/136	Estadísticas de las pesquerías Españolas atuneras en el Océano Atlántico Tropical, en el periodo 1990 a 2019	Pascual-Alayon PJ, Rojo V., Amatcha H., Swo FN., Ramos ML. and Abascal FJ.
SCRS/2020/137	Statistics of the French Purse seine fishing fleet targeting Tropical tunas in the Atlantic Ocean (1991-2019).	Duparc A., Floch L., Cauquil P., Depetris M., Lebranchu J., Yala D. and Bach P.
SCRS/2020/138	Spatio-temporal patterns of juveniles in EU Purse sein fleet catch targeting tropical tunas over the period 1990-2019.	Duparc A., Pascual-Alayon PJ., Abascal F. and Floch L.
SCRS/2020/139	Past and current dFADs fishing moratoria in Eastern Atlantic Ocean: what can AOTTP	Perez I., Guery L., Authier M. and Gaertner D.

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SCRS/2020/140	Demonstration of an MSE framework for western Skipjack tuna, including operating model conditioning	Huynh QC., Carruthers T., Mourato B., Sant'Ana R., Cardoso LG., Travassos P. and Hazin F.
SCRS/2020/141	Revised and updated catches of the Common dolphinfish ( <i>Coryphaena hippurus</i> ) from Venezuelan fisheries	Arocha F., Gutierrez X., and Evaristo E.
SCRS/2020/142	Towards the Development of an Electronic Monitoring Program for ICCAT Longline Fisheries	Wozniak E., Gibbon J., Michelin M., and Gall G.R.
SCRS/2020/143	Trilateral collaborative study among Japan, Korea and Taiwan for producing joint abundance index by longline fisheries for the tropical tuna species in the Atlantic Ocean	Satoh K., T. Matsumoto, H. Yokoi, K. Okamoto, S.I. Lee, M.K. Lee, JH. Lim, SP. Wang, NJ. Su, WP. Tsai, ST. Chang, and T. Kitakado

SCRS/P/2020/001	The "new" SCRS Task-3 and the ICCAT data dissemination policy	Anonymous
SCRS/P/2020/002	Overview of Secretariat Tasks related to SCRS activities	Anonymous
SCRS/P/2020/003	Overview on funding of SCRS activities	Anonymous
SCRS/P/2020/004	Update on the North Atlantic Swordfish MSE	Hordyk A., and Carruthers T.
SCRS/P/2020/005	Preliminary analysis of the reproductive study for the three swordfish stocks	Anonymous
SCRS/P/2020/006	A swordfish de novo genome assembly to support population genetic analysis: searching the genetic clustering between and within Atlantic and Mediterranean populations	Gioacchini G., Filippi S., Marisaldi L., Candelma M., Righi T., Gillespie K. Hanke A., Caputo L., and Carnevali O.
SCRS/P/2020/007	Update on USA (NOAA) and Portugal (IPMA) Collaborative Pop-up Satellite Archival Tagging of Atlantic Swordfish	Brow C., Orbesen E., Snodgrass D., and Coelho R.
SCRS/P/2020/008	Towards mitigation of seabird bycatch in pelagic longline fisheries: operational effectiveness of night setting and Tori lines across multiple fleets/wide spatial and temporal scales	Jiménez S., Domingo A., Winker H., Parker D., Gianuca D., Neves T., Coelho R., and Kerwath S.
SCRS/P/2020/009	IOTC workshop to identify regions in the IOTC convention area for informing the implementation of the ecosystem approach to fisheries management	Maria-José Juan Jordá, Anne-Elise Nieblas, Hilario Murua, Paul De Bruyn, Sylvain Bonhommeau, Mark Dickey Collas, Mayeul Dalleau, Fabio Fiorellato, Donna Hayes, Irwan Jatmiko, Philippe Koubbi, Mohammed Koya, Marcel Kroese, Francis Marsac, Pierre Pepin, Umair Shahid, Pascal Thoya, Sachiko Tsuji, Anton Wolfaardt
SCRS/P/2020/010	Spatio-temporal distribution of spinetail devil ray ( <i>Mobula mobular</i> ) in the eastern tropical Atlantic Ocean	Nerea Lezama-Ochoa, Jon Lopez, Martin Hall, Pascal Bach, Francisco Abascal, Hilario Murua

SCRS/P/2020/011	Proposal for advancing in TASK 12 (Environmental Pressure) Ecosystem Report Card: From process specific to generic evaluation of the task	Alvarez-Berastegui D., Juan Jorda M.J., and Andonegi E., Kell L.
SCRS/P/2020/012	The Atlantic Ocean Tropical tuna Tagging Programme (AOTTP) Electronic tags (metadata and preliminary analyses) deployed by AOTTP 2016-2020	AOTTP Coordination
SCRS/P/2020/013	Interaction of protected species with the artisanal tuna fishery of the Bay of Biscay: preliminary results	Louzao M., Oyarzabal I., Uriarte A., Onandia I., and Ruiz J.
SCRS/P/2020/014	Towards mitigation of seabird bycatch in pelagic longline fisheries: operational effectiveness of night setting and tori lines across multiple fleets/wide spatial and temporal scales	Jiménez, S., Domingo, A., Winker, H., Parker, D., Gianuca, D., Neves, T., Coelho, R, Kerwath, S
SCRS/P/2020/015	The Atlantic Ocean Tropical tuna Tagging Programme: data, preliminary results and their use in stock assessment	AOTTP Coordination
SCRS/P/2020/016	Summary on North Atlantic Albacore MSE	Arrizabalaga H., and Merino G.
SCRS/P/2020/017	Status of the North Atlantic Swordfish MSE Project	Adrian Hordyk
SCRS/P/2020/018	Incorporating environmental effects and species interactions in a bluefin tuna index standardization	Gillespie K., Minch T., Turcotte F., and Hanke A.
SCRS/P/2020/019	Atlantic Bluefin tuna MSE Progress and lessons learned to date	Walter J.F.
SCRS/P/2020/020	Data inputs and preliminary results for the 2020 update of the 2017 Eastern and Mediterranean Atlantic bluefin tuna stock assessment.	Rouyer T., Kimoto A., Zarrad R., Ortiz M., Palma C., Mayor C., Lauretta M., Gordo A., and Walter J.
SCRS/P/2020/021	Summary of tropical tuna MSE	Die D.
SCRS/P/2020/022	Preliminary evaluation of a CMP for Atlantic bluefin using MSE (v6.6.12)	Andonegi E., Arrizabalaga H., Fernandez C., Gordo A., and Rouyer T.
SCRS/P/2020/023	Western Atlantic Bluefin Tuna Stock Assessment 1950-2018 Using Stock Synthesis: Preliminary Results and Diagnostics with Initial settings	Tsukahara Y., Walter J., Gillespie K., Kimoto A., and Ortiz M.
SCRS/P/2020/025	BFT MSE developments 2020 May	Carruthers T.
SCRS/P/2020/026	Exploring models for the 2020 update of the 2017 EBFT stock assessment	Rouyer T., Kimoto A., Zarrad R., Ortiz M., Palma C., Mayor C., Lauretta M., Gordo A., and Walter J.
SCRS/P/2020/027	West Atlantic Bluefin Tuna Updated Base Model Diagnostics	Lauretta M., Kimoto A., Hanke A., Rouyer T., Ortiz M., Palma C., Mayor C., and Walter J.
SCRS/P/2020/028	Stock status, projections and K2SM for an ensemble of two JABBA assessment scenarios for Mediterranean swordfish ( <i>Xiphias gladius</i> )	Winker H., Kimoto A., Mourato B.L., Tserpses G., and Ortiz M.
SCRS/P/2020/029	Final Assessment of the Mediterranean swordfish stock by means of extended survivor analysis (XSA)	Tserpes G., and Mantopoulou-Palouka D.
SCRS/P/2020/030	Final Assessment of the Mediterranean swordfish stock by means of assessment for all initiative (a4a)	Mantopoulou-Palouka D., and Tserpes G.
SCRS/P/2020/031	Update on the NSW OM Uncertainty Grid	Hordyk A.

SCRS/P/2020/032	Developing CMPs for the SWO MSE Framework	Hordyk A.
SCRS/P/2020/033	Developing performance metrics and exceptional circumstances for N-SWO MSE	Gillespie K.,
SCRS/P/2020/034	Hooking mortality of porbeagle shark ( <i>Lamna nasus</i> ) in pelagic longline fisheries in the Southwestern Atlantic Ocean	Federico Mas, Rodrigo Forselledo, Sebastián Jiménez & Andrés Domingo
SCRS/P/2020/035	Standardized CPUE of porbeagle shark ( <i>Lamna nasus</i> ) caught by the Uruguayan pelagic longline fleet in the Southwestern Atlantic Ocean (1982-2012)	R. Forselledo, F. Mas, A. Domingo and S.D. Hoyle
SCRS/P/2020/036	The performance of input control options for the management of Porbeagle Shark - A Management Strategy Evaluation approach.	Taylor N.G.
SCRS/P/2020/037	Fisheries independent abundance index for Porbeagle	Bowlby H., Yin Y., Joyce W.
SCRS/P/2020/038	Estimates of vital rates, productivity, and other population dynamics parameters of interest for Porbeagle sharks	Cortes E. and Semba Y.
SCRS/P/2020/039	Preliminary Sustainability Assessment for Fishing Effects (SAFE) of pelagic longline fisheries on Porbeagle sharks and identification of F-based biological reference points	Cortés E, Bowlby H., Carlson J, Coelho R, Domingo A, Forselledo R, Jagger C, Mas F., Parker D, Santos C, Semba Y, Taylor N, and Zhang X
SCRS/P/2020/040	Study on the possibility of applying length-based models to estimate the reproductive potential of Porbeagle	Cardoso L.G.
SCRS/P/2020/041	Evaluation of exceptional circumstances in 2020	Merino G.
SCRS/P/2020/042	Updated North Atlantic albacore pop-up tagging in the Canary Islands	Onandia I., Lezama N., Arregui I., Ortiz de Zarate V., Delgado de Molina R., Santiago J., and Arrizabalaga H.
SCRS/P/2020/043	North Atlantic albacore: New MSE roadmap and future work	Fernandez C. and Merino G.
SCRS/P/2020/044	Length-length, length-weight and weight-weight relationships of albacore, <i>Thunnus alalunga</i> , caught by longliners in the Southwestern Atlantic Ocean.	Forselledo R., Mas F., Ortiz M., and Domingo A.
SCRS/P/2020/045	Spanish albacore ( <i>Thunnus alalunga</i> ) baitboat fishery in Canary Islands.	Delgado de Molina R.
SCRS/P/2020/046	JABBA Base-Case Model Run for South Atlantic Albacore: Stock Status and Projections	Winker H., Mourato B., Parker D., Sant'Ana R., Kimoto A., and Ortiz M.
SCRS/P/2020/047	Comparisons of stock status and projections between ASPIC and JABBA for South Atlantic Albacore	Kimoto A., Winker H., Matsumoto T., Mourato B., Parker D., Sant'Ana R., and Ortiz M.
SCRS/P/2020/048	Using a decision-support system (FishPath tool) for identifying options of stock assessment models for wahoo	Lucena-Frédou F., Travassos P., Hazim F., Mourato B., Cope J., and Cardoso L.G
SCRS/P/2020/049	Analysis of Atlantic bonito ( <i>Sarda sarda</i> ) stock status in the Northeast Atlantic based on Russian data	Petukhova N.G.
SCRS/P/2020/050	Small Tunas in the Atlantic Ocean: an update of knowledge with recommendations for the future	Lucena-Frédou F., Mourato B., Frédou T., Lino P.G., Muñoz-Lechuga R., Palma C., Soares A. and Pons M.

SCRS/P/2020/051	Exploitation and stock status of Atlantic bonito ( <i>Sarda sarda</i> ) in the South Atlantic of Morocco.	Sid'Ahmed B., Abid N., Bensbai J., and Lucena-Fredou F.
SCRS/P/2020/052	Little Tunny Growth Estimated from AOTTP Tagging Data	Ailloud L., Garcia J., and Beare D.
SCRS/P/2020/053	Preliminary results on movements and migrations of the Little tunny ( <i>Euthynnus alletteratus</i> ) in the Eastern Central Atlantic Ocean based on conventional tag-release-recapture data	Ba K., and Ngom F.
SCRS/P/2020/054	AOTTP Exit Strategy	Ailloud L., Kebe S., García J., Pastor R. and Beare D.
SCRS/P/2020/055	Short-term contract for ICCAT SMTYP for the biological samples collection for growth, maturity and genetics studies	Hazin F., and Lucena-Fredou F.
SCRS/P/2020/056	Short-term contract for ICCAT to continue the collection of biological samples for the study of growth of billfish in the eastern Atlantic	Ngom F.
SCRS/P/2020/057	Advances on growth studies of Small Tuna species	Lechuga R.M., and Lino P.G.
SCRS/P/2020/058	Bluefin CPUE time series of the Balfegó purse seine joint fishing fleet in Balearic waters from 2003 to 2020.	Gordoa A.
SCRS/P/2020/059	2019 Update to the Southern Gulf of Saint Lawrence acoustic index	Minch T.
SCRS/P/2020/060	Review Catch Rates BFT by vessel type and size	Ortiz M.
SCRS/P/2020/061	Review of progress made under the ICCAT short-term contract on Swordfish growth, reproduction and genetics studies: biological samples collection and preliminary analysis	Gillespie, Alex Hanke, Sámar Saber, Josetxu Ortiz de Urbina, François Poisson, Rui Coelho, Daniela Rosa, Miguel Ángel Puerto, Fulvio Garabaldi, David Macías, Oliana Carnevali, Giorgia Gioacchini
SCRS/P/2020/062	The Atlantic Ocean Tropical tuna Tagging Programme (AOTTP) in 2020	Anonymous

## **Report of the ICCAT Atlantic-Wide Research Programme for Bluefin Tuna (ICCAT GBYP)**

*(Activity report for the last part of Phase 9 and the first part of Phase 10 (2019-2020))*

### **1. Introduction**

The ICCAT Atlantic-wide Research Programme for Bluefin Tuna (GBYP) was officially adopted by the SCRS and the ICCAT Commission in 2008, and it started officially at the end of 2009, with the objectives of improving a) basic data collection, including fishery independent data; b) understanding of key biological and ecological processes and c) assessment models and provision of scientific advice on stock status. It was initially envisaged as a 6-year programme, but in 2014 the Commission, acknowledging the importance of the programme for bluefin tuna management, endorsed the GBYP Steering Committee (2015) and the SCRS recommendations (Report of Special Research Programmes – GBYP contained in the *Report for Biennial Period 2014-15, Part I (2014) - Vol. 2*) for extending the GBYP activities up to 2021. Consequently, the donors have maintained their budgetary support (EU 80%, other donors 20%) since then, allowing for the continuity of the programme. The general information about GBYP activities and its results, as well as on budgetary and other administrative issues of the GBYP programme, from the very beginning of the programme until today, are available on the [GBYP webpage](#). All the relevant documents related to programme development, including final reports of every activity and the derived scientific papers, Annual Reports to the SCRS and European Union, GBYP workshops or Steering Committee meetings reports, are also readily available on the GBYP webpage.

The ninth phase of the GBYP officially started on 1 January 2019 following the signature of the Grant Agreement for the co-financing of the GBYP Phase 9 (SI2.795824) by the European Commission. Initial duration of the Phase was one year, but, in order to better adjust to the period of bluefin fishing and harvesting operations, which condition many GBYP activities, it was extended for four months, thus officially ending on 30 April 2020. The activities carried out during the first nine months of Phase 9 and their preliminary results were presented to the SCRS and the Commission in 2019 (Alemany *et al.*, 2019) and approved. The tenth phase of the GBYP officially started, following an EU request, on 1 January 2020, after the signature of the Grant Agreement for co-financing of Phase 10 (SI2.819120) by the European Commission, with a planned duration of one year. Although these two GBYP phases have been partially developed in parallel, this has not caused any major problems since each phase has a different and well defined workplan and budget, and every cost can be assigned unequivocally to the activities detailed in the respective Grant Agreements.

In general, although several tasks have been affected due to the COVID-19 pandemic, most of the activities planned within both phases have been or are being implemented successfully. The activities in both phases have continued to be structured considering the same main lines of research established since the beginning of the programme, i.e. data recovery, biological studies, tagging, aerial surveys and modelling, but this does not mean that the workplans of these last two phases mimic those of the previous ones, since the specific activities are adapted every year in accordance with the SCRS research needs and Commission requests, continuously improving the methodologies and optimizing the working procedures year after year to increase the efficiency and quality of the advice.

All activities carried out throughout the GBYP Phase 9 and those launched during the first part of Phase 10, as well their final or preliminary results and the related coordination activities, are described and summarised in this report. Moreover, it also includes a proposal of activities to be carried out within Phase 11, for consideration and eventual support of the SCRS.

The COVID-19 pandemic affected the latest activities in Phase 9, such as a workshop on electronic tagging that had been planned for March 2020, which was postponed indefinitely at the very last moment, and a tagging activity also planned for March 2020, which was cancelled. Activities planned for the first semester of Phase 10 have also been heavily affected by the pandemic. Specifically, two workshops, one on the Potential use of Close-Kin methods for the Eastern ABFT stock assessment and another on ABFT Eastern stock larval index surveys coordination have been postponed. In addition, the 2020 aerial surveys were cancelled, as well a pilot study on growth in farms that was going to be carried out in Morocco in summer 2020, because of the restrictions on international travel. The lockdown measures and the temporary closure

of the ICCAT Secretariat headquarters have also obliged the GBYP coordination team to change the usual working procedures, which has been using telecommuting facilities since March 2020 to manage the programme.

## **2. Coordination activities and general issues of GBYP programme management**

The GBYP Steering Committee in Phase 9 has been composed by the SCRS Chair, the Western Bluefin Tuna Rapporteur, the Eastern Bluefin Tuna Rapporteur, the ICCAT Executive Secretary and/or his deputy. During 2019, one contracted external expert also acted as a full member of the GBYP SC. In order to define the workplan and refine the ongoing activities, the Steering Committee held one meeting in September 2019 and various online-meetings in May-June 2020. In addition, its members have been constantly informed by the GBYP Coordination Team about the status of the activities through detailed reports provided on a monthly basis, and they have been regularly consulted by email on many issues.

The GBYP Coordination Team has been composed of the GBYP Coordinator, the Assistant Coordinator and the Database Specialist. The ICCAT Secretariat has provided technical and administrative support for all GBYP activities on a daily basis. In Phase 9 a total of 6 calls for tenders and 6 official invitations were released, which resulted in 19 contracts awarded to various entities.

### **2.1 Financial aspects**

In Phase 9 the GBYP budget has had the following funders (in order of contribution already received or committed): European Union (Grant Agreement) €1,400,000.00, United States of America €165,330.24, Japan €56,060.18, Tunisia €50,887.30, Turkey €41,428.12, Libya €34,294.50, Syria, €1,999.66 and ICCAT Secretariat €10,000.00. Thus, the total budget has been €1,750,000.00.

In Phase 10 the total budget is €2,000,000.00, thanks to the contributions from the following donors: European Union (Grant Agreement) €1,600,000.00, Algeria €105,479.22, Japan €68,344.70, Morocco €64,962.81, United States of America €64,000.00, Libya €20,775.11, Canada €19,252.55, Egypt €13,007.74, Tunisia €11,764.30, Albania €7,718.45, China, €4,401.12, Korea €4,054.67, Iceland €3,239.33, Chinese Taipei €3,000.00, ICCAT Secretariat €10,000.00.

The residual amounts of previous GBYP Phases were used to better balance the EU contribution and to compensate costs that were not covered by EU funding in various Phases. Additional eventual residuals from the amounts provided in Phase 10 will be used for the following Phases of GBYP. It should be noted that contributions for the current and previous GBYP Phases are still pending from some ICCAT CPCs.

The approved budget for Phase 9 and Phase10 is summarised in **Table 1**.

## **3. Summary of Phase 9 and Phase 10 GBYP scientific activities and results by main line of research**

### **3.1 Data mining, recovery and management**

The general objective of GBYP data recovery activities is to fill the many gaps existing in several data series currently present in the ICCAT databases, concerning both recent and historical catch or catch by size data, which increase uncertainties in the assessment process. Such activities can also include the recovery of old or recent raw data on BFT ecology or biological parameters.

During Phase 9 there were no contracts related to data recovery, since no relevant datasets were made available for GBYP. However, the GBYP coordination team carried out in-house work in this line related to the study on ABFT growth in farms, which included reformatting and compiling data from stereo-cameras which have already been reported to ICCAT in previous years.

Apart from the continuation of the aforementioned activity, in Phase 10 the in-house work will focus on completing the recovery of all raw data from GBYP funded research activities not yet included in GBYP information system and in designing and built up relational databases to facilitate the management of this information, including the data generated so far from biological sampling, tagging and aerial surveys, as well as a database integrating the information from stereo-cameras, eBCDs and harvesting operations in

BFT farms. All these tasks will be done in close cooperation with the Secretariat Science and Statistics department. In addition, the financial resources assigned to this line will be dedicated to collection and evaluation of relevant data not previously available to SCRS, namely:

- recovery of old electronic tags datasets (University of Bari)
- recovery of recent datasets on catches from Sicilian tuna traps
- recovery of recent electronic tags datasets from other scientists.

### **3.2 Stock indices: Aerial Survey on Bluefin Tuna Spawning Aggregations**

The GBYP Aerial Survey on Bluefin Spawning Aggregations was initially identified by the Commission as one of the three main research objectives of the programme, in order to provide fishery-independent trends on the minimum SSB. Up to now, GBYP has produced a 7-year long series of fisheries independent index of spawning stock abundance based on these aerial surveys over the 4 main spawning areas in the Mediterranean. The index has not been used in stock assessment yet, but it is used in MSE.

However, due to different reasons, this activity has not been developed regularly and has not followed homogenous methodologies and sampling strategies throughout the successive GBYP Phases. The method was finally normalized in 2015, reanalysing all previous datasets, thus providing standardized series of index. Nevertheless, a global revision of the results carried out within Phase 8 showed that no clear patterns in weight and/or abundance among years and areas were discerned yet, and the Coefficient of Variation of the indices remained high, suggesting that there was still room for further methodological improvements. Therefore, several activities aiming at detecting and quantifying potential sources of bias, as calibration surveys, and to improve as much as possible the accuracy of the currently available indices, through refining the sampling strategy and sighting methodology, have been implemented since then.

The aerial surveys in Phase 9 were carried out on the same 4 preferential spawning areas already defined in the previous Phases, using in general the same standardized sampling design and methodology followed from 2017, but incorporating some improvements, such as a change in the Area A in order for it to better fit the real distribution of bluefin tuna spawners and a new refined sighting protocol. In addition, a complete re-analysis of all sighting from 2010 to 2019, including a complete revision of the base data to detect and filter out, for the first time, sightings of juvenile fish has been carried out, in order to provide a new and fully standardized series and remove potential sources of bias. Re-analyses included fine-scale readjustment of the overlap areas and effort tracks, assignment of adult/juvenile categories and recovery of missing data, re-checking the use of bubble windows and creation of parallel datasets to be analyzed independently for cluster size, and then repeated for weight.

Due to the logistical impediments which were in place in the second trimester of 2020 because of the coronavirus crisis, it was impossible to complete all preparatory tasks for the 2020 campaign and therefore the aerial surveys in phase 10 have been cancelled. Consequently, a further field calibration exercise, which was also planned for Phase 10, has been cancelled as well.

Other activities related to fishery independent indices which implied field activities in June, such as feasibility studies for the use of acoustic techniques for developing new BFT indices and for the validation of aerial survey indices were not launched either.

In addition, given that the global revision of the aerial survey data carried out in 2019 has raised various concerns about the representativeness of the index, the Steering Committee recommended that these issues be discussed in-depth before moving forward. Therefore, it was recommended that the BFT Species Group should thoroughly revise GBYP aerial surveys and decide on the conditions for their continuity, as well as determine the research priorities in relation to this and other fisheries independent indices. For that purpose, in order to allow SCRS BFT Species Group to take a well-informed decision, an external review of the GBYP Aerial surveys by independent experts will be carried out within Phase 10.

### **3.3 Tagging activity**

The main objectives of tagging activities are the estimation of the natural mortality rates of bluefin tuna populations by age or age-groups and the evaluation of habitat utilization and large-scale movement patterns (spatio-temporal), including estimates of mixing rates between stock units by area and time strata,

of both juveniles and spawners. This line of research has faced two important problems from the very beginning of the GBYP programme, which have prevented or limited the full achievement of the objectives. One is the very low recovery rate of conventional tags, which impeded the use of these data to estimate reliable mortality rates. Due to this, the GBYP SC decided to cancel the conventional tagging programme in Phase 4 and focus on electronic tagging instead, maintaining only complementary conventional tagging activities by providing tags and tagging equipment to different institutions or organizations, as well as maintaining the awareness and reward campaigns and the database, integrating all the results from recovered tags. The second major problem has been the relatively short time that most of the electronic pop up tags have remained on fish. While the latter problem has already been mitigated by improving the deployment methodology and provision of training to the tagging teams, the problem of the low recovery rate of conventional tags remains.

The specific objective of the 2019 e-tagging campaign was to improve the estimations of the degree of mixing of western and eastern Atlantic bluefin tuna stocks in the different statistical areas over the year cycle, specifically considering the current needs of the MSE modelling process. To this end, the Steering Committee decided to concentrate tagging activities in the North or Norwegian Sea and/or Celtic Sea. Tagging off Ireland was carried out by the Marine Institute in October/ November 2019 with 12 individuals tagged. In Skagerrak tagging was done by the Technical University of Denmark (DTU-Aqua) between the end of August and beginning of September 2019, deploying 15 pop-up electronic tags. In addition, in July 2019, 7 electronic tags were deployed in Olhão, Portugal, within the practical sessions of the GBYP Workshop on electronic tagging deployment methodologies organized in Phase 9 to improve the pop-up tag retention rates. The details have already been given in last year's report. The outputs from this workshop are being used as a reference for developing a new GBYP e-tagging protocol, which will be completed and presented in GBYP phase 10.

The 2019 e-tagging campaigns have been carried out taking into account the conclusions of the aforementioned workshop. Therefore, all the tags have been equipped with reinforced tethers and titanium darts and tagged on board using retention loops. The tags deployed using these reinforced tethers and improved attaching methodologies that have already released, with a mean period on fish higher than that the historical mean in GBYP e-tags, even completing the whole programmed one-year period in some cases, have provided relevant results, such as returns to the same foraging area where the fish was tagged just one year later or confirmation that some adult fish belonging to the eastern stock do not enter the Mediterranean in summer for spawning. Most of tags deployed in Autumn 2019, around 20, have not popped off yet, which confirms the significant increase in the retention rates of GBYP e-tags.

Unfortunately, it must be pointed out that in 2019-2020 the obtainment of data from electronic tags was greatly hindered by a tag transmission problem affecting Wildlife Computer tags Mini PATs produced from the second half of 2018 onwards, about which GBYP was informed in October 2019. The manufacturer recognized that the problem is due to a new type of battery integrated in the tag, which proved to have worse performance than specified, resulting in shorter transmission times, and have replaced the tags in which these transmission failures can be demonstrated. The magnitude of this problem is being currently analysed, and when a global picture be available, once all the potentially affected tags had popped off by the end of 2020, the compensations for these technical failures will be negotiated with the manufacturers.

In addition to field activities, a broad Workshop on bluefin tuna tagging was programmed in Phase 9 as well. It was going to take place in March 2020, but it was postponed at the very last moment due to the quick evolution of coronavirus pandemic. The aim of the Workshop was to reach a broad consensus about the strategic planning of future and the best use of the already available information, with the specific objectives of identifying gaps in movement transitions and life history that can be addressed by strategic electronic tags deployments and drafting terms of reference for conducting joint analyses of the combined tagging datasets. It is envisaged to resume the organization of the workshop once the global situation allows it.

Regarding Phase 10 e-tagging activities, the initial plan was to deploy one batch of electronic tags in the Levantine Sea during the spawning peak, aiming to fill the knowledge gap on the spatial patterns of Eastern Mediterranean populations after spawning, and to deploy the remaining tags in the locations recommended by SCRS experts during the Workshop on tagging that was going to be held in March 2020. At the beginning of 2020 the GBYP SC also decided to take advantage of an offer of collaboration from the "Tag a Giant programme" to deploy for free some e-tags offered in kind or at low cost to GBYP by the University of Cadiz and by LOTEK company, within the framework of a campaign that this team was going to develop in the Canary islands in March 2020.

These plans have changed due to COVID-19 pandemic, since the GBYP Workshop on BFT e-tagging was postponed and therefore no guidelines were produced, and the envisaged field activities in the Mediterranean and the Canary Islands had to be cancelled. Therefore, taking into account the uncertainty on how the pandemic will progress as well the technical problems affecting WC e-tag performance, the GBYP Steering Committee decided to delay the acquisition of new tags and to deploy in Phase 10 only those already available from cancelled activities or from replacements of previously deployed tags that had failed taking advantage of existing national tagging programmes. To this end, a Call for collaboration in GBYP e-tagging programmes was launched, and after evaluating the offers of 5 MoU to deploy GBYP tags (36 pop-up and 20 archival) in different areas of North Atlantic (Bay of Biscay, Celtic Sea, English Channel, North Sea, Skagerrak and off Newfoundland) have been or will be signed shortly.

Besides the activities carried out under formal GBYP contracts or agreements, GBYP has supported e-tagging activities carried out independently by other institutions, by allowing the use of GBYP RMA in case of BFT casualties during tagging operations and the use of GBYP Argos system account for data transmission. Specifically, the Italian branch of WWF Mediterranean Marine Initiative have been included in the 2019 GBYP list of institutions that can make use of RMA. WWF has recently deployed several satellite tags in the Western Mediterranean which are associated to GBYP Argos system account, so the resulting data will be directly integrated in the GBYP database.

As regards conventional tagging, the GBYP programme has been maintained as a complementary activity, providing logistical support to several institutions. In Phase 9, a total of 293 tags were deployed on 250 bluefin tuna individuals. In total, from the beginning of the Programme, more than 20 thousand bluefin tuna individuals have been tagged, using more than 28 thousand tags of different types.

The GBYP tag awareness and reward policy has also been maintained as in previous phases. As a result, the impressive improvement in the recovery rates detected from the beginning of the GBYP programme has been maintained. Thus, in the year 2019 and the beginning of 2020 a total of 116 and 11 tags have been recovered, respectively. These are slightly fewer than in previous years, but this can probably be attributed to the fact that, on the recommendation of the Steering Committee, from 2014 onwards the GBYP massive conventional tagging programme was cancelled, and hence the number of deployed conventional tags has decreased. It should be stressed that, in the last couple of years, the number of tags recovered and reported from the Mediterranean Sea is higher than any other area. Considering that reported tags from the Mediterranean were almost nil before the GBYP, this is the clear evidence that GBYP tag awareness campaign is producing positive effects.

### **3.4 Biological studies**

One of the core activities of ICCAT GBYP are the so-called Biological Studies, including biological sampling and a series of studies based on the analysis of these samples, as microchemical and genetics analyses to investigate mixing and population structure, with a particular focus on identifying the age structure and the probable sub-populations. The activities in Phase 9 were mostly directed at resolving the Atlantic bluefin tuna population structure and mixing. In particular, one of the most important uncertainties to resolve was related to the understanding of the implications of the new spawning grounds in the Atlantic Ocean (Slope Sea, Bay of Biscay). The priority has been given to mixing analyses to provide accurate information and clear alternative hypotheses to the MSE process. In addition, GBYP has continued with the broad study to determine BFT growth in farms, in connection to ICCAT Rec. 18-02, paragraph 28.

The sampling activity in potential mixing areas for adults, such as the Central Atlantic, Canary Islands and Morocco, has been prioritized with the objective of resolving the population structure. In addition, adult BFT individuals were sampled in the Mediterranean farms, aiming at guaranteeing the availability of enough biological samples to construct representative annual age length keys and for other analyses in a future. In 2019 more than 4400 biological samples were collected, from almost 3000 bluefin tuna individuals. All GBYP samples are stored in the GBYP Tissue Bank, which is maintained by AZTI.

As concerns biological analyses, it was decided to combine both genetic and microchemical analyses on the same sample, whenever possible, to take advantage of the synergies between both approaches to determine the stock of origin.

Regarding otolith microchemistry, new carbon and oxygen stable isotope analyses were carried out in 129 otoliths of Atlantic bluefin tuna captured in the Central North Atlantic in 2016 to determine their nursery area, and the results indicated that these samples were dominated by eastern origin individuals. The comparative analysis with previous Phases suggests that mixing of the two populations occurs at a variable rate, but Mediterranean bluefin tuna may be the principal contributors to the Japanese fishery operating in the central North Atlantic. In addition, for the first time the high-precision secondary ion mass spectrometry (SIMS) was used, with the aim of providing high resolution estimates of oxygen stable isotopes along otolith growth transects. Examination of the relative patterns between individuals indicated substantial variability in environmental histories during the first few months of life. The results support the hypothesis that some individuals are retained within homogenous water masses during early life, while others are exposed to wide variation in water chemistry. Possible evidence of trans-Atlantic migration of adult fish was also recorded in some otolith chemistry profiles.

As concerns the genetic analyses, with the final aim of improving the accuracy of mixing proportions, it was envisaged to generate an improved baseline for the RAD-seq method for origin assignment and expand the number of analyzed bluefin tuna individuals from the Atlantic Ocean. Therefore, an improved baseline for 96 SNP existing traceability tool integrating genome-wide genetic background of the included samples has been generated, considering information on population dynamics complexity. Improved assignment rates were obtained using the new genetic-informed baseline which, together with the original baseline, was used to assign the genetic origin of >2400 samples from feeding aggregations, including 470 newly genotyped samples, completing the mixing map of the Gulf of Mexico and Mediterranean genetic components along the Atlantic. Assignments using the new genetic-informed baseline produced higher assignment rates than those calculated using the original location-informed baseline, both analyses confirming high mixing in Western locations. Besides, when using the genetic-informed baseline, lower proportions of unassigned samples were obtained. The addition of the newly genotyped samples completing the mixing map along the North Atlantic Ocean confirmed previously observed patterns, revealing strong mixing of eastern and western genetic origin individuals in the west Atlantic. Indeed, the Mediterranean genetic profile was majoritarian at every sampled location except for Nova Scotia and Newfoundland. Regarding the population structure of Atlantic bluefin tuna, gene-flow from the Mediterranean Sea into the Gulf of Mexico, most likely through the Slope Sea, was confirmed analyzing RAD-seq data from 535 individuals.

Previous studies supporting the presence of two populations of Atlantic Bluefin Tuna (ABFT) have allowed the development of a traceability SNP panel that assigns individuals to their stock of origin, which is very relevant for ABFT management. Yet, more in-depth analyses have shown that the population dynamics of ABFT are more complex than a pure homing behaviour to the two main spawning grounds (the Mediterranean and the Gulf of Mexico), with feeding aggregates mixing in the Atlantic. First, individuals with Mediterranean genetic background are found within the Gulf of Mexico and, second, the Slope Sea constitutes a genetically intermediate population, which might explain why some individuals cannot be assigned to either population and why some Gulf of Mexico individuals are assigned to the Mediterranean Sea. Initially, these unassignments and misassignments were thought to be a methodological bias, but recent results suggest that they might be due to a more complex population structure in ABFT that is not considered by the genetic assignment method. Since the current mixed stock model used for management purposes does not acknowledge that individuals from both stocks can interbreed, the consequences of doing so should be evaluated. In addition, the contribution of the individuals born in the Slope Sea to each of the two main stocks is not clear as there is no way to differentiate them genetically. Thus, in order to better understand the migration and reproductive behaviour of ABFT and to develop an improved traceability panel that takes these new findings into account, additional analyses are envisaged.

Other analyses included larvae identification in the Bay of Biscay and a feasibility study on the use of larvae from larval index surveys for genetic analysis. A search was performed for ABFT larvae in samples collected in past surveys in the Bay of Biscay because recent studies demonstrated through the presence of early larvae that ABFT spawns, at least occasionally, in this area. Therefore, a total of 7,017 larvae were checked from 368 zooplankton samples from previous surveys in the region and one larva identified genetically as bluefin was found. This sample was collected in August 2009 west of Santander in a mean sea surface temperature of 21.6°C and a mean sea surface salinity of 34.88. Since this larva could not have been transported in any way into this area from the Mediterranean Sea spawning ground, it provides further evidence of BFT spawning in this region. However, further studies should be conducted, based on plankton hauls specifically designed to target tuna larvae, to evaluate the importance of this new spawning ground.

The feasibility study on the use of larvae from current larval surveys in the Balearic Sea for genetic analysis showed that larvae preserved in Cytoscan are not suitable for the genetic analysis, while larvae preserved in pure Ethanol were suitable. Finally, a total of 339 bluefin tuna larvae from 22 stations sampled in 2018 and 2019 surveys following this latter preservation methodology were genetically analyzed within this study. It could be concluded that thanks to these methodological improvements in samples preservation and handling, larval surveys could provide useful material for genetic analyses, even for those studies which require a high number of larvae, such as the Close Kin approach.

Regarding ageing related analyses, in Phase 9 a broad otolith calibration exercise has been carried out by the ageing group of experts of the SCRS BFT species group (6 laboratories) and a new and more complete otolith reference collection has been created. In addition, the reading of a set of 2,000 otoliths has been successfully finished by Fish Ageing Services. The readings show a high coherence, since a single more prominent cohort can be followed consistently along the years and the resulting length at age data also show a coherent growth curve. However, due to some systematic bias in these results in relation to estimations from other experts detected during the calibration exercise, the final revision of these data will be carried out within Phase 10 before using them for management purposes.

There were two workshops related to biological studies planned to be held within the last months of Phase 9, but both were cancelled/postponed due to the COVID-19 outbreak. One was a larval index surveys coordination workshop, aiming at facilitating coordination between different CPCs' national studies, while the second was a workshop on Close Kin methodology, aiming at providing insights into new achievements of the method and evaluating its potential use on Eastern BFT stock.

The plan for biological studies in Phase 10 is to continue with sampling in the Atlantic Ocean in order to resolve population structure and to sample in the Mediterranean, as well to contribute to the update of the ALK. The analyses will be focused on providing accurate and reliable estimations of mixing rates between two BFT stocks. In particular, it is planned to further clarify the Bluefin Tuna genetic population structure by understanding the phenomena that are driving genetic differentiation despite gene flow, to develop a cost-effective and reliable SNP genotyping tool for tracing movements and estimating gene-flow between management areas, to improve the traceability panel and to continue monitoring mixing throughout foraging areas using alternative baselines and alternative markers. In addition, in relation to aging, it is envisaged to perform a new calibration of the otolith age estimates provided in Phase 9 by FAS, and to perform an analysis of the otolith edge type deposition and marginal increment along year cycle. In addition, further ichthyoplankton studies, including sampling of ABFT larvae in the Bay of Biscay and provision of Balearic Sea ABFT larvae for genetic studies, will be carried out within Phase 10.

#### *3.4.1 Study on BFT growth in farms*

Following the successful preparatory work finished in Phase 8, the activity in Phase 9 continued with the implementation of field and desk work for database generation, including preliminary and partial data analysis. With that purpose, contracts were signed with farms and/or research institution to carry out studies in 5 representative areas: Portugal, Spain, Malta, Croatia and Turkey. Among these, it was possible to perform broad tagging experiments only in two farms, in Portugal and Croatia. Therefore, in addition to the individual growth approach required by Rec. 18-02, aiming to provide comparable growth rate estimations among different areas, a common methodology based on the intensive monitoring of one or two cages in each farm, containing the widest possible caged fish length distributions, has been implemented in all the areas. The monitoring includes, in addition to the initial estimation of the length distribution in the cage through the official measurement with stereo-cameras, bimonthly or seasonal additional measurements with stereo-cameras, a daily record of environmental parameters and food supply and the record of real length and weight data from all the fish in the monitored cage at harvesting. This will for the determination of seasonal growth in length by size group through Modal Progression Analyses, the relation of these growth rates with environmental parameters and the determination of the final gain in weight by size group. These studies will be completed within Phase 10, when all the fish in the monitored cages are harvested.

As already mentioned, the tagging of part of the fish in the monitoring cages, in order to get individual growth data, was performed on adult fish in Portugal and on juveniles in Croatia. The study in Portugal was affected by a high mortality of tagged fish and a loss of great number of identifying tags, which hindered the obtention of reliable results. Therefore, this study is being repeated within Phase 10. The tagging study in

Croatia initiated in Phase 9 with the successful tagging of 202 juveniles, with almost null mortalities after tagging, and which also includes the intensive and continuous monitoring along the whole farming period described in the previous paragraph, is being conducted by now without any problem. The final data will be available only in 2021 when the fish will be harvested.

In parallel with field activities, in-house work to contribute to growth in farms studies was initiated at the ICCAT Secretariat through close collaboration between the Department of Research and Statistics and the GBYP Coordination team. It has been oriented to the formatting and consolidation of data reported from stereo-cameras to ICCAT (2014-2018). This first step will enable the creation of an operative relational data base, linking data on estimated initial lengths and weights from stereo-cameras at caging with measures of real final weights and lengths at harvesting from e-BCD system, as well VMS data. It will facilitate broad studies on the growth of caged fish in all the areas where BFT farming takes place along Phase 10 and, at the same time, provide crucial information for stock assessment (length distributions of the captures of purse-seine fisheries).

The combination of all the information on growth rates generated by these different approaches with the information about farming methodologies gathered through the ad hoc questionnaire submitted by all the ABFT farms and the direct detailed monitoring of environmental parameters and food supply in selected cages will also allow for the exploration of the causes of potential variability among growth rates in different regions at several time and space scales.

Following activities to be developed within Phase 10 will include the continuity of experiments initiated in 2019, whenever necessary, as well as the development of new pilot studies, using acoustic and IAS techniques, allowing accurate (even on a daily basis if required) measurement of the growth of caged fishes, both in length and weight. In addition, in-house activities on the consolidation of data from stereo-cameras and the creation of a relational database will continue. The initial plan was to develop these studies in two areas, one in the Mediterranean and one in the Atlantic, specifically in Morocco. Finally, despite the fact that the preparatory work had been already carried out over the first quarter of 2020, due to the coronavirus outbreak the pilot study in Morocco has had to be postponed until 2021.

The global analysis of all the data generated within the aforementioned GBYP studies will be carried out in close coordination with the SCRS subgroup on growth in farms, which will take care of elaborating a unique and agreed response to the Commission.

### **3.5 Modelling approaches**

The modelling programme addresses the GBYP general objective 3, which is "Improving assessment models and providing scientific advice on stock status through improved modelling of key biological processes (including growth and stock-recruitment), further developing stock assessment models including mixing between various areas, and developing and use of biologically realistic operating models for more rigorous management option testing". The modelling activities started in Phase 2, and very soon it became evident that this line of study had greater importance than perceived at the time when the GBYP was conceived and that the amount of effort for this activity should be much larger than initially considered. In addition, the MSE process embarked upon by ICCAT has been an important initiative which has represented a significant investment of time and resources by the Commission, CPCs and the scientists involved.

In Phases 9 and 10 the contract for modelling approaches was again awarded to Dr. Tom Carruthers (Blue Matter Science, Canada), who initiated the work on MSE and modelling in 2014. The 2019 contract saw the final adjustments to model configuration and data weighting. Over the course of 5 revisions, including more than 100 individual changes to the input data and model, an estimation model was developed in November and presented in December 2019. This model, which could pass the necessary red-face tests, spans the range of uncertainties of the reference set operating models and recreates the scenarios of the robustness set operating models. A series of additional tasks were completed, such as data processing checks, engaging in dialogue with data providers to confirm that the data are processed correctly for M3 OM conditioning, updating Trial Specifications document and M3 model to version 5, coding and fitting of new reference and new robustness set OMs, fitting interim grid OMs with sensitivity runs, updating ABT-MSE framework, fully debugging and adding M3-ABTMSE check mode, checking and implementing basis for transforming biennial estimates of variance and correlation in recruitment, updating OM report to include estimated movement probabilities, observed tag recaps and recruitment, adding latest interim grid OMs and robustness and further performance statistics OMs to the package, and drafting SCRS papers on results for multiple alternative Master indices, simple model-based CMP and fully defining protocols for CMP tuning.

All deliverables were completed, with the exception of the updated Shiny App which requires finalized reference set and robustness set operating models and CMPs. In addition to the contracted tasks, more than 100 changes were made in the model and data, following requests from the Bluefin Tuna Working Group. The MSE framework is complete, but all components downstream of the Management Procedures and the Management Objectives are still not finalized.

The plan for Phase 10 is to ensure the OM scenarios agreed by the CMG in 2016 and revised in 2017, 2018 and 2019 by the Technical MSE Group (formerly CMG) and the MSE BFT Group, can be run, that third parties can use the OM to evaluate candidate MPs (CMPs) of their own specifications, and to provide a set of agreed summary statistics that can be used by decision makers to identify the MP, including data and knowledge requirements, that robustly meets the management objectives.

In addition to contracting the MSE expert, GBYP has been continuously providing its support to the BFT MSE Technical Group (formerly GBYP Core Modelling and MSE Group), whenever needed, by covering the travel expenses of the chair and key members for participating in MSE related meetings.

#### 4. Outline of GBYP Phase 11 proposal

- a) Data recovery: Recovery of further data sets relevant for improving BFT management
- b) Fishery independent indices: if recommended by SCRS BFT Species Group, eventual development of new series of aerial surveys according to the conclusions from the global external review carried out in Phase 10, feasibility studies for the development of alternative fishery independent indices, and application of habitat models to standardize fishery independent or dependent indices
- c) Tagging: Support to conventional tagging and tag awareness activities; development of electronic tagging campaigns, prioritizing areas according to assessment needs
- d) Biological studies: Maintenance of GBYP tissue bank, development of biological sampling and analysis programme aiming to ensure availability of samples and generation of basic data to cover research needs derived from SCRS recommendations; pilot study combining image analyses and acoustic techniques to determine growth in farms in Atlantic waters (Moroccan farms); implementation, within ICCAT DB system framework, of relational databases integrating data from GBYP (biological analysis, tagging, data from stereocamera systems and harvesting operations); workshop on biological sampling standardization and coordination; if recommended by SCRS BFT Species Group, the implementation of Close Kin methodology for the assessment of Eastern BFT stock, following the conclusions from the workshop on Close Kin methodologies held in Phase 10.
- e) Modelling: Continuous GBYP support to the development of the ICCAT BFT MSE process (funding developers and BFT MSE technical group workshops).

Total envisaged budget € 1,500,000\*\*

*\*\*Tentative budget subject to revisions derived from BFT SG discussion and budget availability*

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Alemay F, Tensek S., Pagá García A., 2019. ICCAT Atlantic-Wide Research Programme for Bluefin tuna (GBYP) Activity report for Phase 8 and the first part of Phase 9 (2018-2019). ICCAT Col. Vol. Sci. Papers. 76(2): 521-566.

**Table 1.** Approved budget of GBYP Phase 9 and 10.

Item	Phase 9	Phase 10
Coordination	€227,000.00	€375,000.00
Data Recovery	-	€25,000.00
Aerial Survey	€535,775.00	€612,000.00
Biological Studies	€710,000.00	€620,000.00
Tagging	€177,500.00	€218,000.00
Modelling	€99,725.00	€150,000.00
<b>Total</b>	<b>€1,750,000.00</b>	<b>€2,000,000.00</b>

**Report of the ICCAT Atlantic Ocean Tropical Tuna Tagging Programme (AOTTP)**  
*(Evidence based approach for sustainable management of tuna resources in the Atlantic)*

## 1. AOTTP Results and Activities

### 1.1 Background

The overall objective of the Atlantic Tuna Tagging Programme (AOTTP) is to contribute to food security and economic growth of the Atlantic developing coastal states by ensuring sustainable management of tropical tuna resources in the Atlantic Ocean. The specific objective of this programme is to provide evidence-based scientific advice to developing coastal states and other Contracting Parties, to support the adoption of effective Conservation and Management Measures (CMMs) in the framework of the International Commission for the Conservation of Atlantic Tunas (ICCAT). This will be achieved through improving the estimation, derived from tag-recapture data, of key parameters for stock assessment analyses, i.e. growth, natural mortality, movements and stock structure, etc.

### 1.2 Budget

The total budget for the programme is 15 million euros over five years, of which the European Union contributes 90% and the rest is made up from voluntary contributions from ICCAT CPCs and Cooperators. Since the AOTTP began 43 contracts have been negotiated and signed (**Table 1**).

## 2. Tag-recapture and associated data from the three main tropical tuna and on neritic tuna species in the Atlantic are stored in a database at the ICCAT Secretariat

### 2.1 Tagging of tropical tunas

Tagging began in June 2016 around the Azores. Since then ICCAT-AOTTP has tagged tuna over large areas of the tropical Atlantic. Tagging has recently finished around the island of St. Helena (BOT), and is ongoing in the seas of the Caribbean/USA using sport and recreational fishers. A total of 119,218 tropical tuna across species have now been tagged and released with conventional tags (e.g. **Figure 1**), and 16,816 of those have been recovered. AOTTP has now achieved 99% of its overall tagging targets (see **Table 2**). Similarly AOTTP and colleagues have deployed 29 Desert Star, 108 Wildlife computers and 29 Microwave Telemetry electronic pop-up tags and 36, ArcGeo 9 (Lotek), and 392, Lat 2810 (Lotek) internal/archival tags (**Figure 2** and **Table 3**).

Over 20 different boats have so far been used by ICCAT-AOTTP to tag fish in the Atlantic, and they have completed 511 tagging trips overall (**Table 4**).

### 2.2 Awareness Campaigns and Recovery Schemes

Awareness raising and recovery schemes are ongoing in the following thirteen locations: (1) Azores Islands (Portugal), (2) Madeira (Portugal); (3) Canary Islands (Spain); (4) Mauritania; (5) Senegal; (6) Cabo Verde; (7) Ghana; (8) Côte d'Ivoire; (9) São Tomé and Príncipe; (10) South Africa; (11) Brazil; (12) Ghana; and (13) Uruguay, see **Figure 3**. Awareness raising is also ongoing in sport and recreational fishers in the USA. The current contracts expire in October 2020 but will be extended by the ICCAT Secretariat until January 2021 subject to the approval of a no-cost extension of 3 months.

### 2.3 Recovery of tags and transmission of data to ICCAT Secretariat

The number of valid tag recoveries is now (July 2020) 16,816 (see **Figures 4** and **5**) translating to an overall recovery rate (**Table 2**) of 14.1% which is more than the rate originally predicted (10%). Of special importance is the fact that the recovery rates for BET and YFT are both above 19% (**Table 2**). Out of those, 1,949 BET, 3,648 SKJ and 3,143 YFT have been tagged chemically (**Table 5**). Recovery rates of the chemically tagged BET and YFT are 15-18% (**Table 5**). All data are sent to ICCAT in a standard format via

the AOTTP Tag Recovery Group (35 Members). The system facilitates rapid data correction and helps avoid coding mistakes. It also allows immediate feedback between AOTTP Coordination and the recovery officers.

Tag seeding experiments to estimate the Reporting rates are ongoing and 880 fish have so far been tagged with false tags throughout the tropical Atlantic (**Table 6**).

### **3. Key parameters supporting stock assessments are estimated on the basis of data collected through the programme and integrated in stock assessments**

ICCAT-AOTTP now has a rich dataset which is being used to estimate growth rates, mortality (including gear selectivity), and migration rates in tropical tunas. Statistics and observations (e.g. number of releases, numbers of recoveries) were presented at the SCRS Species Group Meetings in September 2017, 2018, and 2019 (Beare *et al.*, 2017; Guemes *et al.*, 2017; Goñi *et al.*, 2017; Onandia *et al.*, 2017; Arregui *et al.*, 2019; Gaertner *et al.*, 2019a, b); and again at the SCRS Plenaries in October 2017 (Appendix 8 to the *Report for Biennial Period 2016-2017, Part I (2017), Vol. 2*), and 2018 (Appendix 5 to the *Report for Biennial Period 2018-2019, Part I (2018), Vol. 2*). Preliminary observations on LTA have now been presented at the 2017 Small Tunas Intersessional Meeting by the ICCAT Secretariat in Miami in April 2017 and at the Small Tunas Intersessional Meetings in June 2019, and July 2020 by Dr. Fambaye Ngom and Kamarel Ba.

AOTTP tag-recapture data contributed to the BET Stock Assessment in 2018 (Arregui *et al.*, 2019; Gaertner *et al.*, 2019b,c).

At the April 2019 YFT Data Preparatory meeting detailed analyses based on AOTTP data were presented concerning: tag shedding rates (Gaertner *et al.*, 2019a); the impact of the FAD moratorium (Deledda-Tramoni and Gaertner 2019); tag reporting rates (Akia *et al.*, 2020); and progress on the otolith growth rate validation work (Ailloud *et al.*, 2019).

Prior to the 2019 YFT Stock Assessment, by the SCRS, the AOTTP formatted the tagging data for inclusion in the integrated assessment model, Stock Synthesis. Tag-shedding (Gaertner *et al.*, 2019a, b) and tag reporting rate (Akia *et al.*, 2020) were estimated from the AOTTP double-tagging work (**Table 7**) and tag-seeding experiments, respectively. The stock assessors were also provided with daily YFT ages from the AOTTP reference collection together with annual ages of large individuals caught off South Africa. Growth trajectories from tagging data and otolith ages were used to guide the estimation of growth within the Stock Synthesis model. Preliminary analyses of chemically marked fish from the AOTTP contributed to the important decision to raise the assumed maximum age of YFT from 11 to 18 years.

#### **3.1. Reading of hard parts**

AOTTP targeted 10,000 fish for 'chemical tags', i.e. they are injected with oxytetracycline (OTC) so their otoliths (or other hard parts) can be 'read' and aged more easily (**Table 5**).

ICCAT-AOTTP has now purchased and taken biological samples from 1,317 fish representing all size classes, 4 species, and both sexes (**Table 8**). Other biological information like body-weight, state of sexual maturity, and stomach contents has also been collected to complement eventual analyses.

ICCAT-AOTTP is working with scientists in Senegal, Ivory Coast, Brazil and Australia to analyse AOTTP chemically marked otoliths. Results are improving age reading protocols and gauging the utility of daily versus annual increment counts for future age estimation. Results were presented at the 2019 YFT Data Preparatory meeting (Ailloud *et al.* 2019). These results indicated that daily micro-increment counts lead to underestimates of age for fish any larger than 55cm FL, and that annual ageing might be more accurate (alternate opaque versus translucent increments). The AOTTP efforts to analyse hard parts will continue until the end of the project.

Two laboratory technicians were hired by ICCAT-AOTTP partners in January 2019: one at the CRO in Abidjan and one at the CRODT in Dakar. These new hires attended a workshop in March 2019 where they learned advanced techniques in otolith preparation, growth ring interpretation, and calculation of bias and precision in age readings. They also underwent an additional week of training (August 2019, which focused on the preparation and interpretation of otoliths for annual ageing (as opposed to daily ageing), and on the use of the fluorescent microscope to validate the deposition rates of otolith rings in chemically marked fish.

### **3.2. Information from stakeholders**

A Final AOTTP International Symposium was planned to take place in Dakar, Senegal, in June 2020 in order to present and publicise its results. Unfortunately, the Symposium had to be postponed due to the pandemic and has now been rescheduled for January 2021 subject to the approval of the 3-month no-cost extension. In March 2020 AOTTP Coordination visited Dakar in Senegal to discuss details of the Symposium with the Event Manager that had been contracted (**Figure 6**).

## **4. Training**

### **4.1 Training in tagging techniques and data collection**

This indicator has been well satisfied. The numbers of fish tagged during the AOTTP programme by scientists from all countries is summarised in **Table 6**. It shows that over two-thirds (66%), have been tagged by scientists/technicians from developing countries. What is particularly encouraging is that colleagues who worked on the first phase tagging and attended training courses have subsequently run their own tagging activities during the second phase. During late 2019 and early 2020 AOTTP Database Specialist, Jesus Garcia, visited the AOTTP Tag Recovery Offices in Dakar, Abidjan and Tema. During these visits Jesus worked with the teams there to improve the accuracy of the tag recovery data.

### **4.2. Training in data analysis**

Note that the original Activities A2.2 and A3.3 were merged to integrate the formal scientific research activities with the training and capacity building.

The relevant Verifiable Indicators for Activities 2.2 and 3.3 are:

- Tag-recovery data collected during the AOTTP will be analysed by scientific consultants before the end of the programme to estimate missing key parameters for stock assessments (Number of analyses undertaken, reports from consultants, scientific publications, AOTTP reports);
- Dedicated workshops will be organised to reinforce the capacity of ICCAT developing member States in data analyses, interpretation of the scientific results and development of the scientific advice.

ICCAT-AOTTP has a large and important dataset including: (i) mark-recapture data from spaghetti/conventional tags; (ii) tag-seeding data; (iii) data from electronic tags; and (iv) biological samples such as otoliths and spines.

Partners (CISEF and VIMs/SHEDD Aquarium) for the data analysis and capacity building work (merging of activities A2.2 and A3.2) are working on tropical tuna mortality, movement/migration and growth (from hard parts, length frequencies and tag-recapture data). All the results will be presented at the Final Symposium in January 2021 and written-up for peer-reviewed publication. Thus far AOTTP Coordination has received 12 draft manuscripts. Note that the Terms of Reference for the scientific aspects of the work were discussed and approved at the SCRS Species Group meeting in autumn 2018. Unfortunately, all of the in-person training workshops organised as part of the CISEF and VIMs contracts were canceled due to the pandemic and the relevant travel budgets are being redistributed and online versions organised instead. In mid July 2020, for example, CISEF will organise an online workshop on Bayesian methods for estimating mortality etc. from tag-recapture data.

*Note:* Access to ICCAT-AOTTP data ICCAT-AOTTP conventional tag data (checked and validated to the extent possible) are now publicly available at six monthly intervals – organized by species - from the ICCAT website (<https://www.iccat.int/en/accesingdb.html>). Data (less well checked) are distributed at monthly intervals to partners more specifically involved in the project (e.g. participants at capacity building workshops, SCRS meeting participants, and other contractors), e.g. [AOTTP Data](#). A decision on the use of AOTTP electronic tag and biological data is expected to be taken soon.

## 5. Beneficiaries

AOTTP is working directly with State Authorities in Spain (Canary Islands), Portugal (Azores, Madeira), Ivory Coast, Mauritania, Senegal, Brazil, USA, Ghana, Uruguay, São Tomé and Príncipe, Cabo Verde, UK (CEFAS, British Overseas Territories of St Helena and Ascension Island) and South Africa.

AOTTP is exchanging biological samples with a range of organisations, mutually benefiting all parties. Members of CISEF and UCT have sent whole otoliths from very large BET and YFT to AOTTP for ageing, and AOTTP will share the resulting data and return the prepared slides when done. In addition, AOTTP has sent CISEF 30 YFT otolith samples from very young fish/short term recaptures caught in the Gulf of Guinea to be analysed for isotopic signatures and natal origin. Results will improve our understanding of stock structure of YFT in the Atlantic.

ICCAT CPCs and Cooperators have also contributed funds to the AOTTP programme including the USA, Canada, and Chinese Taipei. IRD staff contribute their time to analysing AOTTP data without cost.

AOTTP maintains good working relationships with all its Contractors: communication with tagging teams and TROs around the world being performed using a range of modern media, including WhatsApp, Telegram and E-mail.

AOTTP has also signed a Memorandum of Understanding for reward reimbursements with the Saint Helena Government (BOT).

AOTTP partners at the University of Maine and [NOAA](#) are working *voluntarily* with a large range of USA sport fishing associations and organisations including: the [South Shore Marlin and Tuna Club](#), [Sail World](#), [Virginia Saltwater Fishing](#), the [Billfish Foundation](#), the [Fort Walton Beach Sailfish Club](#), the [Billfish Rundown](#), [Grenada Fishing Charters](#), [The Anderson Cabot Center for Ocean Life](#), and [ROFFS](#). These relationships are beginning to become productive and a number fish have now been tagged and recovered by volunteers in the NW Atlantic.

AOTTP has worked with [ARGOS-CLS](#) who run the satellites that collect the data from the pop-up electronic tags.

AOTTP has so far worked with the skippers and crews of more than 25 commercial fishing vessels and feedback with respect to the relationships between the scientific and technical teams and the fishing crews has been routinely positive, according to both verbal and cruise reports from our Contractors. The fishers are usually extremely engaged, enthusiastic about the tagging work, and delighted to help in all possible ways.

AOTTP has an agreement with IATTC to pay rewards on its behalf and collect metadata from tags where possible. The TROs in Abidjan work closely with personnel from IRD and IEO to gain access to log-book data, essential for ascertaining where and when a tagged tuna was actually caught.

The AOTTP SC is also regularly consulted on AOTTP progress and plans, and members have been involved in evaluating contracts. Members of the ICCAT SCRS are also enthusiastic about AOTTP and are looking forward to undertaking research with the data.

The 'Final Beneficiaries' of the Action are: (i) Fishing communities and operators depending on the exploitation of tuna resources; and (ii) Consumers (of tuna).

The Action has already had an impact on the 'Final Beneficiaries'. AOTTP TROs have now recovered over 16,000 tags. Both Recovery Rates and Reporting Rates are good compared with similar oceanic tagging campaigns. These statistics indicate a strong 'buy-in' to the project from fishers, dockers, stevedores and the tuna canning industry. More than 100 scientists and technicians from developing countries have benefited directly from the employment AOTTP is generating, and less directly from the training and capacity building activities they have received (**Table 9**). Thousands of euros of cash rewards, substantial lottery prizes, and t-shirts have also been distributed to many diverse fishery stakeholders.

AOTTP also works extensively with the Observer Programs in the target countries.

In Abidjan, Dakar and Tema the TROs must liaise daily with the Port Authorities to gain access to harbors and fishing vessels. They have also done awareness-raising activities at the tuna canning factories building relationships with their staff.

AOTTP continues to work productively with the [Blue Belt](#) in the British Overseas Territories of Ascension and St Helena. The Blue Belt programme is and has tagged fish in both these locations. When Blue Belt tags are found by AOTTP TROs the rewards are paid and (release and recovery) data shared.

## 6. *Visibility*

The EU logo and funding statement are always clearly visible on all AOTTP communication materials including websites, flyers, pamphlets, posters, reports, newsletters, t-shirts and caps. The materials can be seen at harbours, at fishing beaches, and onboard fishing and recreational vessels throughout AOTTP target countries.

AOTTP, together with the ICCAT Secretariat, has developed a [website](#) packed with regularly updated information about the project.

AOTTP Coordination publishes [quarterly newsletters](#) about the project which, in addition to being available on the website, are also sent by email to all our partners working on the project.

The AOTTP final symposium will provide visibility and has been announced on various platforms, including: the European Tuna Conference, the IATTC meeting, the Tuna Conference and ICCAT SCRS meetings. A webpage has been developed which will contain updates on the status of the rescheduling of the AOTTP Final Symposium (<https://www.iccat.int/AOTTP/en/aottp-symposium.html>).

AOTTP has been formally presented at many different fora around the Atlantic Coastal States, including:

- ICCAT Commission meeting (Gary Melvin, Mallorca, November 2019)
- Bigeye and Yellowfin Ageing Workshop (Lisa Ailloud, Panama City, December 2019)
- ICCAT SCRS Intersessional Meeting on Ecosystems (Doug Beare, Online, May 2020)
- ICCAT Intersessional meeting on Small Tunas (Fambaye Ngom, Kamarel Ba, Doug Beare, Online, July 2020)

AOTTP has already been published widely on the internet, e.g.:

- [Safari News](#)
- [ARGOS-CLS](#)
- [Sail World](#)
- [NOAA](#)
- [Saving Seafood](#)
- [Skiboat](#)
- [St Helena](#)
- [Terramar Project](#)

Many of our partners have made videos and uploaded them to YouTube, eg.:

- [Senegal](#) (AZTI);
- [Northern Brazil](#) (FADURPE);
- [Central Brazil](#) (FADURPE);
- [Senegal](#) (CRODT);

## **7. Updated Action Plan**

The final phase of the programme will focus on: tagging the remaining 700 fish to reach the targets; ongoing tag-recovery, awareness-raising and incentive distribution; improving stock assessments using biological parameters estimated from the tag-recapture data; ongoing training in data analysis, scientific publication and age reading; routine age determination and validation work; and, very importantly, dissemination of the scientific output of the programme (organising the AOTTP Final Symposium and the Special Edition of Fisheries Research).

In early 2019, the duration of the AOTTP Project (at no extra cost) was extended until 30 November 2020 giving the project a full 60-month duration. AOTTP Coordination, however, now needs more time to re-organise and re-plan the final stages of the project after the chaos caused by the pandemic. In particular, the large AOTTP Final Symposium had been organised to take place in Dakar, Senegal in June 2020 but was postponed. If the 3-month extension is granted we propose to reorganise the AOTTP Final Symposium (for 100-150 people) in January 2021, again in Dakar in Senegal. The budget has been analysed and it should still be possible to meet current liabilities and fund the Final Symposium at no extra cost outside AOTTP's original budget. Those who may not be able to attend physically due to unpredictable travel restrictions would be invited to attend and present their work remotely.

Considering that the COVID-19 situation is of course highly unpredictable and there are caveats and considerations, for example:

- The current scenario assumes that AOTTP will stop paying for tag recovery activities in October 2020 (November in the Canary Islands). However, it should be noted that ICCAT will take over this cost for 3 months, enabling work to continue until January 2021;
- That the Senegalese government will allow the Symposium to take place in Dakar;
- A Communications Specialist as recommended in the Final Evaluation has not been included in the re-budgeting exercise, although it is worth noting that the Event Manager has some expertise in this area;
- If ICCAT has to postpone the AOTTP Final Symposium again it will likely cause additional costs (canceled flights and hotel rooms etc.) which will have to be considered 'eligible' by DG-DEVCO;

Given the possibility that COVID-19 will disrupt plans to have an in-person symposium in January 2021, we will re-evaluate the situation in October 2020 and make a decision no later than 30 October on whether the situation will allow for an in-person symposium. If conditions force us to cancel, an online symposium will be organized in its place and we will attempt to re-direct any excess funds related to having to cancel the symposium towards short-term contracts, such as data analyses on age and growth, and/or electronic tags. A 3-month extension would also provide additional time for the SCRS and greater scientific community to analyse the results from tags with longer times at liberty, more time to finalise the ageing work (which has also been disrupted by COVID-19 travel restrictions); and more time to analyse the extremely large and challenging AOTTP electronic tag database. Further, it would allow AOTTP Coordination more time to improve the accuracy of the database and transfer relevant expertise to personnel from the ICCAT Secretariat, which is more difficult while teleworking in this current context. Extending the duration of AOTTP for 3 months will enable the project team to work with the ICCAT Secretariat to maintain the main tag-recovery offices and ensure that all results are published properly in the peer-reviewed scientific literature. If this extension is granted, the AOTTP Coordination team will make a detailed work-plan, revise the exit-strategy and, if necessary, may request additional amendments to its budget.

## **8. Acknowledgements**

A tagging programme such as AOTTP depends on the hard work and dedication of fishing skippers and crews, financial administration officers, and tagging and tag-recovery teams around the Atlantic. We therefore thank the ICCAT Secretariat (particularly Camille Manel, Juan Antonio Moreno, Miguel Neves dos Santos, Mauricio Ortiz and Paul de Bruyn) for overseeing the administration of the project, the skippers and crews of the Acoriana, the Grand Primero, the Macizo, the Aita Fraxku, the TarrynAmy, the Estrela Delva, the Katsushio Maru 8, The Thavisson III, the Tuburao Tigre, the Aldbaran I and the Ponta Calhau for their work in finding fish, catching bait and their cheerful help given to the tagging teams on board. In attempting to improve the accuracy of the tag recovery data it is often very useful to have access to detailed logbook data. To that end we would like to thank ANABAC, DPMA, IEO, IRD, OPAGAC-AGAC, ORTHONGEL, and their

representatives for their generous, substantial, and rapid support. We would also like to thank the AOTTP Steering Committee for their help and advice during the project (Camille Manel, David Die, Shannon Cass-Calay, Hilario Murua, Monin Justin Amade, Franco Biagi and Paulo Travassos), some of whom are also involved in AOTTP tagging and recovery activities. Funding from the European Union (DG-DEVCO), ICCAT CPCs and Collaborators is gratefully acknowledged as is the substantial support to the AOTTP project given by AOTTP Project Officers, Isabelle Viallon and Fernando Trabada Crende.

**Table 1.** Contracts awarded by ICCAT-AOTTP since August 2019

<i>Date</i>	<i>Supplier</i>	<i>Objective</i>	<i>Value</i>
2020-02-06	PROMEL	Gestión del evento: "Symposium en Senegal"	€ 59194
03/01/2019	FISH AGEING SERVICES PTY LTD	Otolith Reference Collection	€ 6288

**Table 2.** Number of tags released, number of tags recovered, and percentage recovered

	<i>Numbers released</i>	<i>Numbers recovered</i>	<i>% Recovered</i>
BET	24049	4863	20.2
LTA	7832	580	7.4
SKJ	46860	3514	7.5
WAH	281	2	0.7
YFT	40196	7855	19.5
<b>Totals</b>	<b>119218</b>	<b>16814</b>	<b>14.1</b>

**Table 3.** Electronic tag releases by species

	<i>BET</i>	<i>SKJ</i>	<i>YFT</i>
Desert Star	22	0	7
Lotek ARCGEO9	30	0	6
Lotek LAT2810	131	9	252
Microwave Telemetry	19	0	10
Wildlife Computers	32	0	76
<b>Total</b>	<b>234</b>	<b>9</b>	<b>351</b>

**Table 4.** Tagging campaigns by location

<i>Location</i>	<i>Number</i>
Azores	16
Brasil-Uruguay	55
Canarias	17
Golfo de Guinea	206
Santa Elena	162
Senegal	10
South Africa	7
USA	38

**Table 5.** Chemically tagged totals by species

	<i>BET</i>	<i>SKJ</i>	<i>YFT</i>
Released	1973	3655	3147
Recovered	369	197	476
% recovered	18.7	5.4	15.1

**Table 6.** Reporting rates (%) from tag-seeding experiments by species

<i>species</i>	<i>BB</i>	<i>PS</i>	<i>UNCL</i>
BET	94.6	72.6	100
LTA	71.4	100	NA
SKJ	83.6	79.3	75
YFT	64.1	68	71.4

**Table 7.** Total number of fish double-tagged and released by species.

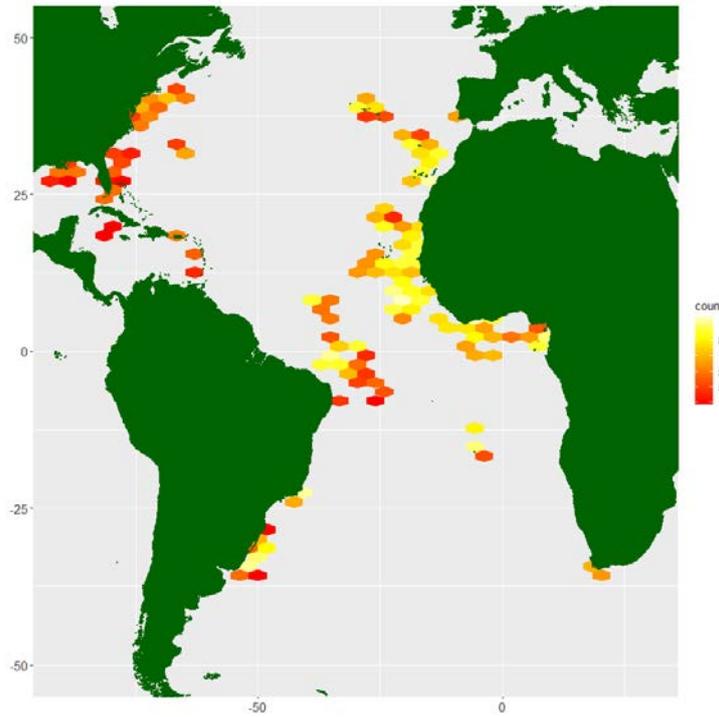
	<i>BET</i>	<i>LTA</i>	<i>SKJ</i>	<i>WAH</i>	<i>YFT</i>	<i>Total</i>
Double tagged	4824	1489	8751	33	6291	21388
Single tagged	19225	6343	38109	248	33905	97830
% double tagged	25	23	23	13	19	22

**Table 8.** Biological samples collected.

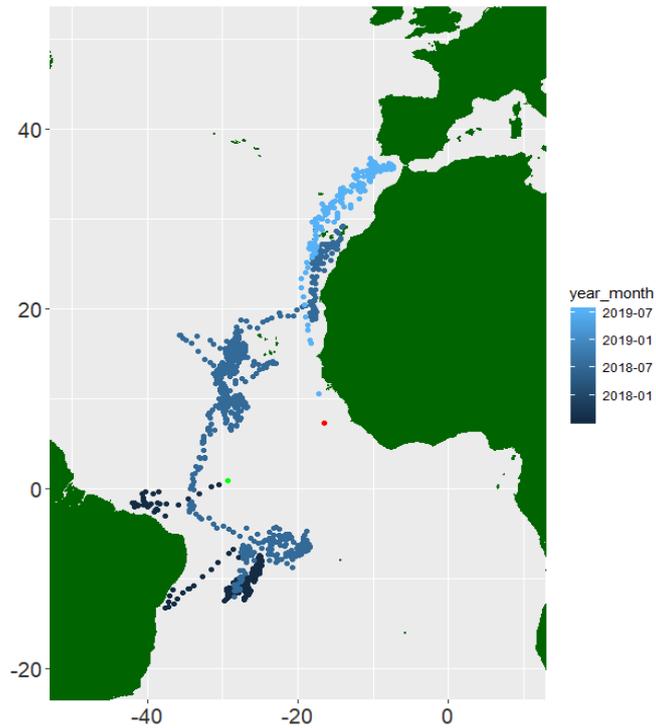
	<i>F</i>	<i>M</i>	<i>U</i>
BET	172	202	59
LTA	1	1	0
SKJ	146	197	6
YFT	205	295	33
<b>Total</b>	<b>524</b>	<b>695</b>	<b>98</b>

**Table 9.** Numbers of fish tagged by nationality.

<i>Country</i>	<i>Frequency</i>
Brazil	33421
Cabo Verde	1268
Côte D'Ivoire	17739
EU Spain	22139
EU Portugal	8040
EU United Kingdom	358
Gabon	862
Ghana	9092
Guinea Bissau	710
Mauritania	1158
S. Tome e Principe	6713
Senegal	10585
South Africa	195
U.S.A.	870
UK Saint Helena	5371
Uruguay	23
<b>Total</b>	<b>118544</b>



**Figure 1.** Spatial distribution of tropical tuna tagged and released (R-1 conventional tags only) by ICCAT-AOTTP between July 2016 and September 2019.



**Figure 2.** Migration of a yellowfin tuna tagged with archival tag (serial number = 2868) in St Peter and Paul Islands.

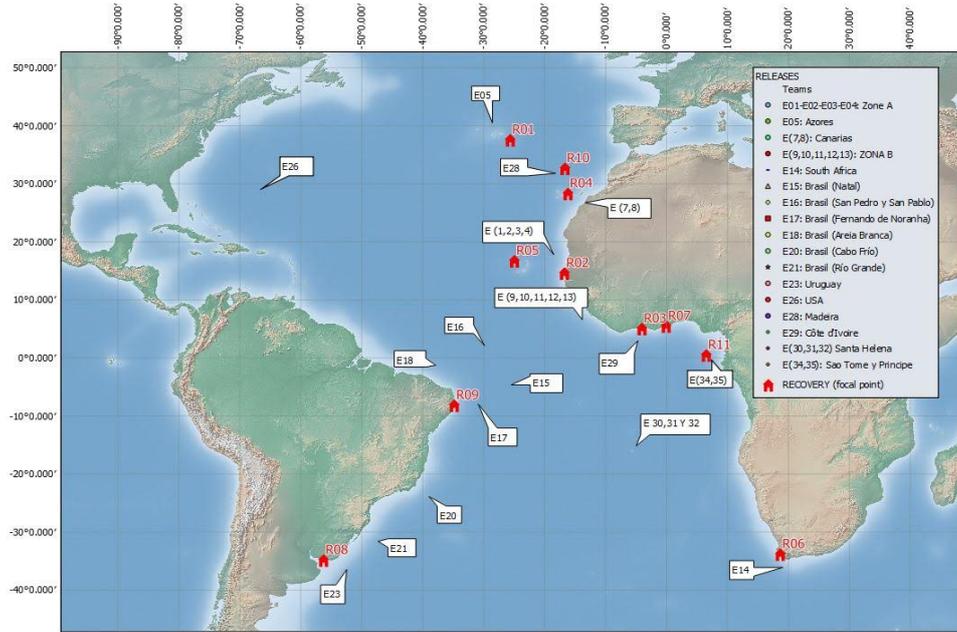


Figure 3. Distribution of ICCAT-AOTTP tag teams (E) and Recovery Teams (R) around the Atlantic Ocean.

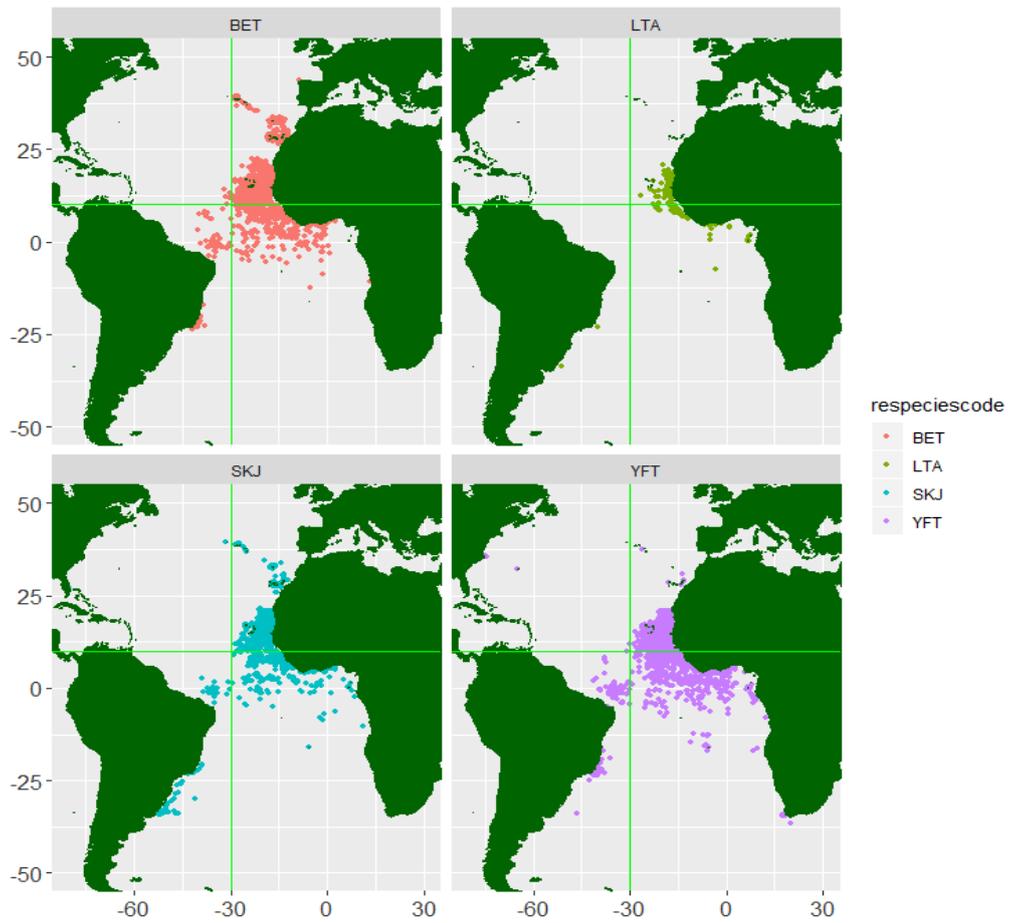
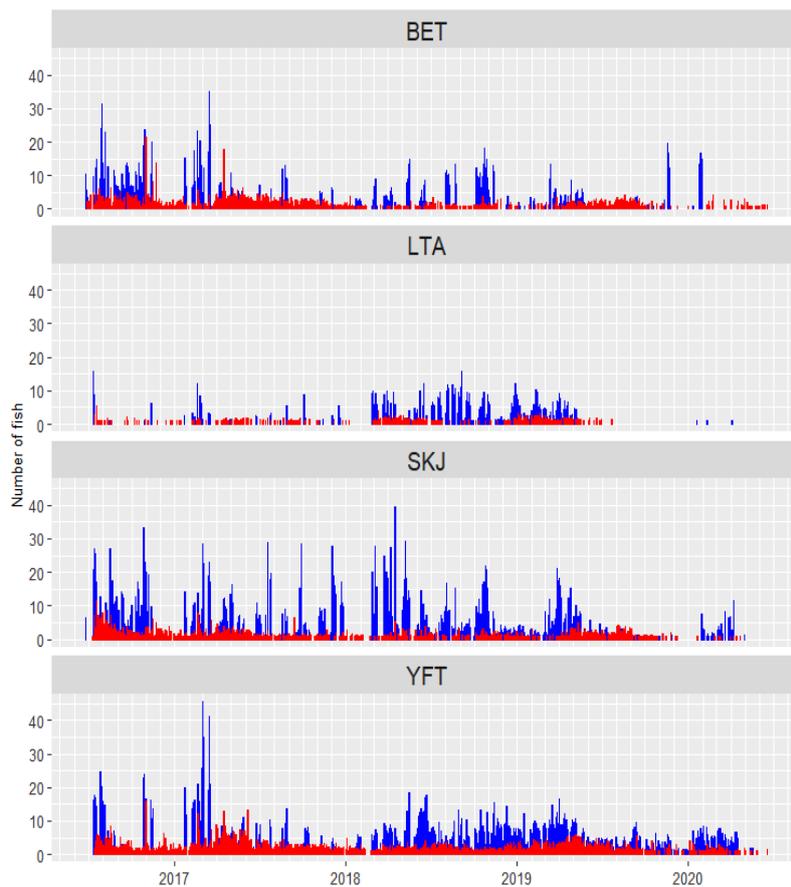


Figure 4. Spatial distribution of conventional tag recoveries June 2016 to June 2019 by species.



**Figure 5.** Total ICCAT-AOTTP releases (blue) and recoveries (red) over time by species (BET=bigeye, LTA=little tunny, SKJ=skipjack, YFT=yellowfin). The numbers have been square-root transformed so they can be seen on the same axes.



**Figure 6.** AOTTP Coordination visit to Dakar, March 2020, Senegal.

## Addendum 1 to Appendix 4

## List of Acronyms

<i>Acronyme</i>	<i>Définition</i>
AGAC	Association des grands thoniers congélateurs
ANABAC	Association nationale des propriétaires de thoniers congélateurs
AOTTP	Programme de marquage des thonidés tropicaux dans l'océan Atlantique
AZTI	Centre technologique expert en innovation marine et alimentaire (Espagne)
BB	Canneur
BET	Thon obèse ( <i>Thunnus obesus</i> )
BOT	Territoire britannique d'outre-mer
CEFAS	Centre des sciences de l'environnement, des pêches et de l'aquaculture (UK)
CIPA	Centre de recherche appliquée sur la pêche (Guinée-Bissau)
CISEF	Cap-Vert Côte d'Ivoire Sénégal Espagne France
CLPA	Comité local de la pêche artisanale (Sénégal)
CRO-CI	Centre de recherches océanologiques (Côte d'Ivoire)
CRODT	Centre de recherches océanographiques de Dakar (Sénégal)
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DAFF	Ministère de l'agriculture de la sylviculture et de la pêche (Afrique du Sud)
DEPAq	Departamento de Pesca e Aquicultura (Brazil)
DG-DEVCO	Direction générale de la coopération internationale et du développement
DG-MARE	Direction générale des affaires maritimes et de la pêche
DPMA	Direction des pêches maritimes et de l'aquaculture (France)
DP-STP	Direcao das Pescas (Sao Tomé e Principe)
ZEE	Zone économique exclusive
FADURPE	Fundacao Apolonio Salles de Desenvolvimento Educacional (Brazil)
FM	Fausse marques
FSSD	Fisheries Scientific Survey Division (Ghana)
IATTC	Commission interaméricaine du thon tropical (USA)
ICCAT	Commission internationale pour la conservation des thonidés de l'Atlantique
ICES/CIEM	Conseil international pour l'exploration de la mer
IEO	Instituto Español de Oceanografía
IFAN	Institut fondamental d'Afrique noire Cheikh Anta Diop (Sénégal)
IMAR	Instituto do Mar
IMROP	Institut mauritanien de recherches océanographiques et des pêches (Mauritanie)
INDP	Instituto Nacional para Desenvolvimento das Pescas (Cabo Verde)
CTOI	Commission des thons de l'océan Indien
IRD	Institut de Recherche pour le Développement (France)
ISRA	Institut sénégalais de recherches agricoles
LATEP	Laboratorio de Tecnologia Pesqueira (Brazil)
LL	Palangre
LPRC	Large Pelagic Research Center (USA)
LTA	Thonine commune ( <i>Euthynnus alletteratus</i> )
MFRD	Marine Fisheries Research Division (Ghana)
MFV	Navire de pêche à moteur
MSE	Évaluation de la stratégie de gestion
NOAA	National Oceanic and Atmospheric Administration (USA)
NRIFSF	National Research Institute of Far Seas Fisheries (Japon)
OPAGAC	Organisation des producteurs de thon congelé
ORTHONGEL	Organisation des producteurs de thon congelé et surgelé (France)
PAD	Port autonome de Dakar (Sénégal)
PFRP	Pelagic Fisheries Research Program (USA)
PROBITEC	Proyectos biológicos y técnicos (Espagne)
PS	Senne
RV	Navire de recherche
SC	Comité directeur
SCRS	Comité permanent pour la recherche et les statistiques

SKJ	Listao ( <i>Katsuwonus pelamis</i> )
SPC	Communauté du Pacifique (Nouvelle Calédonie)
ORGP thonière	Organisation régionale de gestion des pêches thonières
TRO	Coordinateur de récupération des marques
UFERSA	Universidade Federal Rural de Semiarido (Brésil)
UFPRE	Universidade Federal de Pernambuco (Brésil)
UPV	Universidad Politecnica de Valencia (Espagne)
VIMS	Virginia Institute of Marine Science
YFT	Albacore ( <i>Thunnus albacares</i> )

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## Report of the Small Tunas Year Programme (ICCAT/SMTYP)

### Programme objectives

The status of small tuna stocks in the ICCAT Convention area is generally unknown. Nevertheless, these species have a high socio-economic relevance for a considerable number of local communities at the regional level, which depend on landings of these species for their livelihoods.

Fisheries statistics and biological data, which can provide a basis for assessing these resources and thus providing the Commission with appropriate scientific advice for their sustainable exploitation, are generally incomplete and not updated for these species.

The ICCAT Year Research Programme for Small Tunas (SMTYP) was adopted by the SCRS in 2011 and approved by ICCAT during its 2012 Annual meeting in Agadir (Morocco). The main objectives of the programme are recovery of historical series of Task I and Task II data, collecting the available biological data, and conducting biological studies, mainly on growth, maturity and stock structure for the main species of small tunas.

This programme has a wide geographical sampling coverage:

- Mediterranean and Black Sea: bullet tuna, Atlantic bonito, little tunny and plain bonito;
- West Africa: Atlantic bonito, little tunny, tuna, West African Spanish mackerel, frigate tuna, wahoo;
- Caribbean Sea and south-west Atlantic: blackfin tuna, wahoo, king mackerel and Spanish mackerel and dolphinfish.

### 2019/2020 activities

The ICCAT Secretariat launched in April 2019 a Call for tenders with the aim of implementing the main activities scheduled within SMTYP in 2019. The main objective of this Call was (I) to collect biological samples to fill the gaps for estimating the growth parameters, assessing the maturity (size/age at the first maturity, spawning season) of three prioritized species (LTA, BON and WAH), and (II) conclude the analysis of the stock structure for at least one of the three species and provide preliminary results for the remaining stock structure (mainly genetic analysis) in the Atlantic and the Mediterranean Sea, from geographical areas that the Small Tunas Species Group identified as of high priority. As a result, the Secretariat selected one proposal of a consortium of a number of institutions, including 11 CPCs to carry out the tasks aforementioned and issued a short-term contract, which was extended until 31 March 2020.

The SMTYP collected biological samples aiming at describing the growth, maturity and stock structure of these three small tuna species in 2018 and 2019. In 2020 this activity has been heavily impacted due to the COVID-19, which has precluded most of the field and laboratory work. In 2020, final results on stock structure of two of the two species (BON and LTA) were provided, whereas for showing promising results for WAH were also provided. For LTA, there is a probable presence of two different species (or sub-species) in the studied area. The boundary of these two putative sub-species could be somewhere between Senegal and the southern coast of Portugal. BON also showed a clear genetic differentiation between the different studied areas, which do not match the current management areas adopted by ICCAT. In this case, however, the differentiation is at population level. Samples from the Western and Central Mediterranean share the same genetic pool from those obtained in the Northeast Atlantic. This genetic unit is clearly separated that occurring off Senegal (AT-NE) and Côte d'Ivoire (AT\_SE), which show a clear differentiation between them. Preliminary results for WAH were also provided. This species did not show any genetic differentiation among the studied area, although samples were only available from only two ICCAT areas (AT-NE and AT-SE). Although the results for these species should be further investigated mainly by improving the geographic coverage, the sampling and the analyses. Samples for growth and maturity were considered mostly satisfactory for the areas and species.

**Table1** provides a summary of the number of samples collected within the SMTYP by region and species in 2019/20, within the *Short-term contract for ICCAT SMTYP for the biological samples collection for growth, maturity and genetics studies*. Target samples (No. samples), effective number of samples collected (Provided) and respective percentage.

Species	Research line	Area	CPCs involved	No. samples	Provided	%
Little tunny	Aging and growth	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Maroc	250	238	95
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	150	146	97
		Med	Tunisia, EU-Spain	200	75	38
	Reproduction	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Maroc	250	45	18
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	150	110	73
		Med	Tunisia, EU-Spain	200	27	14
	Stocks structure/	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Maroc	250	263	105
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	150	150	100
		Med	Tunisia, EU-Spain	200	197	99
Bonito	Aging and growth	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Maroc	250	42	17
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	150	77	51
		Med	Tunisia, EU-Spain	200	141	71
	Reproduction	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Maroc	250	31	12
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	150	63	42
		Med	Tunisia, EU-Spain	200	142	71
	Stocks structure/	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Maroc	250	132	53
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	150	79	53
		Med	Tunisia, EU-Spain	200	150	75
Wahoo	Aging and growth	NE Atlantic	EU-Spain	250	0	0
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	50	50	100
		SW Atlantic	Brazil	100	0	0
	Reproduction	NE Atlantic	EU-Spain	250	188	75
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	50	11	22
	Stocks structure	NE Atlantic	EU-Spain	50	50	100
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	50	50	100
		SW Atlantic	Brazil	100	0	0

### Activities planned for 2020-2021

Although the data collection efforts for the years of 2018 and 2019 contracts were mostly successful to accomplish the growth and maturity objectives, some specific gaps were identified. Besides, the previous contract did provide a substantial number of samples for BON and LTA, but that was not the case for WAH. The latter was mostly due to the high cost of these specimens and much lower abundance compared to the other two species included in this programme.

Hence, during the period 2020-2021, the Group plans to: I) continue the collection of biological samples to fill the specific gaps for estimating the growth and maturity parameters for BON and LTA in the Atlantic and the Mediterranean Sea with emphasis to fill spatial-temporal gaps noticed in the 2020 report; II) estimate growth and maturity parameters for LTA and BON, and provide preliminary results for WAH; and, III) continue with the study of the stock structure for BON, LTA and WAH (see details on sample collection in **Table 2**).

**Table 2.** Detailed information on sampling targets by species, size classes and regions to be carried out by species for between August 2020 and throughout 2021 under the ICCAT SMTYP.

Species	Research line	Area	CPCs involved	Target size classes and desirable number of samples (in brackets)
<b>Little Tunny (LTA)</b>	Aging and growth and reproduction	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Morocco	> 60 cm (30)
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	≤ 40 cm and > 55 cm (50)
		Med	Tunisia, EU-Spain	≥50 cm (30)
<b>Atlantic Bonito (BON)</b>	Aging and growth and reproduction	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Morocco	≤ 40 cm and > 60 cm (50)
		SE Atlantic	Cote d'Ivoire, Gabon, EU-Spain	≤ 40 cm and > 50 cm (50)
		Med	Tunisia, EU-Spain	< 30 cm and ≥ 50 cm (50)
<b>Wahoo (WAH)</b>	Stock structure	SW Atlantic	Brazil	All sizes (50)

Nevertheless, these objectives could not be achieved with the single financial support of ICCAT, and will only be possible through additional external funding that hopefully will be made available by the significant voluntary contribution provided ICCAT CPCs, as it has been specifically the case of the European Union. In **Table 3** the responsible for coordinating the analysis and Institutions where samples will be stored are identified.

**Table 3.** Scientist responsible for coordinating the analysis and Institutions where samples will be stored.

Analysis	Institution	Country	Coordinator
Growth	Instituto Português do Mar e da Atmosfera	EU-Portugal	P. Lino and Ruben Muñoz Lechuga
Reproduction	Instituto Español de Oceanografía- Málaga	EU-Spain	D. Macias, S. Saber and J.M. Ortíz
Stock structure	University of Girona	EU-Spain	J. Viñas

### 2018, 2019 and 2020 Expenditures and long-term planning

The total expenditures within SMTYP during 2018 and 2019 amounted to €50,000 and €60,000, respectively. To implement the main activities planned in the framework of SMTYP in 2020, a total budget of €85,000 was provided from ICCAT. The details of costs related to activities to be carried out in 2020 are shown in the **Table 4**.

**Table 4.** The detailed expenditures within SMTYP during 2020.

Component	AMOUNT (€)
Coordination work	5,100
Objective I - Sampling	5,960
Objective II – Age and growth analysis	32,225
Objective III – Analysis on reproductive biology	28,500
Objective IV – Stock structure analysis	12,815
Shipping	400
<b>TOTAL</b>	<b>85,000</b>

In **Table 5**, provides the estimated research funds needed in the short and medium terms (2021 to 2023). These aim at concluding in 2021 the ongoing studies on BON and LTA, and eventually WAH. Furthermore, the requested funds envisage other activities related to the assessment of stock status stock assessment using data-limited methods and investigate basic key biological parameters for other small tunas species to be prioritized by the SMT Species Group.

**Table 5.** Required budget (in €) for the research activities to be carried out for the period of 2021-2023 under the ICCAT SMTYP.

Species: Small tunas	2021	2022	2023
Tagging and rewards	20,000	5,000	5,000
Biological studies:			
Reproduction	15,000	25,000	25,000
Age and growth	15,000	25,000	25,000
Genetic	15,000	25,000	25,000
Other fisheries related studies (including data recovery)		5,000	5,000
Sample collection and shipping	10,000	25,000	25,000
Revision of the ICCAT manual for small tunas species:	5,000		
Workshops on Data-Limit stock assessment (in 2021 and 2023) + Workshop on the maturity staging (in 2022)	25,000	20,000	25,000
<b>TOTAL</b>	<b>105,000</b>	<b>130,000</b>	<b>135,000</b>

## Report of the ICCAT Shark Research and Data Collection Programme (ICCAT/SRDCP)

### Background and programme objectives

During the 2014 Commission meeting it was decided that an overall budget of €135,000 would be allocated to the Shark Research and Data Collection Programme (SRDCP). During the 2015 Blue Shark Data Preparatory Meeting, (Anon. 2016a) the Shark Species Group (SSG) reviewed the proposal for implementation of the SRDCP that had been prepared in 2014 and identified national scientists who would be in charge of preparing proposals for receiving funds to carry out each of the research topics listed in the original proposal. For the first three years the programme focused on biological and other aspects of the shortfin mako and contemplated extensive collaborative work among national scientists with the aim of contributing information to the 2017 shortfin mako stock assessment. Activities under the SRDCP continued throughout 2018, 2019, and 2020 and extended to include other shark species, including porbeagle.

### 2020 Activities

During the 2015 Blue Shark Stock Assessment Meeting (Anon. 2016b) and shortly thereafter, four project proposals covering different aspects of the life history, stock structure, and fisheries of the shortfin mako were presented: a pan-Atlantic age and growth study; a population genetics study to estimate the stock structure and phylogeography of Atlantic shortfin mako; a post-release mortality study focusing on pelagic longline fisheries; and a satellite tagging study for determining movements and habitat use. The following are the cumulative SRDCP activities conducted up to 2020.

### *Age and growth of shortfin mako in the Atlantic Ocean*

The project leaders for this study are Dr. Rui Coelho and Daniela Rosa, national scientists from EU-Portugal, with participation of scientists from EU-Portugal, United States and Uruguay. There still remained uncertainties about the age and growth parameters of shortfin mako and this project aimed to update the available estimates by ageing specimens from multiple areas in the Atlantic. To that end, an inventory of existing vertebral samples available at each national laboratory was compiled, and additional sampling was carried out. All samples were processed and digital images were uploaded to an ICCAT online repository. Following a two-day age and growth workshop organized by NOAA-NEFSC (Narragansett Laboratory) with the participation of the involved scientists in June 2016 in which an initial reference set for ageing samples was established, one biologist from each participating institution read and estimated the ages from all the samples, based on the agreed ages from the reference set, and growth models were developed based on those readings. For the North Atlantic, data from 375 specimens ranging in size from 57 to 366 cm fork length (FL) for females and 52 to 279 cm FL for males have been analyzed, with the work completed in 2017 and presented in several SCRS papers (Rosa et al., 2017a,b). The growth models presented in Rosa et al. (2017b) for the North Atlantic were used in the 2017 SMA stock assessment. For the South Atlantic, data from 332 specimens, ranging in size from 90 to 330 cm FL for females and 81 to 250 cm FL for males, have been analysed (Rosa et al. 2018). Given the poorly estimated parameters, the Group did not recommend the use of the growth curves for the South Atlantic stock at that time, and it was noted that more samples are still required to develop more credible growth curves, particularly specimens from the southeast region. A few samples from Japan and Namibia have been made available to this project since then. Additionally, in late 2019, a few hundred samples more from Southern Brazil were also made available to this project and are now starting to be processed by the IPMA, Portugal laboratory. Sample processing should be completed by the end of 2020, and an updated work for the South Atlantic is planned to be provided to the SSG in 2021.

### *Genetic analysis of shortfin mako in the Atlantic Ocean*

Dr. Yasuko Semba, national scientist from Japan took over as project leader for this study from Mr. Kotaro Yokawa. With funding from the SRDCP 2020 grant, two questions arising from previous studies on Atlantic shortfin mako were addressed: (1) the true picture of the spatiotemporal genetic heterogeneities of mitochondrial DNA in the equatorial and South Atlantic populations (Nohara et al., 2019), and (2) the reason for the inconsistency between genetic population structures predicted from mitochondrial and nuclear DNA analyses (Taguchi et al., 2016, Nohara et al., 2017). To answer these questions two genome-wide analysis approaches were used: whole mitochondrial genome analysis (mitogenomics) and nuclear-genome-wide

single-nucleotide polymorphism (SNP) genotyping (genotyping-by-sequencing; GBS). For the mitogenomics approach, the research group reconstructed two mitogenomes (approximately 0.9 giga bases of sequence data per individual) with high coverage (52 and 104 reads per base, respectively) by using whole genome shotgun sequencing. By comparing sequence variability between mitochondrial gene regions, unexpectedly lower genetic variability (0.8%) was observed in the control region (*CR*), which was used as the DNA marker in previous analyses of Atlantic populations, when compared with the whole mitogenome excluding the *CR* (1.3%). This result indicates that, notwithstanding the low variability of the *CR*, the whole mitogenome sequences can still be regarded as a rich source of markers for studying variations and genetic population structure of shortfin mako. The group succeeded in preparing a low-cost shotgun sequencing library from degraded DNA according to the method described by Gaio *et al.* (2019). By using this library for high-throughput next generation sequencing of the mitogenome of over 200 individuals from throughout the Atlantic Ocean, the group aims to clarify the maternal genetic population structure. For the nuclear-genome-wide SNP GBS approach, the group first tested the usability of a genotyping by random amplicon sequencing-direct method (GRAS-Di; Enoki and Takeuchi, 2018), for four shortfin mako individuals. Approximately one giga base of sequence data was obtained per individual. A total of 19,611 loci were detected for the four individuals by mapping trimmed sequence reads onto the reference genome of the closely related great white shark (Marra *et al.*, 2019). The group is currently optimizing the amount of sequence reads per individual, after which many more individuals will be genotyped.

### ***Post-release mortality of shortfin mako in the Atlantic Ocean***

The project leader for this study is Dr. Andrés Domingo, National scientist from Uruguay. The main purpose of this project is to quantify the post-release mortality of Atlantic shortfin makos on pelagic longlines, which was non-existent when the project started, to potentially contribute to their assessment and management. To that end, Survivorship Popup Satellite Archival Transmitting Tags (sPATs) were acquired and distributed to the participating laboratories for deployment in three main areas of the Atlantic: the northwest Atlantic, the tropical northeast Atlantic and equatorial region, and the southwest Atlantic. A total of 14 sPATs have been deployed thus far by scientific observers from IPMA (EU-Portugal), DINARA (Uruguay), NOAA (USA), Brazil and EU-Spain, and additional information from 29 miniPATs was also available to estimate post-release mortality. Of the 35 specimens with available information, eight died (22.9%), whereas the remaining 27 survived (77.1%), at least the first 30 days after tagging. The updated results from this project were reported and published in Miller *et al.* (2019). Tag deployment has continued throughout 2019 and in March two more shortfin makos were tagged with miniPATs.

### ***Movements, stock boundaries and habitat use of shortfin mako in the Atlantic Ocean***

The project leaders for this study are Dr. Rui Coelho and Catarina C. Santos, national scientists from EU-Portugal. The main purpose of this study is to use satellite telemetry to gather and provide information on stock boundaries, movement patterns and habitat use of shortfin mako in the Atlantic Ocean, to potentially contribute to their assessment and management. All phase 1 (2015-2016) and Phase 2 (2016-2017) tags have been deployed (36 tags: 22 miniPATs and 14 sPATs). Regarding Phase 3 (2017-2018), 5 of the 20 miniPATs acquired have been deployed on shortfin mako and 3 tags were deployed on silky shark. Eight of these tags are planned to be deployed in the Indian Ocean in order to assess inter-ocean movements of shortfin mako. Four of the 20 tags acquired during Phase 4 (2018-2019) were deployed on shortfin mako and 6 on other vulnerable species (oceanic whitetip, silky shark, porbeagle and scalloped hammerhead). In all, a total of 43 tags (29 miniPATs and 14 sPATs) were deployed by observers on EU-Portugal, Uruguay, Brazil, EU-Spain and US vessels in the temperate NE and NW, Equatorial and SW Atlantic. Data from 41 of the 43 tags/specimens are available for a total of 1,656 tracking days recorded. However, due to the battery issues with Wildlife Computer tags, several of the tags had to be returned for replacement, and those will be deployed later in 2020 or during 2021, depending on the tagging opportunities. Twenty-four additional tags from other projects involving the same partners were also deployed in these same areas, covering both hemispheres and both sides of the Atlantic. The preliminary movement analysis shows that specimens tagged in the temperate northeast moved to southern areas, while specimens tagged in the tropical northeast region close to the Cabo Verde Archipelago moved easterly to the African continent shelf. One specimen was tagged in equatorial waters and moved south to Namibia. The specimens tagged in the southwest Atlantic off Uruguay stayed in the same general area, and the specimens tagged in the temperate Northwest Atlantic showed some general southward movements. Shortfin makos spent most of their time above the thermocline (0-90 m), between 18 and 22°C. The updated results from this project were reported

and published in Santos *et al.* (2020). The main plan for the next phase of the project is to continue tag deployment during the rest of 2020, depending on the opportunities, considering the current difficulties with onboard missions due to Covid-19. Tagging will also continue for the next stage of the project in 2021.

### ***Reproduction of shortfin mako and porbeagle in the Atlantic Ocean***

The point of contact for this study is Dr. Enric Cortés, national scientist from the United States. A two-day, hands-on training session on determination of reproductive maturity of porbeagle sharks was held at the Narragansett Rhode Island, NOAA Fisheries NEFSC Laboratory on 14-15 July 2017, led by Dr. Lisa Natanson. During this training, scientists from the participating laboratories (NOAA SEFSC and NEFSC) worked together to collect reproductive organ samples to aid in determining reproductive habits and maturity for the species. The training was aimed at establishing standardized dissecting and sampling practices among researchers for more consistent collection of life history data. Sampling has taken place at several shark tournaments between New York and Maine, USA. In 2017, five male and 16 female shortfin makos and 8 female porbeagle were dissected. Although previous research based on specimens collected from the western North Atlantic Ocean indicated that this lamnid shark has an annual reproductive cycle, the results of a recent evaluation of reproductive tracts from a geographically segregated group of porbeagles within the western North Atlantic Ocean indicate the presence of females in a resting stage of maturity. The observation of a resting stage has implications not only for the reproductive cycle (biennial versus annual), but also in the lifetime productivity of the species. This finding indicates that this shark follows the typical lamnid resting period between pregnancies, a period that would decrease the lifetime output of young sharks (Natanson *et al.* 2019. Presence of a resting population of female porbeagles (*Lamna nasus*), indicating a biennial reproductive cycle, in the western North Atlantic Ocean). In 2020, a workshop on reproductive and other life history aspects of porbeagle and other pelagic sharks in the Atlantic Ocean was held at the IPMA, in Olhão, Portugal. An overview of shark reproduction studies of porbeagle in the Northwest Atlantic Ocean was provided. Median size at maturity for males and females using data from all years was updated to 173.1 and 216.3 cm FL, respectively. There is no new information on the timing of mating, gestation period or average number of pups. The reproductive cycle of at least some portion of the population is biennial or triennial based on the finding of a resting stage. The reproductive cycle of the shortfin mako in the North Atlantic, the estimation of maturity of shortfin mako in the North Pacific, and the reproductive biology of the blue shark in the Pacific Ocean were also reviewed. Workshop recommendations included an increase in hormone analysis to determine maturity and pregnancy of pelagic sharks, and to combine size data from various fleets to obtain more robust estimates of size at maturity and the overall reproductive cycle of porbeagle.

### ***Movements, stock boundaries and habitat use of porbeagle in the Atlantic Ocean***

The project leaders for this study are Dr. Andrés Domingo and Dr. Rui Coelho, national scientists from Uruguay and EU-Portugal. The main purpose of this study is to use satellite telemetry to gather and provide information on stock boundaries, movement patterns and habitat use of porbeagle in the Atlantic Ocean, to potentially contribute to their assessment and management. A total of 16 miniPATs acquired for this project were distributed to scientists from EU-France, EU-Portugal, and Norway, to be deployed in the North Atlantic, and Uruguay to be deployed in the South Atlantic. Relevant to this activity and that related to shortfin mako, the SSG was informed of other ongoing national programmes that can contribute data, such as Canada's, which is currently deploying 30 sPATs on shortfin mako and 30 sPATs on porbeagle during 2018-2019; and 12 new sPATs for porbeagle from a US/NOAA project that will be deployed in EU-Portugal, Uruguay, and United States vessels. To date, a total of five POR tags have been deployed by EU-Portugal and EU-France. Four sharks were tagged in the Northeast Atlantic, in the Bay of Biscay/Celtic Sea area. Three of these specimens tended to stay in the same general area and one appeared to travel west after a 3-month residency period in the Bay of Biscay. The one shark tagged in the central North Atlantic appeared to have died shortly after tagging. The remaining 11 tags available for porbeagle had battery issues and had to be returned to Wildlife Computers for tag replacement. Those tags will be deployed later in 2020 or during 2021, depending on the opportunities and given the current difficulties for onboard observer missions due to Covid-19.

### ***Movements, stock boundaries and habitat use of silky, oceanic whitetip and hammerhead sharks in the Atlantic Ocean***

The project leaders for this study are Dr. Andrés Domingo, Dr. Rui Coelho, Catarina C. Santos, and Dr. John Carlson, national scientists from Uruguay, EU-Portugal, and the United States. The SSG also decided that of 17 satellite tags that were acquired in 2019 for the SRDCP, 9 should be deployed on oceanic whitetip and hammerhead sharks and 8 on silky sharks. A total of 5 silky sharks, 3 oceanic whitetips and 1 scalloped hammerhead have been tagged with miniPATs thus far by Portuguese, Uruguayan and USA scientists/scientific observers (in collaboration with the Cape Eleuthera Institute, and Florida State University) in the U.S. Gulf of Mexico, Caribbean Sea, and Atlantic Ocean. These tags were acquired in previous years (2017-2018), but were only deployed during late 2018 and 2019. With respect to tags acquired in 2019, a total 2 silky sharks and 3 oceanic whitetips were tagged by Portuguese scientific observers in the Equatorial region of the Atlantic Ocean. In addition, 1 smooth hammerhead was tagged by the Uruguayan team in the Southwest Atlantic Ocean. Eleven tags await deployment, but due to the battery issues with Wildlife Computer tags these tags had to be returned for replacement and therefore will be deployed later in 2020 or during 2021, depending on the tagging opportunities. These sharks are considered priority shark species and are currently prohibited to be retained in ICCAT fisheries (a review of satellite tags previously deployed on these species in the Atlantic revealed that only three silky sharks had been tagged off Cuba, and oceanic whitetip sharks were tagged only in the NW Atlantic, but almost nowhere else in the Atlantic). Also, these species were ranked with high vulnerability in the ICCAT shark ERAs (Cortés *et al.*, 2010 and Cortés *et al.* 2015).

#### ***Other activities***

Discussions continued intersessionally on the prospects of Close-Kin Mark-Recapture (CKMR) for shortfin mako sharks, as a robust way to assess abundance and productivity. There is already a strong sampling program in Brazil, and the capacity to do the necessary sampling in Namibia and South Africa from observer programs, without the complications of high-seas CITES permits that seem to be an impediment to sampling in the North Atlantic. Based on the 2019 design study, those three programs could within a few years provide enough samples of the right type with the right geographic spread, to assess the sustainability of current combined catches from the South Atlantic shortfin mako population. External funding has been set back by Covid-19 but opportunities are being investigated.

#### **2021 Plan and Activities**

##### ***Age and growth of shortfin mako in the Atlantic Ocean***

In view of the need for additional vertebrae to develop reliable growth curves for the South Atlantic stock, the SSG will endeavour to analyze samples collected by Japan, Namibia and Brazil in the southeast Atlantic and conduct final analyses.

##### ***Genetic analysis of shortfin mako in the Atlantic Ocean***

National scientists from Japan will continue work on the genetic population structure of shortfin mako using two genome-wide analysis approaches and provide updated results. During the remaining period of the 2020 project, the maternal genetic population structure of Atlantic shortfin mako will be clarified by analysis of the spatiotemporal heterogeneities of the mitochondrial genome of over 200 individuals from about 10 sampling locations throughout the Atlantic Ocean. After the genotyping conditions of the nuclear-genome-wide GRAS-Di are optimized, this method will also be carried out for a total of 80 individuals (half from the North and half from the South Atlantic sampling locations). In the coming 2021 project, GRAS-Di analysis will be conducted on the same set of samples as used for the population mitogenomics. Finally, from the current analyses of the two resultant large-scale data sets from mitochondrial and nuclear genomes, it is expected that progress will be made in the understanding of the reason for the inconsistency between genetic population structures predicted from mitochondrial and nuclear DNA analyses in previous studies and consequently gain a more accurate picture of the genetic population structure of Atlantic shortfin mako.

***Post-release mortality of shortfin mako in the Atlantic Ocean/movements, stock boundaries and habitat use of shortfin mako in the Atlantic Ocean***

The SSG will continue deployment of the remaining tags acquired since late 2018, including 4 tags by scientists from EU-France, with the final analyses of these projects expected during late 2020. Additionally, 4 tags have also been deployed by South Africa.

***Movements and habitat use of porbeagle in the Atlantic Ocean***

In 2021 we plan to finish deployment of the available miniPATs acquired in recent years, which have not yet have been deployed. The deployments are planned by scientists from EU-Portugal and Norway in the North Atlantic, and Uruguay in the South Atlantic.

***Movements, stock boundaries and habitat use of silky, oceanic whitetip, longfin mako, and hammerhead sharks in the Atlantic Ocean***

The SSG decided that the 17 satellite tags acquired in late 2018 and 2019 for the SRDCP should be deployed on silky, oceanic whitetip, and hammerhead sharks, with priority given to silky sharks as this was ranked as the most vulnerable species in the 2010 ERA (Cortés *et al.*, 2010). In 2020 we acquired additional tags to be deployed on silky, oceanic whitetip and hammerhead sharks to continue the project. In 2021 we propose to acquire an additional 13-14 tags to be deployed by the various partners in different regions of the Atlantic.

**2020 budget and expenditures**

This section presents a summary of the contributions for the SRDCP during 2020. The Shark Species Group developed a budget of €125,000 for Year 6 of the programme (**Table 1**). These funds were approved and allocated as follows: €25,000 for the shortfin mako genetic analysis, €10,000 for the age and growth study, €35,000 for the reproductive study, and €55,000 for purchasing satellite tags (including satellite time and fish costs) to be deployed on silky, oceanic whitetip and hammerheads sharks.

**Table 1.** 2020 SRDCP budget.

<i>Project</i>	<i>Participating CPCs</i>	<i>Project leader</i>	<i>Approved budget (€) 2020</i>
<b>SHORTFIN MAKO</b>			
Stock boundaries (Genetics)	EU, Japan, Uruguay, US,	Y. Semba	25,000
Age and growth (South Atlantic)	EU, Brazil, Uruguay, Namibia, Japan	R. Coelho, D. Rosa	10,000
<b>PORBEAGLE</b>			
Reproduction	EU, Canada, Japan, Uruguay, US,	E. Cortés	35,000
<b>SILKY, OCEANIC WHITETIP &amp; HAMMERHEAD</b>			
Movements and habitat use (PSATs)	EU, Canada, Uruguay, US, Brazil	A. Domingo, R. Coelho, C. Santos, J. Carlson	55,000
<b>Total</b>			<b>125,000</b>

**2021 budget and requested contributions**

The proposed budget for Year 7 of the SRDCP (2021) amounts to a total of €100,000 (**Table 2**). Funds are being requested for research on shortfin mako, porbeagle, silky, oceanic whitetip, longfin mako, and hammerhead sharks, distributed as follows:

- Shortfin mako genetics (NGS - next generation sequencing, with additional samples from Uruguay): €25,000;
- Shortfin mako South Atlantic age and growth study, including additional sample analysis and finalizing analytical results €10,000;
- Silky, oceanic whitetip, longfin mako and hammerhead sharks: €65,000 to study movement and habitat characterization studies for other priority ICCAT species (includes costs for purchasing 13-14 satellite tags, satellite use and fish);

**Table 2.** Proposed budget for 2021 SRDCP.

<i>Project</i>	<i>Participating CPCs</i>	<i>Project leader</i>	<i>Budget requested (€) 2021</i>
<b>SHORTFIN MAKO</b>			
Stock boundaries (Genetics)	EU, Japan, Uruguay, US, etc.	Y. Semba	25,000
Age and growth (southern Atlantic)	EU, Brazil, Uruguay, Namibia, Japan	R. Coelho, D. Rosa	10,000
<b>SILKY, OCEANIC WHITETIP, LONGFIN MAKO &amp; HAMMERHEADS</b>			
Movements and habitat use (PSATs)	EU, Canada, Uruguay, US, Brazil	A. Domingo, R. Coelho, C. Santos, J. Carlson	65,000
<b>Total</b>			<b>100,000</b>

**Report of the Enhanced Programme for Billfish Research (ICCAT/EPBR)**  
(Expenditures/Contributions 2020 and Programme Plan for 2021)

### Summary and Programme objectives

The ICCAT Enhanced Programme for Billfish Research (EPBR) continued its activities in 2020, although with restrictions due to the COVID-19 pandemic situation. The Secretariat coordinates the transfer of funds and distribution of tags, information, and data. The overall programme coordinator and eastern Atlantic coordinator during 2020 was Dr Fambaye Ngom Sow (Senegal) and Ms. Karina Ramírez López (Mexico) remaining as 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. During past Billfish Species Group meetings, the Billfish Species Group requested that the objectives of EPBR expand to evaluate adult billfish habitat use, study billfish spawning patterns and billfish population genetics. The Billfish Species Group considers that these studies are essential to improve billfish assessments. Efforts to meet these goals since 2019 are highlighted below.

The specific funding for EPBR previously available has now been combined with the general research fund (ICCAT Science Envelope). Project funding will now be allotted on a competitive basis with other species working groups.

### 2020 activities

In July 2019 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 months period (until June 2020). Now, it 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).

Following the SCRS request, in Autumn 2019 through the ICCAT Science Envelope, a contract was proposed the Dirección General Adjunta de Investigación Pesquera en el Atlántico, Centro Regional de Investigación Acuícola y Pesquera en Veracruz (Mexico) to develop a Reproductive biology study on Atlantic blue marlin in the Gulf of Mexico. Unfortunately, albeit all the efforts made by the Secretariat, such contract was never signed. Accordingly, the Secretariat is currently evaluating together with the western coordinator of the EPBR, an alternative to implement this study as soon as possible.

In 2020 funds have been made available for sampling of artisanal and small scale fisheries in the eastern Atlantic (Côte d'Ivoire, São Tomé and Senegal). These funds were allocated to support the estimation of catch and effort statistics of fleets contributing the largest parts of the catch and/or those having traditionally provided the higher quality data in the past, to ensure the preservation of an uninterrupted time series of catch and relative abundance indices. However, no reimbursement has been requested as of 10 July 2020.

In 2020, it should be noted that due to of the COVID19 pandemic only the activity relating to the age and growth study has been carried out and are still ongoing. Specifically, a total of 273 samples have been collected to date both by artisanal and industrial fleets within the age and growth component of the project, and laboratory sample processing is ongoing. All other activities of the billfish work plan for EPBR 2020 could not be performed, namely those involving mainly field work research, due to the COVID-19 restrictions imposed by local authorities.

## 2021 plan and activities

The highest priorities for 2021 are to support the objectives established by the billfish work plan and those of the EPBR, with specific emphasis on the collection of biological samples for growth and reproductive studies that are on hold due to the COVID-19 issue, enhance the collection of fisheries data in developing countries and resume the field and laboratory research activities as much as possible:

- support the collection of billfish biological samples off West Africa;
- support the blue marlin biological and photographic sampling in Gulf of Mexico;
- fund a workshop on growth and aging techniques involving researchers from both eastern and western Atlantic;
- support the monitoring of billfish catches from West African artisanal fishing fleets (i.e. Côte d'Ivoire, Ghana, São Tomé e Príncipe and Senegal);
- fund 1 regional workshop for CPC statistical correspondents on artisanal fisheries data collection;
- fund the development of an App for mobile phones for the collection and report of fisheries data from artisanal fisheries in collaboration with local scientific institutions.

All these activities depend on successful coordination, sufficient financial resources and adequate in-kind support by the CPCs involved. Details of EPBR funded activities for 2021 are provided below.

### ***Shore-based sampling***

Sampling of artisanal and small scale fisheries to support the estimation of catch and effort statistics will be focused on fleets contributing the largest parts of the catch and/or those having traditionally provided the higher quality data in the past, to ensure the preservation of an uninterrupted time series of catch and relative abundance indices. In the eastern Atlantic, monitoring and sample collection will be supported for the artisanal fisheries of Côte d'Ivoire, Ghana, São Tomé e Príncipe and Senegal.

### ***Biological studies***

The collection of biological samples for genetic study to differentiate white marlin and spearfish, will continue in 2021.

Continue efforts to finalize the collection of biological samples for reproduction, age and growth studies for marlins and sailfish caught off West Africa, either from directed or by-catch billfish fisheries of both artisanal and industrial fleets. In 2021 increasing effort will be made for processing and analyze the available samples, which is expected to continue also in the following years. Such activities require the continuation of financial support from ICCAT and additional voluntary contributions from CPCs.

### ***Coordination***

#### *Training and sample collection*

Programme coordinators need to travel to locations not directly accessible to promote EPBR activities and ICCAT data requirements regarding billfish. This includes travel to West African countries, as well as the Caribbean and South America by the general coordinator and the coordinator from the West. Coordinated activities between EPBR, JCAP2 and ICCAT data funds will continue to be required.

#### *Programme management*

The EPBR budget is now part of the ICCAT Science Envelope and management is assumed by the programme coordinators, with the support of the Secretariat. Reporting to the SCRS is a responsibility of the coordinators. Countries that are allocated budget lines for programme activities need to contact the respective programme coordinators for approval of expenditures before the work is carried out. Invoices and brief reports on activities conducted need to be sent to the programme coordinators and ICCAT to obtain reimbursement. Funding requests need to follow ICCAT protocols for the use of funds (see Addendum 2 to Appendix 7 of *Report for Biennial Period 2010-2011, Part II (2011), Vol. 2*).

## 2020 Budget and expenditures

This section presents a summary of the EPBR budget for 2020, which amounted to €77,000 (**Table 1**). These funds were approved and allocated as follows: €23,000 for studies related to three billfish species (BUM, WHM and SAI) on: age and growth and genetics studies, sample collection and shipping; €5,000 for a marlin reproduction biology study, including the collection of photographic samples; €45,000 for the workshops on age reading and statistical correspondents for data collection in the eastern Atlantic and €4,000 for the development of an application for mobiles.

**Table 1.** 2020 EPBR budget.

Activity	Requested	Assigned
Reproductive biology (Western Atlantic)	€5,000	€5,000
Age and growth	€25,000	€15,000
Sampling and shipping (Eastern Atlantic)	€10,000	€8,000
Monitoring Eastern Atlantic fisheries	€12,000	€0
Workshop statistical correspondents (only 1 workshop)	€50,000	€25,000
Workshop aging reading/reference set	€25,000	€20,000
Application development for mobile phones for the collection and report of fisheries data from artisanal fisheries and Pilot study	€25,000	€4,000
<b>TOTAL</b>	<b>€152,000</b>	<b>€77,000</b>

As of 10 July 2020, no reimbursement regarding shore-based sampling in the eastern Atlantic has been requested to the Secretariat.

## 2021 budget and requested contributions

The proposed 2021 budget, totalling €105,000 is detailed in **Table 2**. To achieve all its objectives in 2021 the programme will continue to require contributions from other sources, such as those voluntary contributions generously provided by the US and Chinese Taipei. **Table 2** also provides tentative budgets for the following years of 2022 (95,000€) and 2023 (95,000€).

Development of improved age and growth curves and estimates of maximum longevity of billfishes has been recommended by the Group. **Table 2** continues to include research funding allocations to conduct biological sampling and sample processing for age and growth of sailfish, blue and white marlins in the eastern Atlantic, as currently no age and growth information is available for the eastern stock of sailfish, nor for the two marlin species caught in that region. Additionally, now it includes funds for a workshop on growth and aging techniques involving researchers from both eastern and western Atlantic.

The consequence of the programme failing to obtain the requested budget will be to stop or reduce programme activities for 2021, 2022 and 2023 including: (1) collection and processing of genetic samples, collection and processing of gonad samples and hard structures (spines and otoliths), (2) size sampling and collection of statistics of catches from fleets in the eastern Atlantic, (3) enhancing regional sampling programmes. All these activities are critical to continue the improvement of the information available to the SCRS for billfish stock assessments.

**Table 2.** Breakdown of the requested EPBR estimated budget for the period 2021 - 2023.

Activity:	2021	2022	2023
Tagging			
Biological studies:			
Reproduction	5.000		
Age and growth	15.000	15.000	15.000
Genetic [WHM/RSP kits]	5.000	5.000	5.000
Other (identify)			
Other fisheries related studies (including data recovery and collection of fisheries statistics in the field in West Africa)	10.000	10.000	10.000
Sample collection and shipping	10.000	10.000	10.000
Consumables	5.000	5.000	5.000
Workshops [Age-growth 2021] + [Data Artisanal fisheries 2021, 2022]/stock assessment expert [SAI Stock Assessment 2022]/reviewer	55.000	30.000	25.000
<b>Total</b>	<b>105.000</b>	<b>75.000</b>	<b>70.000</b>

### Conclusion

The EPBR is an important mechanism towards completing the goal of having the highest quality information to assess billfish stocks. The EPBR has been credited for major improvements in the data supporting the last ICCAT billfish assessments and the SCRS advice to the Commission. The EPBR is the only programme that focuses exclusively on billfish, and now has the added benefit of including sampling and data collection from both artisanal and industrial fleets. Therefore, programme continuation is paramount to facilitate the collection of biological and fishery information on billfish species. The EPBR will continue to require support from ICCAT and other sources to operate and address the needs of the Commission.

## 2020 Secretariat Report on Research and Statistics

### Introduction

The activities and information included in this report refer to the period between 1 October 2019 and 18 August 2020 (the reporting period)<sup>1</sup>. All the fisheries statistics, biological statistics and compliance related information have been presented by the Secretariat to the SCRS Working Groups during inter-sessional and species groups meetings. After five years of continuous improvements, the Secretariat observed during 2020 a slight regression in data completion quality (more datasets only passed the SCRS filtering criteria after the corrections made by the Secretariat) and submissions not using the most recent ICCAT electronic forms (2020 version). The Secretariat will work closely with CPCs' scientific correspondents to ameliorate these problems in the future. Regarding the activities conducted by the Secretariat in the most recent years, in addition to the normal activities developed on statistics, publications, data funds management and others, the Secretariat is dedicating substantial additional work related to stock assessment activities, whether participating actively in the assessment or coordinating and managing external support to the SCRS work. 2020 was particularly difficult for the Secretariat, due to the increased number of SCRS and Commission meetings (20 and 3, respectively). Such a high number of meetings greatly limited the capacity of the Secretariat, in addition to the fact that due to the pandemic most of these meetings were held online, which requires an additional workload related to the associated logistics, preparatory work and online meeting management.

### 1. Statistical and biological information reporting status

ICCAT Circular #0667/2020 of 3 February 2020 established the provisions for reporting fishery statistics and biological data to ICCAT. The receipt date of each email (with the respective files attached) was adopted as the official submission date of the Contracting, Cooperating Party, Entity or Fishing Entity (CPC). The deadlines for the intersessional meetings (all requiring finalised data up to 2019), established by default as 15 days ahead of the start of the meeting, were: Mediterranean Swordfish Data Preparatory meeting, 2 March 2020; Atlantic Bluefin tuna Intersessional meeting, 5 April 2020; Porbeagle Stock Assessment meeting, 1 June 2020; Atlantic Albacore Stock assessment meeting, 15 June 2020. The general deadline for reporting 2019 statistics (or any required revision to prior years) of all species and fisheries was 31 July 2020. A tolerance of 24 hours has been given to include all the time zones.

A total of 59 ICCAT CPCs (53 Contracting Parties (CP), plus 6 Cooperating non-Contracting Parties/Entities/Fishing Entities (NCC)) have reporting obligations to ICCAT. For statistical purposes, this corresponds to a total of 77 flag related CPCs (51 CP + 1 CP [16 EU Member States] + 1 CP [4 UK Overseas Territories Member States] + 6 NCC) who have reported information to ICCAT in recent years. The term "flag CPC" was adopted here to refer to those 77 flags.

The Secretariat continues to use (since 2015) the SCRS filtering criteria (Filters 1 and 2, described in Addendum 2 to Appendix 8 of 2013 SCRS report, updated by the SCRS in 2017) to validate and accept statistical data received under official formats. The filtering criteria have been embedded in the electronic forms since 2015.

For 2019 data Filter 1 was effectively applied and the results are presented in the SCRS Report Cards (**Tables 1, 2, 3, 4, and 5**, with a summary in **Figure 1**). The "orange" cells indicate the datasets that have not passed Filter 1. The "green" and "yellow" cells indicate the datasets that have passed Filter 1, and were reported before and after the deadline, respectively. The Secretariat has corrected the rejected datasets and inform the respective CPCs on the revisions needed. The updated datasets that arrived before 31 July are shown in "green", and the ones arriving afterwards are shown in "yellow". All the "orange" cells were provisionally integrated into the ICCAT database system (ICCAT-DB), and marked for revision. Filter 2 was also applied, and the results presented to the SCRS. Both filters were used on every Task 1 and Task 2 dataset

<sup>1</sup> Statistical data received by the Secretariat in valid formats (version 2019/2020 of the electronic forms, or special formats) and by 18 August 2020 was considered in this report. Information submitted afterwards is not referred to in the report.

received (scenario 2, methodology described in Palma and Gallego, 2015<sup>2</sup>). The implementation of the SCRS filtering criteria to the remainder of the statistical and tagging forms will be progressively carried out in the following years, because it requires that the Secretariat prepare in advance the corresponding databases and forms, and develop the data integration tools.

About 95% of all of the “ST” statistical forms (ST01, ST02, ST03,..., ST10) received (a total of about 910 forms) during the reporting period were automatically processed, validated and stored, using the new JAVA “automated data processing framework” (nearly 100%, discounting the data arriving in special formats). The Secretariat has already enlarged the functionality of this framework to process the remainder of the statistical forms (ST07 through ST10) and has plans to include the automatic integration of the conventional tagging forms in the future (possible only after the tagging database redesign, which will also include an electronic tagging module).

Only three flag CPCs have used older SCRS forms to report 2019 data. These CPCs promptly replaced them with the 2020 version. The Secretariat reminds CPCs of the Commission’s requirement of using the MOST RECENT standard electronic forms adopted by the SCRS for data submission.

The overall reporting status for 2019 data (summarised in **Table 5** and **Figure 1**), shows that 62 of the 77 flag CPCs (81%) have reported fisheries and biological information: 48 flags with catches (62%); 14 flags with no fishing activity (18%). No information was received from 15 flag CPCs (19%) over the reporting period: Angola, Egypt, EU-Germany, EU-Latvia, EU-Lithuania, Gabon, The Gambia, Grenada, Guinea Bissau, Rep. Guinea, Liberia, Libya, Panama, Philippines and Guyana.

All the information received after 18 August 2020 will be included in the final report for the Commission.

### **1.1 Task 1**

The two datasets of Task 1 statistics (T1FC fleet characteristics; T1NC nominal catches) are yearly based global information on (a) fishing capacity (using form ST01-T1FC), and (b) total catches by species (using form ST02-T1NC), both forms being mandatory for all CPCs. The Secretariat reminds that for T1NC, the statistical sampling areas are now mandatory (maps: [www.iccat.int/Data/ICCAT\\_maps.pdf](http://www.iccat.int/Data/ICCAT_maps.pdf)). The old Task 1 areas without geographical delimitation are optional.

#### *1.1.1 Fleet characteristics (T1FC)*

The information requested in form ST01-T1FC has two sub-forms. Sub-form ST01A is used to compile information by individual vessel. Sub-form ST01B, is used to compile information by groups of vessels, but only for small scale vessels (length overall less than 20 meters) not included in ST01A. Only the fishing vessels actively fishing within a given calendar year should be reported in ST01-T1FC.

The structure of the ST01 form adopted in 2015, allows to collect more complete and detailed information on effective fishing capacity, fleet structure, and optionally yearly based and gear independent nominal fishing effort (fishing days). However, the “optional” condition of reporting the nominal fishing effort (for 2019 data, about 70% of the flag CPCs reported fishing days) makes it unfeasible to obtain overall effort indicators and compromise possible estimations of total fishing capacity. Having the fishing days for each vessel in both Atlantic and Mediterranean regions would allow to effectively differentiate active from inactive vessels from all the authorised vessels to fish in the ICCAT Convention area. Hence, the Secretariat reiterates once again the request to make this field mandatory aiming to improve the quality of T1FC data and its potential use in scientific studies.

The T1FC Report Card for 2019 is presented in **Table 1**. For the sixth consecutive year (2014 to 2019 data) T1FC has been requested on an individual vessel basis, in agreement with the ICCAT vessel record requirements of the Commission for the 11 vessel authorisation lists, which facilitates the cross-validation process. The Secretariat reminds that this information is also used by the Commission (fulfilling the requirements under Rec. 15-08, which collects previous year vessel activity under some ICCAT fisheries (BFT-E, Tropical species, and, SWO-M).

<sup>2</sup> Palma C. & Gallego J.L. 2015. Results of applying Filters 1 and 2 to the 2013 statistical data reported during 2014. ICCAT Col. Vol. Sci. Pap. 71(6): 3070-3084.

The overall reporting ratio of ST01 for 2019 was 69% (53 flag CPCs) with 1 flag CPC having late submissions. From the corrections made to ST01, 4 flag CPCs needed revisions.

The vessel sizes (LOA) ranged from 5 to 195 meters in 2019 data, including small scale vessels reported in sub-form ST01B by seven flag CPCs. Near 1,500 small scale vessels reported in T1FC were not found in the ICCAT vessel record database (with about 53,950 vessels registered). Some cases could be related to different vessel characteristics being reported in the T1FC and in the ICCAT vessel record. Solving these inconsistencies will require additional work.

### 1.1.2 Nominal catch (T1NC)

Task 1 nominal catch data (T1NC) which contains landings and discards (dead and alive) by species, stock, gear, fleet and year (all in live weight) is a “key” dataset used in all the stock assessments. Thus, complete and timely available datasets are essential for SCRS work. The T1NC compiles (form ST02-T1NC) fishery statistics using two sub-forms. Sub-form ST02A, compiles positive catches (separating landings, dead discards, live discards, and live catches for farming facilities). Sub-form ST02B, compiles a “zero” catch matrix (major species/stock by gear) with positive fishing effort of active gears that have operated within the year. This approach, approved by the Commission (Res. 15-09), has greatly normalised and simplified the “zero” catch reporting obligation. Only one “zero” is now required per major species/stock and gear combination.

The T1NC Report Card for 2019 is presented in **Table 2**, presenting the CPCs that reported positive catches and the “zero” catches (excludes the SCRS catch estimations). A summary of the “zero” catches reported by flag CPCs and major species/stock in sub-form ST02B, is presented in **Table 15**. All the T1NC datasets received from 62 flag CPCs (81%), including the 4 flag CPCs with late-reports, were processed and presented to the SCRS. This includes some datasets corrected by the Secretariat (orange cells, marked for revision) associated to 14 flag CPCs. Only 15 flag CPCs (19%), have not yet reported this information. The total 2019 T1NC nominal catches (720,000 t) reported is about 8% lower compared to the average of the last five years (790,000 t).

## 1.2 Task 2

Task 2 statistics with catch-effort and size information are more detailed in terms of time (month) and area (1x1, 5x5, or, sampling areas), and often reflects a partial coverage associated to the total production (T1NC). Task 2 information is the main source of data used by the SCRS on stock assessments and the Secretariat on the estimation of important datasets, such as CATDIS, EFFDIS, CAS, and CAA by species (all used by the SCRS and the Commission). ICCAT CPCs must report three types of Task 2 information under their respective electronic forms:

- T2CE (catch & effort): using form ST03-T2CE,
- T2SZ (size samples): using form ST04-T2SZ,
- T2CS (catch-at-size): using form ST05-T2CS (only for ALB, BFT, BET, YFT, SKJ, SWO).

Or alternatively, any of the special agreed formats convened by the Secretariat and an ICCAT CPC.

There is also a special form (ST06-T2FM) used to report bluefin tuna caught by purse seiners and transferred to farming facilities, in both events, while caging and harvested after growing. These compiled datasets can be considered a special type of Task 2 size information. However, this information is treated separately (given the growth at the farms) and used in the stock assessment after discounting growth at farms.

### 1.2.1 Catch and effort

The T2CE Report Card for 2019 is presented in **Table 3**. A total of 55 flags CPCs (71% reporting ratio), including 4 late-reporting flag CPCs and 3 flags with corrections on their data, have reported T2CE. 22 flag CPCs (29%) have not yet properly submitted T2CE statistics for 2019.

All the T2CE information was reported by month and for the most part had the geographical resolution required by the SCRS (1x1 or better for surface fisheries, and, 5x5 or better for longline fisheries). The number of datasets reported with the exact geographical location (Latitude/Longitude) continues to increase. The number of species reported in T2CE datasets has also increased lately, in particular for the

pelagic shark species. For the most recent years, the trend of reporting more detailed and complete T2CE has continued. Since 2017, the T2CE datasets without effort information are not integrated into ICCAT-DB, and explicit requests for revisions are always made by the Secretariat to the corresponding flag CPCs. The Secretariat continues with a T2CE data recovery task, aiming to complete the gaps identified, and to replace “poor” datasets whenever possible, using the new levels of resolution required by the SCRS, such as monthly based datasets, spatial resolution of 1x1 squares for surface gears up to a maximum of 5x5 squares for longline gears. This task should continue in the future, and the Secretariat recommends a more active collaboration of CPC scientists and Statistical Correspondents.

An important part of the Secretariat estimations (CATDIS and EFFDIS) depends on the quality of T2CE. However, some deficiencies persist in some datasets reported, being the most problematic ones:

- Non-standard fishing effort types for certain gears (e.g. for longline “hooks” is the standard);
- Incomplete or partial species catch composition;
- Double counting of fishing effort, where same fishing effort is being reported several times in different forms for the same gear.

The Secretariat recalls that, as recommended by the SCRS several years ago, T2CE statistics should be in all cases reported with the most complete species catch composition. This rule will avoid the duplication of the fishing effort for the same fleet/gear/year combination, in cases where each species is reported in a different form with incompatible stratifications.

### *1.2.2 Size information*

The T2SZ Report Card for 2019 is presented in **Table 4**. This Report Card also contains the datasets of T2CS (catch at size flag CPC estimates, for the six mandatory species) and size information T2SZ. It does not contain the bluefin tuna size samples arriving in form ST06-T2FM, or the bluefin tuna stereoscopic camera measurements. The inclusion of these two datasets into the T2SZ Report Card is performed manually after inventorying and checking all the datasets reported.

A total of 49 flag CPCs (64%), including 5 CPCs with submissions after the deadline, have reported T2SZ. 28 flag CPCs (36%) have not yet submitted T2SZ information for 2019.

Since 2017, the SCRS requires that all the T2SZ/T2CS datasets be reported by month, and with the highest geographical stratification possible (1x1, 5x5, 5x10, and, 10x10 grids only), maintaining the ICCAT Sampling Areas for biological port sampling. All the size datasets for 2019 arrived by month. The use of smaller geographical grids (1x1, 5x5, 5x10) has also increased slightly. The size/weight class bins reported for 2019 have followed the SCRS recommendation on size structures (1, 2, and 5 cm) and weight structures (1 kg). As opposed to the previous year, no error was observed in the units of the size/weight class bins (e.g. millimetres reported as centimetres) within 2019 size datasets.

Following Resolution 11-14 on the standardized presentation of scientific information, the SCRS developed the Standard Catalogues on data availability for a period of years, for all the major species and stocks. All the catalogues (29 tables) are presented in **Addendum 1 to Appendix 8**. These catalogues show the information for a “30 year” period (1990-2019), grouped by flag/gear group combinations, in terms of Task 1 nominal catches (ranked by importance in descending order), and the availability of Task 2 data catch and effort, size sampling, and catch-at-size, by year. This instrument, which summarises large amounts of information per species/stock, shows the level of data completeness/availability, and the data gaps, for the most important fisheries. In **Addendum 1 to Appendix 8** the catalogues are provided for the ten major tuna and billfish species and three main sharks stocks only. The catalogues for the main small tuna species, usually prepared for the Small Tunas Species Group intersessional meetings only, were also updated for the SCRS.

The SCRS scorecard on Task 1/2 data availability is presented in **Table 6**, using the methodology adopted by the SCRS in 2019 (SCRS/2019/45). It has the format adopted by the WGSAM (exception: last column having the relative score changes against the 2018 final year on the “30 year” time frame) and already contains all the valid 2019 data received during the reporting period. Two indications arise from the scorecard results: a) A general increase of all the scores as we reduce the time-scale scores from 30 to 10 years based periods; b) Overall, the scores coincide with how the SCRS categorises each species/stock in terms of fisheries data availability (data-poor/data-rich concepts).

### 1.3 Tagging

#### 1.3.1 Electronic tags

The laboratories conducting tagging campaigns with electronic tags (pop-up, archival, etc.) in the Convention area have informed the Secretariat of 165 releases and 11 recoveries made during the reporting period.

#### 1.3.2 Conventional tags

In relation to conventional tags, several Contracting Parties have reported to ICCAT a total of 122,772 released fish and 18,262 recoveries (**Table 7**) during the reporting period.

As in previous years, the Secretariat provided conventional tags for tagging experiments to the ICCAT scientific community (individual scientists or research institutions). During the reporting period, the Secretariat distributed 2,100 conventional tags, primarily under the tagging projects of the Atlantic Wide Research Programme for Bluefin Tuna (ICCAT GBYP) and to various scientific institutions (**Table 8**).

#### 1.3.3 Tagging lottery

National laboratories award prizes or special gifts to people who recover tags aiming to encourage the return of recovered tags. In support of the tagging programmes, ICCAT organizes, on a yearly basis, a conventional tagging lottery carrying a prize money of \$ 500 US dollars. In the last ICCAT lottery held on 30 September 2019, prizes were awarded for three tags for each of the following categories: small tunas, sharks, billfishes, and temperate tunas. The winning tags per category were as follows:

Category	Tag winner	Species	Release INFO	Recovery INFO
Small tunas	ATP125360	Little tunny ( <i>Euthynnus alletteratus</i> , LTA)	Côte d’Ivoire tagging campaigns	Côte d’Ivoire citizen
Sharks	45513	Shortfin mako shark ( <i>Prionace glauca</i> , BSH)	Ireland tagging campaigns	Portuguese citizen
Billfishes	321975	Swordfish ( <i>Xiphias gladius</i> , SWO)	United States tagging campaigns	Spanish citizen
Temperate tunas	AAB002286	Albacore ( <i>Thunnus alalunga</i> , ALB)	Spanish tagging campaigns.	Spanish citizen

An additional draw took place supported by the Atlantic-Wide Research Programme for Bluefin Tuna (ICCAT GBYP). This draw carries three prizes, one for €1,000 and two for €500 for recoveries of bluefin tuna tags (*Thunnus thynnus*, BFT) only. The winning tags and their rewards were as follows:

- €1,000: tag BYP014778 (from Spanish campaigns), recovered by a Spanish citizen.
- €500: tag BYP000403, recovered by a Spanish citizen.
- €500: tag BF454843, recovered by a Maltese citizen.

A second additional draw took place supported by the Atlantic Ocean Tropical Tuna Tagging Programme (ICCAT AOTTP). The draw carried a cash prize of €500 for each of the three main tropical species. The winning tags and their rewards were as follows:

Tag winner	Species	Release INFO	Recovery INFO
ATP156450	Bigeye ( <i>Thunnus obesus</i> , BET)	Spanish tagging campaigns	Spanish citizen
ATP160662	Skipjack ( <i>Katsuwonus pelamis</i> , SKJ)	Portuguese (Madeira) tagging campaigns	Portuguese citizen
ATP123711	Yellowfin ( <i>Thunnus albacares</i> , YFT)	Côte d'Ivoire tagging campaigns	Côte d'Ivoire citizen

#### 1.4 By-catch

The ST09 form was modified again in 2020 to include some of the detail stripped from the 2018 version of the form. In addition to observer data themselves, the form now includes information that was formerly reported on the ST11 form about each CPCs observer program design. The cumulative information on CPCs observer program design is included in **Addendum 3 to Appendix 8**. CPC that reported ST09 data are listed in **Addendum 4 to Appendix 8**. Note that because the delivery date for the Secretariat's report on statistics was pushed back one month, CPCs have not yet had time to respond with revisions to their data; accordingly, the data are incomplete, including which CPCs reported. The Secretariat reporting summary will be updated later for the Commission.

In addition, the ST09 updated form included an optional form C that compiles some of this detailed information as optional; at the request of the SCRS, the Secretariat summarized the data submitted on which CPCs provided this information and or about their rationale for not providing it (**Addendum 5 to Appendix 8**).

**Table 9** provides a summary of ST09-DomObPrg data reported for the 2019 by discard fate and species group including sharks, sea turtles and seabirds. **Table 10** contains T1NC data for by-catch species for 2019.

##### 1.4.1 Sharks

Shark data was submitted through ST09 forms and through Task 1. These data are summarized in **Tables 9** and **10**, respectively.

##### 1.4.2 Sea Turtles

A summary of sea turtles information submitted for 2019 in ST09 forms is provided in **Table 11**. The Secretariat received much of the by-catch information from submitted ST09-DomObPrg forms.

##### 1.4.3 Seabirds

A summary of the information submitted on ST09 forms for seabirds is provided in **Table 12**.

## 2. Data recovery and improvement

### 2.1 Revisions and updates

By default, historical revisions cover the years not covered by the SCRS "3 +1 revision rule", where the last three years already reported officially to ICCAT plus the new year, are considered preliminary data and can be freely revised by CPCs. For 2019 data, all years before 2016 require a scientific document explaining the revision.

Several CPCs have submitted historical revisions to T1NC for tuna and tuna-like species, sharks and other by-catch species. Part of those revisions (Mediterranean swordfish and major sharks) were made during the 2020 ICCAT intersessional data preparatory meetings. Some gaps were also completed and a few series with unclassified gears were also discriminated. Many CPC scientists were involved with the Secretariat in these revisions. This joint effort has greatly contributed to the T1NC improvements of these species, and,

this type of joint work should be recommended to the other ICCAT species groups. All the T1NC updates are summarised in **Table 13**, which contains all the revisions with the supported SCRS documents and already adopted by the respective species groups.

There are however, some official T1NC datasets (**Table 14**) reported for years before 2014, without a scientific document. These series would require SCRS approval.

No major historical revisions were made to T2CE. **Table 16** presents the historical T2CE datasets reported and adopted by the respective species groups (already integrated into the ICCAT-DB).

The Secretariat has also received some historical revisions for T2SZ. **Table 17** presents the historical T2SZ datasets reported and adopted by the respective species groups (already integrated into the ICCAT-DB).

## **2.2 Additional by-catch information**

The seabird mitigation measures, compiled in the past using forms CP44 and ST011, are now integrated in the new ST09 form. The use of seabird mitigation measures was reported by 12 CPCs on ST09 forms. In addition, three CPCs reported their seabird mitigation measures on CP44 forms.

## **3. ICCAT databases**

The ICCAT database information system (ICCAT-DB) is a relational database management system (RDBMS servers: MS-SQL 2016 as the main server & MariaDB 10.3 for various purposes) with about 40 databases built to manage all the structured information received by the Secretariat. It has various frontend/backend tools including, client applications developed mostly with Java technologies, SQL scripts, and, some VBA tools. These tools are used to interact with the information (validation, transformation, processing, statistical analysis, data mining, standard outputs, etc.) and for data dissemination (web, ICCAT publications, meetings data provision, etc.).

In addition to the statistical and scientific information managed, ICCAT-DB system also manages a large portion of the information associated with the Commission's compliance requirements. Since 2009, the workload of compliance-related information, mainly in response to the increase of regulatory measures has steadily increased the database management and related tasks (control, verification, storage and backup).

The Secretariat started in May 2019 the development of the ICCAT Integrated Online Management System (IOMS), a system designed to manage online all the ICCAT data requirements in the future. It is a long-term project intended to entirely replace the current ICCAT data reporting system. Two new senior software developer experts, Jose Sanz (front-end developer) and Manuel Maestre (back-end developer), hired for one year in 2019, were incorporated into ICCAT Secretariat staff in 2020 to continue the phase 2 IOMS implementation, with the supervision and partial contribution to the development made by the Secretariat. The ICCAT Online Reporting Technology Working Group (WG-TOR), whose mandate was established under Resolution 16-19, and extended through Recommendation 19-12, will govern all the IOMS implementation process.

In 2020 the Secretariat refined the databases to store information related to tropical support vessels, FAD deployments, and port sampling for tropical tunas, reported using forms ST07, ST08 and ST09, respectively. It has underway the redesign of four additional databases (Task 1, Task 2, Vessels, and, Tagging) aimed to be integrated into the IOMS project. The full ICCAT-DB documentation, composed of several parts (database reference manuals, user guides, "javadoc" for JAVA tools documentation, special articles, etc.) has been undergoing a merging process with the documentation related to IOMS implementation (IOMS embedded event driven "help", REST API and other web-services, articles for cloud deployments, constant development/integration [CD/CI] practices, etc.). Both will share the same databases, which will allow the elimination of redundant documentation. This ongoing work is being continuously merged and updated in parallel with the improvements made to the ICCAT-DB and the progress of the IOMS.

As in the most recent years, the exceptional circumstances in 2020 obliged the Secretariat to delay or postpone several projects. The most important ones were: the replacement of the stand-alone MS-ACCESS databases with Task 2 data (T2CE: “t2ce.mdb”, T2SZ/CS: “t2sz.mdb”) by the SQLite; the “ICCAT forms” online Task 1/2 validation prototype; delay of the GIS project (aimed at geo-referencing all the ICCAT datasets, and to create a “marine-rich” PostGIS server); delay of the conventional/electronic tagging work (database redesign, automatic data integration tools, sex recoveries by individuals, etc.).

### **3.1 Statistics**

#### *3.1.1 Task 1 and Task 2*

All the electronic forms used to collect Task 1 and Task 2 data (ST01-T1FC, ST01-T1NC, ST03-T2CE, ST04-T2SZ, ST05-CAS and ST06-T2FM) were updated to version “2020a” to incorporate the required changes of the SCRS (codes, structures, filtering criteria, etc.). The respective databases were updated accordingly. The Secretariat completed the automatic data integration of the information received in forms ST07, ST08, ST09 and ST10 forms, and, also improved the automation processes to handle Task 1 and Task 2 forms. The Secretariat has plans to also develop automatic data integration for the conventional tagging forms TG01 and TG02. Extension of this automatic integration framework for all the “ST” and “TG” forms will occur progressively (2021 and beyond) due to its complexity.

#### *3.1.2 Catch distribution (CATDIS)*

The CATDIS update, covering the period 1950 to 2018, was postponed to October due to the lack of time. This will also delay the ICCAT annual Statistical Bulletin, which will be completed by the end of October. It will not include the estimations of four additional species: spearfish (SPF), blue shark (BSH), shortfin mako (SMA) and porbeagle (POR), due to the lack of sufficient information in T2CE for these species (**Addendum 1 to Appendix 8**).

#### *3.1.3 Catch at size/Catch at age*

The catch-at-size (CAS) database is complete and functional, with an active connection between the size data and the substitution tables used for the CAS estimation. This year, the Secretariat has completed a full revision of Mediterranean swordfish (period 1972-2018) and a partial update to the bluefin tuna (Eastern/Western stocks) adding the period 2015-2018.

#### *3.1.4 FAD forms*

In 2014, an electronic form (ST08-FadsDep) was created to collect information on the number of FADs deployed according to Rec. 13-01. This form has been revised several times and in 2018 the SCRS approved a new version addressing the main concerns raised by CPCs. In addition to the information provided on the ST08 forms, CPCs are also requested to submit FAD Management Plans according to paragraph 18 of Rec. [16-01](#) and [19-02](#). Countries fishing for tropical tunas that have submitted information about their FAD fisheries and their FAD Management Plans, as well the ST08-FADsDep data in 2020 is summarized in **Addendum 2 to Appendix 8**.

### **3.2 Compliance**

In recent years, several compliance-related measures adopted by the Commission include several reporting requirements of various kinds on Contracting Parties. The Secretariat maintains databases for these sets of information separately from the traditional fishery statistics (Tasks I and II). Since 2011, following the Commission’s adoption of the Confidentiality Data Policy, the Secretariat has provided compliance-related information to the SCRS to fill gaps, complement or cross-check fishery statistics. This section of the report includes the available data that has been summarized for the SCRS in 2020.

#### *3.2.1 ICCAT Vessel record*

The Secretariat maintains the ICCAT Record of Vessels database in accordance with Recs. 13-13/14-10, 16-05, 16-06, 16-07, 16-15, 17-02, 17-03, 19-02 and 19-04). The Record comprises a total of 11 vessel lists. Since 2015, the ICCAT vessel record database is synchronised daily with the t-RFMOs Consolidated List of

Authorized Vessels (CLAV) and the electronic Bluefin Catch Documentation Program (e-BCD). In coordination with CPCs, the Secretariat also carries out continuous revision and updates of the ICCAT vessel record database, covering also the elimination of vessel duplicates. The Secretariat is currently working on an online module for reporting this information (see sections 3 and 11 of this report).

### 3.2.2 Bluefin tuna fisheries

Recommendation 19-04 establish several reporting requirements for CPCs fishing and / or farming bluefin tuna:

- List of vessels authorized to catch eastern bluefin (Paras. 49 and 51 of Rec. 19-04)
- List of other bluefin tuna vessels authorized to operate in the eastern bluefin tuna fishery (Para. 49 and 51 of Rec. 19-04)
- Record of Joint Fishing Operations (Paras 56-60 of Rec. 19-04)
- Detailed information on bluefin tuna catches in the eastern Atlantic and Mediterranean in the preceding fishing year (Para. 57 of Rec. 19-04)
- Weekly eastern bluefin tuna catch reports by vessel and traps (Para. 74 of Rec. 19-04)
- Monthly western bluefin tuna catch reports (Para 24 of Rec. 17-06)
- VMS messages (Para. 5 of Rec. 07-08 and Para. 105 of Rec. 19-04)
- List of bluefin tuna traps (Paras 55-56 of Rec. 19-04)
- Bluefin tuna farming facilities (Para. 9b) of Rec. 06-07)
- Bluefin tuna farming reports (Para. 5 of Rec. 06-07)
- The use of stereoscopic cameras systems in the context of caging operations (Para. 99 and Annex 9, Rec. 19-04)
- Carry over of caged bluefin tuna (Para. 7 of Rec. 18-13)
- Bluefin tuna caging declarations (Para. 2b of Rec. 06-07 and Para. 102 of Rec. 19-04)
- List of ports in which vessels are authorized to land and/or tranship eastern bluefin tuna (Para. 69 and 70 of Rec. 19-04)
- Data and information collected under each CPCs domestic observer programme (Para. 83 of Rec. 19-04)

### 3.2.3 VMS messages

The VMS information received under Rec. 19-04 consists of vessel ID (name, flag, radio call sign) and a position every hour. This information can, in theory, be used to infer fishing effort distribution and intensity. **Figure 2** shows the number of messages received in each 1° by 1° degree rectangle from 8 September 2018 to 16 September 2019 (reporting period). The plot represents only the Mediterranean Sea VMS messages that originated at sea.

### 3.2.4 Bluefin Catch Document (BCD) and electronic BCD

In compliance with Rec. 18-13, the Secretariat receives paper copies of bluefin tuna catch documents and re-export certificates that are intended to track bluefin tuna from the catch location to the market. Very few paper copies are received now, as the use of the electronic system (eBCD system) become mandatory on 1 May 2016. Since 2016 the Secretariat had continued to work with the eBCD Technical Working Group on further developments and support for the eBCD system. **Table 18** summarizes the BCD / eBCD catches (weight and number) currently available as of 18 August 2020.

### 3.2.5 Bluefin catch reports

Under Recs. 17-06 and 19-04, bluefin catch reports are sent to the Secretariat. **Table 19** and **20** summarize the information available from the monthly (West) and weekly (East) catch reports (as of 14 August 2020), respectively.

### 3.2.6 Caging declarations

Caging declarations are submitted by farming Contracting Parties in compliance with Recs. 18-02 and 19-04. The caged amounts reported by different fleets and introduced into cages are shown in **Table 21**. The data shown represents data submitted up to 14 August 2020. Recommendation 18-13 also requires CPCs to submit the amounts remaining in cages from the previous year, and Recommendation 06-07 requires a summary report of amounts farmed, as well as quantities marketed, mortalities and estimated growth.

### 3.2.7 Statistical Document Programme

Recs. 01-21 and 01-22 track international trade of certain types of fish products of bigeye and swordfish, under the ICCAT statistical document programme. **Table 22** summarises the number of biannual reports (SD: statistical documents; RC: re-export certificates) received from ICCAT CPCs during the reporting period. **Table 23** and **Table 24** compare (swordfish and bigeye, respectively) for the period 2012 to 2020 (2020 only first semester) current Task 1 nominal catch against trade statistics (SDs and RCs, in product weight) received during the reporting period.

### 3.2.8 Transshipments

Rec. 16-15 established a programme to monitor at-sea transshipments by large-scale longliners. The amounts transhipped are reported in **Table 25**. Note that, there are many product types for which there are no conversion factors to a common weight unit.

### 3.2.9 Bluefin Tuna Regional Observer Programme (ROP-BFT)

The data sets from this programme have been made available by the implementing consortium to the Bluefin Tuna Species Group. Given the complexity of the data base, such data sets are provided on request.

### 3.2.10 Bluefin Tuna Farming Operations

In 2017 the Secretariat presented an updated review of the size at harvest of bluefin from farming operations (Ortiz 2017<sup>3</sup>). This information was used in the 2017 Bluefin Stock Assessment. A new database integrating farming size at caging and harvesting operations and auxiliary information has been developed with the collaboration of the GBYP to address research on bluefin tuna growth during caging.

## 3.3 FAD management plans

The *Recommendation by ICCAT on a Multi-Annual Conservation and Management Programme for Tropical Tunas* (Recs. 19-02, 16 -01) states that each year by 31 January, CPCs with purse seine and baitboat vessels fishing for bigeye, yellowfin and skipjack tunas in association with objects that could affect fish aggregation, including FADs, shall submit Management Plans to the Executive Secretary for the use of such aggregating devices by vessels flying their flag. The elaboration of the plan in Annex 6 provides an extensive list of criteria that must be included in the Plan.

In 2020, ST08-FadsDep forms were received from 10 CPCs. Of these, three reported not using or deploying FADs. Data reported for the remaining CPCs are summarized in **Addendum 2 to Appendix 8**. Some of the requirements for the Plan are covered by the FAD data collection forms (ST08-FAD).

## 4. Work in support of the SCRS Intersessional Meetings

The main task of the Secretariat is to provide full support for all intersessional and annual meetings of the SCRS, including provision of the fisheries statistic data (Task 1, 2, tagging) and auxiliary data as requested by the Working Groups. The Secretariat also provides scientific support in collaboration with scientists and modelers for all the assessment methods, normally following an intersessional work plan approved by the Sub-Committees, Species Groups and/or Working Groups. During the meetings the Secretariat also

<sup>3</sup> Ortiz M. 2017. Update review of bluefin tuna (*Thunnus thynnus*) size and weight measures taken with stereo video cameras at caging operations in the Mediterranean Sea 2015. ICCAT Coll. Vol. Sci. Pap. 73(7): 2289-2298.

collaborates with the compilation and integration of results, creating Status and Kobe plots, projections, auxiliary analysis and the backup of all analyses and main results in support of the management advice provided by the SCRS. Finally, in collaboration with Rapporteurs, the Secretariat provides support for research work plans, Call for tenders and other activities with the aim of making the best use of the available funds for science and data collection.

During 2020 the Secretariat provided support to the following SCRS meetings:

- SCRS Process and Protocol meeting
  - The meeting was held in Madrid, Spain, 20–22 February 2020
- Intersessional Meeting of the Bluefin MSE Technical Group
  - The meeting was held in Madrid, Spain, 24-28 February 2020
- Intersessional Meeting of the Swordfish Species Group
  - The meeting was held online, 16-19 March 2020
- Intersessional Meeting of the Sub-Committee on Ecosystems
  - The meeting was held online, 4-6 May 2020
- Meeting of the Working Group on Stock Assessment Methods
  - The meeting was held online, 7-8 May 2020
- Intersessional Meeting of the Bluefin Tuna Species Group
  - The meeting was held online, 14-22 May 2020
- Mediterranean Swordfish Stock Assessment Meeting
  - The meeting was held online, 25 May to 2 June 2020
- Bluefin tuna Sub-group on Growth in Farms Meeting
  - The meeting was held online, 3 June 2020
- Swordfish MSE technical Group Meeting
  - The meeting was held online, 4-5 June 2020
- Porbeagle Stock Assessment Meeting
  - The meeting was held online, 15-22 June 2020
- Atlantic Albacore Stock Assessment Meeting
  - The meeting was held online, 29 June to 8 July 2020
- Billfishes, Small tunas and Tropical Tuna Species Group meetings
  - The meetings were held online, 15-17 July 2020
- Intersessional Meeting of the Bluefin Tuna Species Group
  - The meeting was held online, 20-28 July 2020
- Swordfish, Sharks, Albacore, Bluefin Tuna and Tropical Tuna Species Group meetings
  - The meetings were held online, 31 August to 9 September 2020

## **5. Infrastructure and technology**

Described below are the most significant improvements made to the Secretariat's IT department.

### ***5.1 Purchase of 3 new HP servers***

Three new HP servers were purchased to replace the current ones, in addition to two HP switches to connect the new servers to one another and to shared storage. We also have a new storage cabinet provided by the supplier free of charge.

### ***5.2 Use of the Palo Alto 820 firewall VPN during the COVID-19 pandemic***

The Secretariat office's Palo Alto 820 VPN service was used to allow staff to work remotely during the COVID-19 lockdown. Remote support was given to staff as required.

### ***5.3 Endpoint security software subscription replacement***

The Endpoint security software has been replaced with a Sophos solution for Symnatec user computers and servers.

#### ***5.4 Backup service with disaster recovery for virtual servers and user computers***

Work has continued on the virtual machine backup service to guarantee continuity in the event of a physical disaster at the Secretariat facilities.

Backups of user computers continue to be made in order to allow them to keep working with the same data and/or complete system, as required, in the event that the computer is damaged.

#### ***5.5 Possibility of buying a Zoom license for online meetings***

The possibility of buying a Zoom license has been studied in the event that it is needed for online meetings. It allows for simultaneous interpreting. A specialised online events company has been located to manage online meetings on Zoom or its own application with simultaneous interpreting.

#### ***5.6 IP thermometer for the DPC***

An IP thermometer has been purchased to monitor the temperature of the server room.

#### ***5.7 Purchase of server and computer management software***

Manage Engine's Desktop Control software program has been purchased to manage servers and user computers, improving security.

#### ***5.8 Purchase of DPC IT asset management software***

Manage Engine's oPManager software program has been purchased to monitor over 50 servers/switches/firewalls, etc.

#### ***5.9 Cybersecurity and regulatory compliance consultation services***

We have been looking for an external company to help us fulfill the Spanish Data Protection Act and create Security Policies, in line with ISO 27001, which includes security regulations related to teleworking. It is based on a preliminary audit and a vulnerability analysis, in addition to penetration testing. It is based on an analysis of the risks to be covered by the Secretariat.

#### ***5.10 'Passwordless' access solution***

Work is currently being carried out on a 'Passwordless' access solution, which allows users to log in to their computer with a USB stick, as well as access Microsoft 365 (Office) software and the Palo Alto VPN to connect to our office. It is based on Yubkey by Yubico. It is a 2FA (Two-Factor Authentication) solution.

#### ***5.11 Additional email security layer***

An email protection solution based on Fortimail and FortiSandbox, and managed by an SOC (Security Operations Center), has been acquired.

#### ***5.12 New computers for staff***

Two new computers have been delivered - one desktop computer and one laptop - to ICCAT staff.

#### ***5.13 Work environment for person covering maternity leave***

A remote work environment has been prepared for the person covering the maternity leave of a member of the ICCAT staff.

#### ***5.14 Fax virtualization***

Work is currently being carried out to virtualize the ICCAT Secretariat's fax service.

## 6. Publications

### 6.1 ICCAT series of periodic publications

For the current year, the Secretariat has continued the series of periodic publications developed throughout the history of ICCAT. **Table 26** shows the volumes of these series that were published in 2020. Due to the request from the Commission to reduce costs, all the ICCAT periodic publications are only published in electronic format and are all available for download on the ICCAT publications webpage.

Volume 4 of the Biennial Report was published for the first time in 2011. This Volume contains the reports generated by the Secretariat for the SCRS and the Commission, such as the Secretariat Report on Statistics and Coordination of Research, the Financial and Administrative Reports, and the ICCAT Secretariat Reports to the Conservation and Management Measures Compliance Committee (COC) and the Permanent Working Group for the Improvement of ICCAT Statistics and Conservation Measures (PWG).

Volume 46 of the Statistical Bulletin will be published in October as an electronic version. The current edition provides the catches and other statistics series for the period 1950 to 2018.

Given the Secretariat's workload and the request to reduce the time of publication of the ICCAT Collective Volume of Scientific Papers, and considering that a significant number of authors do not follow the publication guidelines provided, the SCRS agreed in 2014 that those papers not meeting the minimum standards would not be published. As a result of applying this practice since 2017, the list of unpublished papers in the volume includes those withdrawn by the authors and those which failed to meet the minimum established publication standards. The Secretariat also adopted the necessary measures in 2017 to ensure that documents be published in electronic format soon after Sub-committees and Species Groups and Working Group meetings. As a result of improvements imposed in the publication process, throughout 2020 the Secretariat completed publishing of volume 76 (completed issues 7 to 11) and already published issues 1 to 5 of volume 77 of the ICCAT Collective Volume of Scientific Papers.

### 6.2 ICCAT- Aquatic Living Resources (ALR) Agreement

In 2007, ICCAT signed an agreement with ALR, with the aim of providing wider dissemination of the work of the SCRS within the scientific community. This agreement meant the development of a thematic section on tunas in the journal, to include documents presented to the SCRS and selected by the SCRS to be inserted in this section. Since that date, six volumes of the journal have been published with this section and a total of 24 ICCAT documents. However, in 2014 ALR changed its editorial line towards an ecosystem approach of fisheries management, which considerably reduces the possibilities of publishing the documents presented to the SCRS.

In 2015, the former ALR editor, Dr. Brigitte Milcendon, informed the Secretariat that ALR would continue as a peer-reviewed journal, with a new editing team and without the participation of IFREMER in the publication. Dr. Milcendon also expressed the new team's will to maintain the agreement with ICCAT. The field of interest of the journal in its new phase will continue to have an ecosystem approach, but with a broader outlook than in its last phase, which will open the publication up to a larger number of SCRS documents. In 2016 the Secretariat contacted the new ALR editorial team, which reiterated their willingness to enhance the collaboration with ICCAT and requested greater involvement of the SCRS in the process of selection, review and publication of the documents through an Editorial Committee. On the other hand, ALR expressed their willingness to publish a few more ICCAT papers (12-15) on an annual basis. However, in 2016 only 2 papers were selected by the Sub-committees Conveners and Species Group Rapporteurs as of potential interest for publication in the ALR. In 2017 and 2018 no papers were selected. Based on this fact, which precludes ALR having an annual ICCAT issue, the Secretariat and the SCRS Chair presented in 2018 an alternative option, according to which the Sub-Committee's conveners and the Species/Working Group Rapporteurs should identify a specific paper in their workplan for 2020 that will be put forward for publication in the primary literature. This issue was discussed in the 2020 SCRS Process and Protocol meeting, which reiterated the value of having each SCRS Species Group Chair identify 1-2 papers in their work plans for submission to the peer-reviewed journal during the following year. A proposal was made to engage scientists from developing CPCs in the drafting of such papers.

### **6.3 ICCAT Manual**

In 2019 and 2020, a request has been made regarding the Manual. The Small Tuna Species Group recommended extending the species description chapter(s) of the ICCAT Manual for other small tuna species, including wahoo (*Acanthocybium solandri*), serra Spanish mackerel (*Scomberomorus brasiliensis*), West African Spanish mackerel (*Scomberomorus tritor*), dolphinfish (*Coryphaena hippurus*), plain bonito (BOP, *Orcynopsis unicolor*) and cero mackerel (CER, *Scomberomorus regalis*), and update all other species chapters, which were last updated in 2006, except for *Thunnus atlanticus*, which was updated in 2013. The Secretariat will launch a Call for Tenders during the 4<sup>th</sup> quarter of 2020 regarding the signing of a short-term contract with an expert to proceed with the update of the ICCAT Manual.

### **6.4 ICCAT web site**

The ICCAT web site, in the three official languages of the Commission, continues to be updated on a regular basis to provide better service to users.

The development of the web page and search engine for MSE documents has been completed. Likewise, improvements have been made to the structure, databases, documents and pages with the aim of improving browsing and results in the global search engine, which will be made available on our web site as soon as possible.

We continue to adapt the web site to new navigator functionalities.

## **7. International activities**

### **7.1 Coordinating Working Group on Fishery Statistics (CWP)**

No meetings were scheduled by FAO-CWP technical workshop on global harmonization of tuna fisheries statistics in 2020. However, the Secretariat has maintained close collaboration with FAO-CWP and FAO-FIRMS experts at the technical level on the solution of various data issues (data corrections, coding systems, application of CWP fisheries harmonization standards and concepts, data exchange, etc.). The ICCAT Secretariat also has activities under way for the accomplishment of the data provision for the FAO-FIRMS Global Tuna Atlas as described in the FAO FIRMS Steering Committee eleventh session report (FS11, May 2019 Rome-Italy: <http://www.fao.org/3/ca5247en/ca5247en.pdf>). These activities will continue until the public dissemination of the FAO Global Tuna Atlas, planned for October 2020.

### **7.2 Fisheries and Resources Monitoring System (FIRMS)**

ICCAT is partner of the FAO/FIRMS that provides access to information on the global monitoring and management of fishery marine resources. As such the Secretariat provides regular updates for the stock status of ICCAT species (<http://firms.fao.org/firms/en>) assessed by the SCRS. In early 2020, the Secretariat updated the species identification sheets for white marlin and yellowfin tuna which were assessed by the SCRS in 2019.

### **7.3 ASFA**

Since the last SCRS meeting, the Secretariat could not prepare new entries for the Aquatic Sciences and Fisheries Abstracts (ASFA-ProQuest) database of the papers published in the most recent issues of the ICCAT Collective Volume of Scientific Papers.

### **7.4 EU Regional Coordination Group Large Pelagics (RCG LP)**

The ICCAT Secretariat has participated in the European Union (EU) Regional Coordination Group on Large Pelagics (RCG LP) Annual Meeting, held online (25-26 June, 2020), as one of the potential beneficiaries of the outcomes planned by the RCG-LP on the provision by EU Member States of fisheries and biological data, through the EU data collection framework (DCF). The Secretariat considers that the DCF system has the potential to be used in ICCAT by EU Member States to fulfil their data obligations. The Secretariat presented to the Group the various aspects of the ICCAT data collection system, namely the data call process, the types

of fisheries and biological data and respective formats, and the submission and the validation process using some of the SCRS instruments recently developed (filtering criteria, report cards, catalogues, and scorecard), among others. Special attention was given to the way the data transmission failures are handled by the EU and ICCAT in relation to EU Member State data provision. The Group recognised that the existing practice of sending a yearly report to the EU (DG-MARE) (prepared by the ICCAT Secretariat around October) on the “EU reporting status” is a good instrument used to track with some level of detail the data provision failures of EU Member States. The Secretariat noted that the report still has potential for improvements in the future.

### **7.5 Cooperation agreement with SEAFO**

In 2019 the Secretariat drafted a cooperation agreement MoU with the South East Atlantic Fisheries Organization SEAFO for the exchange and view of enhancing the conservation and rational use of stocks and species which are of interest of both Organisations. The MoU was ratified by the Commission at its annual meeting in Palma de Mallorca, Spain, in November 2019. It is expected that this recently signed agreement will facilitate scientific and data exchange in benefit of both Regional Fisheries Bodies including vessel authorised to fish in accordance with the Organisation’s conservation measures, illegal, unreported and unregulated (IUU) fishing vessels and IUU Vessels List, and catch, bycatch and vessel information and or data.

## **8. ICCAT Scientific programmes**

The activities of the Atlantic-Wide Bluefin Research Programme (ICCAT GBYP), Atlantic Ocean Tropical tuna Tagging Programme (ICCAT AOTTP), Year Research Programme for Small Tunas (ICCAT SMTYP), the Shark Research and Data Collection Programme (SRDCP), and the Enhanced Research Programme for Billfish (ICCAT ERPB), are separately presented in reports to the SCRS (see **Appendices 3-7** of the 2020 SCRS Advice to the Commission, respectively). The Secretariat’s participation in these programmes mainly consists in administrative and scientific support. In the administrative area the Secretariat aids with the coordination of proposal research, Call for tenders/Quotation request, and funds administration, and oversees the auditory and accounting responsibilities of these programmes. Regarding scientific support, the Secretariat plays a major role between the SCRS and the programme coordinator in the design of research proposals, Call for tenders, evaluation of proposals, coordination of research and database management, as well as IT support to each of the programmes. As in the past, during 2020 the Secretariat actively participated in several of the research programmes components.

In addition to the above mentioned programmes, the Secretariat has been providing administrative and scientific support to other research activities (see item 6.6), namely regarding the ongoing work of the Sub-Committee on Ecosystems, swordfish and albacore Species Groups, as well as, the Stock Assessment methods Working Group. Such support involved coordination of research of proposals, Call for tenders, administration of allocated funds and accounting responsibilities of the different contracts issued.

## **9. Other activities**

### **9.1 T-RMFO Bycatch Working Group Sharks Meeting**

The Secretariat organized a meeting of the tRMFO Bycatch Working Group on sharks. This was the first meeting of the tRMFO Bycatch Working Group dedicated to sharks. The meeting was convened to promote discussions on the assessment and management of elasmobranchs across the globe. It was held on 16–18 December 2019 in Porto Portugal. The [meeting report](#) is published on the ICCAT webpage.

### **9.2 International Whale Commission (IWC)**

The Bycatch Coordinator was invited to review an IWC report entitled “A Review of Regional Fishery Management Organization Efforts in Addressing Cetacean Bycatch”. The absence of any ICCAT recommendation on cetaceans was identified as an important shortcoming affecting ICCAT’s low overall ranking in the IWC’s report. The Secretariat and the SCRS coordinated to draft a response, noting some errors in the arguments and facts of the IWC’s report. The Bycatch Coordinator attended the IWC Scientific

Committee's By-catch Working Group meeting, held 12-24 May online, and discussed the report. A revised version of the IWC's report largely reflected the revisions sent by ICCAT. It was clear that the IWC wishes to engage with ICCAT to develop measures to quantify and mitigate marine mammal bycatch in ICCAT fisheries.

### ***9.3 The Western Pacific Fisheries Management Council's International Workshop on Area-Based Management of Blue Water Fisheries***

The Bycatch Coordinator was invited to participate in this meeting, held 15–17 June 2020. The objectives of the meeting were to: review and define objectives and performance metrics for area-based management in blue water ecosystems; examine spatial management measure designs for blue water fisheries; review evidence of ecological objectives met by spatial management measures for pelagic marine fisheries; define research needs for area-based management in pelagic fisheries; review methods to evaluate and monitor area-based management measures; and carry out a social impact assessment of area-based management measures. The participants are drafting a primary paper summarizing their findings, which they plan to submit for publication in September 2020.

### ***9.4 Fish and Ships***

This workshop was jointly organised by Stanford University and the Virginia Polytechnic Institute and State University. The objective of the workshop was to better understand the challenges and benefits of combining pelagic fish electronic tagging data with vessel tracking datasets. The ICCAT Secretariat participated in the Atlantic online meeting on 30–31 July 2020 (separate sessions were held for Pacific CPCs and RMFOs). The Secretariat provided information on which datasets it held of electronic tagging and vessel tracking information. The workshop identified technical issues associated with using electronic tagging datasets and remotely sensed fisheries information together, with the aim of collaboratively synthesizing these datasets in the future. It is anticipated that future workshops will follow as collaborations develop regionally. A report of the meeting's proceedings will be published once it is available.

### ***9.5 Mediterranean Advisory Council (MEDAC)***

The Mediterranean Advisory Council's (MEDAC) role includes the preparation of opinions on fisheries management and socio-economic aspects in support of the fisheries sector in the Mediterranean, to be submitted to the European Member States and institutions in order to facilitate the achievement of the objectives of the European Union Common Fisheries Policy. The ICCAT Secretariat receives an annual invitation to attend one of their meetings and to provide a presentation on the recent findings of the SCRS as regards the status of the stocks of eastern Atlantic and Mediterranean bluefin tuna, as well as for the Mediterranean albacore and swordfish stocks.

## **10. ICCAT funds for data improvement and capacity building**

To improve data collection and strengthen the capacity of the scientists from developing Parties, the Japanese Government created an initial data improvement project, which was continued in a second phase by the ICCAT/Japan Data and Management Improvement Project (JDMIP), in a third phase by the ICCAT/Japan Capacity-Building Assistance Improvement Project (JCAP), and since December 2019 in a fourth phase by the ICCAT/Japan Capacity-Building Assistance Improvement Project (Phase 2) (JCAP-2) (the report is contained in document SCI-09).

Besides this project, there is also a Data Fund, which was established through the *Resolution by ICCAT on Improvements in Data Collection and Quality Assurance* [Res. 03-21]. The Data Fund is open to voluntary contributions from the Contracting Parties. To date, only the United States has contributed to this fund.

The European Union and the United States created their own capacity building funds for data collection and analysis of data and stock assessment methods, as well as to facilitate participation in SCRS meetings.

In 2014, the Commission adopted the *Recommendation by ICCAT amending Recommendation [11-26] on the Establishment of a Meeting Participation Fund for Developing Contracting Parties* [Rec. 14-14], for the participation in both the SCRS and Commission meetings.

In 2013, the Commission adopted the *Recommendation by ICCAT on the Establishment of a Scientific Capacity Building Fund for Developing States which are ICCAT Contracting Parties* [Rec. 13-19] which establishes a Special Capacity Building Fund (SCBF) to support scientists from ICCAT Contracting Parties that are developing States, regarding their need to acquire knowledge and develop capacities in ICCAT related issues.

In 2017 the Commission decided to keep this fund but no budget has been allocated to it since 2018, whereas it was also decided to move the respective balance as of 31 December 2017 to the Science Envelope budgetary line.

To support the SCRS work, at its 2019 meeting, the Commission approved a total amount of €150,000 for the 2020 Science Envelope. In addition, in 2020 the EU committed an additional contribution of €850,000 and the USA provided a total of €77,000 to the Enhanced Programme for Billfish Research Data Fund.

In 2012, the SCRS approved a protocol to use the Data Fund and other ICCAT funds. This protocol defines a broad structure for use of the funds which includes improvement of statistics, training and support of SCRS work, including attendance to meetings. The protocol also includes the criteria to be followed for allocation of funds.

On the basis of this protocol, in 2020 the funds have been used as follows:

- Participation at SCRS meetings: arrangements were made for 5 scientists from Algeria, Brazil, Mauritania, Namibia and Tunisia to attend the swordfish Species Group meeting, which was subsequently canceled and held online.
- Improvement of statistics: A training course has been planned on building the capacity of data collection in industrial tropical tuna fisheries in Gabon (date to be confirmed) and rebuilding the statistical and fisheries data collection system in Liberia, financially supported by the ICCAT - Japan Capacity-Building Assistance Project (JCAP-2).
- SCRS activities funded the following:
  - Short-term contract for collection of biological samples for growth study on billfish in the eastern Atlantic;
  - Short-term contract for collection of biological samples for studies on genetics, growth and maturity - SMTYP;
  - Short-term contract for ICCAT swordfish biological samples collection for growth, reproduction and genetics studies;
  - Short-term contract for modelling approaches: support for the ICCAT North Atlantic swordfish from MSE process.
  - Short-term contract to improve the working framework for assessment of the North Atlantic albacore management strategy;
  - Electronic PSAT tagging of Atlantic swordfish, Atlantic albacore and Atlantic pelagic sharks;
  - Study on the genetic structure of the shortfin mako shark stock based on mitochondrial analysis;
  - Workshop on sampling and biology of ICCAT small tunas (funding for 12 participants).

## 11. Major statistical and IT Tasks planned for 2021

The Secretariat has been working since 2017 on the Integrated Online Managements System (ICCAT IOMS). This project started with two prototypes, the FORS (Fisheries online reporting system, financed by GEF) and the “ICCAT forms” (recommended by the SCRS and made by the Secretariat) aimed to validate online Task 1 and Task 2 forms. In 2018, the Sub-Committee on Statistics recommended (after evaluating the two web-applications presented) that both projects be merged. The SCRS and the Commission’s Online Reporting Technical Working Group has supported and recommended to continue with this project, including its extension to all the compliance and statistical data submission requirements of ICCAT. The Commission also recognized that implementing the project ICCAT IOMS system does require a commitment for financial and expertise support for moving forward and completing it in a near future to fulfil the recommendations from the Online Reporting Technology Working Group. In 2019 the Commission

approved Phase 1 of the ICCAT IOMS project. The Secretariat started its development with the hire of two senior software developers in June 2019. The IOMS Phase 1 workplan and specifications are described in document COC\_317\_IOMS\_Phase1\_Proposal. The new IOMS development phases will be specified by the ICCAT WG-TOR. In 2020, due to the COVID 19 pandemic, the meetings of the IOMS Working Group were postponed. Nevertheless, the Secretariat has continued with the project development workplan and will report to the Working Group at the next meeting.

The following tasks represent continuous database improvements and maintenance that will continue during 2021 and beyond. The priority tasks (including the ones postponed in 2019/20) for 2021 include:

- Replace the stand-alone MS-ACCESS Task 2 databases on the web by SQLite equivalent ones.
- Improve the “client applications” that manage the databases of ICCAT-DB system.
- Continue the tagging database redesign, including the addition of the model structure for electronic tagging, TG forms standardization, and automatic data integration of TG forms.
- Continue the development of the GIS project (create a PostGIS server and geo-reference all the ICCAT data available in ICCAT-DB).
- The standardization of electronic forms of compliance and statistics for automatic data integration.
- The adaption of all the databases of ICCAT-DB to the ICCAT IOMS system.

## **12. Secretariat staff and organization**

In June 2020, Mr. Javier Martínez joined the Secretariat staff as a Full Stack Developer (eBCD). Detailed information on the structure and the Secretariat staff is available on the ICCAT web site ([www.iccat.int/en/staff.html](http://www.iccat.int/en/staff.html)).

The Secretariat went into telework activities on 16 March, 2020 in response to the Spanish Government’s recommendations and mandates due to the COVID-19 pandemic state of alarm. Since then, the Secretariat has been following the health and work recommendations implemented by the National and regional Authorities. However, all the activities of the Secretariat were maintained, including those related to the online meetings. The Secretariat thanks all CPCs’ authorities and scientists for their efforts and support during these difficult times and expresses their wishes for a healthy and prompt return to normal activities. Thanks are also due to the staff, for their commitment and ability to rapidly adjust to remote working, while maintaining the standards of the work.

2020 ADVICE TO THE COMMISSION

Table 1. Task 1 fleet characteristics (new form ST01-T1FC) submission status for 2019 data ("green": before deadline; "yellow": after deadline; "orange": has not passed Filter 1 (scenario 2); "blank": not reported or no active fleets).

Tableau 1. Situation de la soumission des caractéristiques des flottilles de la Tâche 1 (nouveau formulaire ST01-T1FC) pour les données de 2019 (vert: déclarées dans le respect des délais impartis; jaune: déclarées après la date limite; "orange": n'a pas passé le Filtre 1 (scénario 2); cellule vide: non déclarées ou pas de flottilles actives).

Tabla 1. Estado de la presentación de características de la flota de Tarea 1 (nuevo formulario ST01-T1FC) para los datos de 2019 ("verde": dentro del plazo; "amarillo": fuera de plazo; "naranja": no pasó el Filtro 1 (escenario 2); "en blanco": no se han enviado datos o no hay flotas activas).

Status	Party	Flag	Deadline (+1 day tolerance) / Fishery																
			2020-08-01																
			ALBM	ALBN	ALBS	BFTF	BFTW	MULTIFISH	NONE-BC	SHARKS	SMTuna	SWOM	SWON	SWOS	TROP				
CP	ALBANIA	Albania				1													
	ALGÉRIE	Algerie				1							1						
	ANGOLA	Angola																	
	BARBADOS	Barbados							-0.2										
	BELIZE	Belize		1	1					1				1	1	1	1		
	BRAZIL	Brazil								1									
	CANADA	Canada		1						1				1					
	CAP-VERT	Cape Verde																	-0.2
	CHINA PR.	China PR		1	1									1	1	1	1		
	CÔTE D'IVOIRE	Côte d'Ivoire		1															1
	CURAÇAO	Curaçao																	-0.2
	EGYPT	Egypt																	
	EL SALVADOR	El Salvador																	1
	EUROPEAN UNION	EU.Bulgaria								1	1								
		EU.Croatia				1													
		EU.Cyprus	1			1							1						
		EU.Denmark																	
		EU.España	1	1	1	-0.2							1	1	1	1	1		
		EU.France																	
		EU.Germany																	
		EU.Greece	1			1					1	1							
		EU.Ireland		1		1				1									
		EU.Italy	1			1							1						
		EU.Latvia																	
		EU.Lithuania							0										
		EU.Malta	1			1								1					
		EU.Netherlands							-0.2										
		EU.Portugal		1		1				1	1				1	1	1	1	
		EU.United Kingdom		1						1	1	1			1				
	FRANCE (St-Pierre et Miquelon)	FR.St Pierre et Miquelon																	
	GABON	Gabon																	
	GAMBIA	Gambia																	
	GHANA	Ghana																	1
	GRENADA	Grenada																	
	GUATEMALA	Guatemala																	-0.2
	GUINEA BISSAU	Guinea Bissau																	
	GUINEA ECUATORIAL	Guinea Ecuatorial																	
	GUINÉE REP.	Guinée Rep.																	
	HONDURAS	Honduras																	
	ICELAND	Iceland																	
	JAPAN	Japan																	1
	KOREA REP.	Korea Rep.				1													1
	LIBERIA	Liberia							0										
	LIBYA	Libya																	
	MAROC	Maroc				1				1	0			1	0				0
	MAURITANIA	Mauritania																	
	MEXICO	Mexico																	
	NAMIBIA	Namibia			1						1								-0.2
	NICARAGUA	Nicaragua																	1
	NIGERIA	Nigeria																	
	NORWAY	Norway				-0.2													
	PANAMA	Panama									0								0
	PHILIPPINES	Philippines																	
	RUSSIA	Russian Federation									1								
	S. TOMÉ E PRINCIPE	S. Tomé e Príncipe																	
	SENEGAL	Senegal			0	0					0				0	0	0	0	
	SIERRA LEONE	Sierra Leone																	
	SOUTH AFRICA	South Africa																	
	St VINCENT & GRENADINES	St. Vincent and Grenadines																	
	SYRIA	Syria				1													
	TRINIDAD & TOBAGO	Trinidad and Tobago																	1
	TUNISIE	Tunisie									1								
	TURKEY	Turkey				1								1					
	UNITED KINGDOM (O.Territories)	UK.Bermuda			1							1			1				1
		UK.British Virgin Islands																	
		UK.Sta Helena																	1
		UK.Turks and Caicos																	
	UNITED STATES	U.S.A.			1										1				1
	URUGUAY	Uruguay																	
	VANUATU	Vanuatu																	
	VENEZUELA	Venezuela																	0
NCC	Bolivia	Bolivia																	
	Chinese Taipei	Chinese Taipei			1	1													1
	Colombia	Colombia																	
	Costa Rica	Costa Rica																	
	Guyana	Guyana																	
	Suriname	Suriname																	

NOTES: NO FISHING ACTIVITY (flags in green, 14 flags): FR.St Pierre et Miquelon, Honduras, Iceland, Nicaragua, Nigeria, Sierra Leone, UK.British Virgin Islands, UK.Turks and Caicos, Uruguay, NO TARGETING ACTIVITIES (some by-catch): EU.Denmark, EU.Germany, EU.Netherlands, and EU.United Kingdom. ERRORS/UNDER REVISION: Côte d'Ivoire, EU-France, EU-España, Guatemala, Panama, etc.

2020 ADVICE TO THE COMMISSION

Table 2. Task 1 nominal catch (form ST02-T1NC) submission status for 2019 data ("green": before deadline; "yellow": after deadline; "orange": has not passed Filter 1 (scenário 2); "blank": not submitted or zero catch).

Tableau 2. Situation de la soumission des données de la prise nominale de la Tâche 1 (formulaire ST02-T1NC) pour les données de 2019 (vert: déclarées dans le respect des délais impartis; jaune: déclarées après la date limite; "orange": n'a pas passé le Filtre 1 (scénario 2); cellule vide: non déclarées ou prises zéro).

Tabla 2. Estado de la presentación de los datos de captura nominal de Tarea 1 (formulario ST02-T1NC) para los datos de 2019 ("verde": dentro del plazo; "amarillo": fuera de plazo; "naranja": no pasó el Filtro 1 (escenario 2); "en blanco": no se han enviado datos o captura cero).

Status	Party	Flag	Deadline (+1 day tolerance): 2020-08-01										Small tuna			Sharks (major sp.)			
			Tuna (major sp.)										STgrp	BSH	POR	SMA			
			ALB	BET	BFT	BUM	SAI	SKJ	SPF	SWO	WHM	YFT							
CP	ALBANIA	Albania	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	ALGÉRIE	Algerie	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	ANGOLA	Angola	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	BARBADOS	Barbados	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	BELIZE	Belize	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	BRAZIL	Brazil	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	CANADA	Canada	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	CAP-VERT	Cape Verde	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	CHINA PR.	China PR	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	CÔTE D'IVOIRE	Côte d'Ivoire	-0.2	-0.2		-0.2	-0.2	-0.2		-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	CURAÇAO	Curaçao	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	EGYPT	Egypt																	
	EL SALVADOR	El Salvador	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	EUROPEAN UNION	EU.Bulgaria	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.Croatia	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.Cyprus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.Denmark	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.España	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.France	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
		EU.Germany																	
		EU.Greece	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.Ireland	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.Italy	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
		EU.Latvia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.Lithuania																	
		EU.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.Netherlands	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.Portugal	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		EU.United Kingdom	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	FRANCE (St-Pierre et Miquelon)	FR.St Pierre et Miquelon																	
	GABON	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GAMBIA	Gambia																	
	GHANA	Ghana	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	GRENADA	Grenada																	
	GUATEMALA	Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GUINEA BISSAU	Guinea Bissau																	
	GUINEA ECUATORIAL	Guinea Ecuatorial		0			0	0				0			0	0			
	GUINÉE REP.	Guinée Rep.																	
	HONDURAS	Honduras																	
	ICELAND	Iceland																	
	JAPAN	Japan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	KOREA REP.	Korea Rep.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	LIBERIA	Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LIBYA	Libya																	
	MAROC	Maroc	1	0	0	0	0	0	0	1	0	0		0	0	1	0		0
	MAURITANIA	Mauritania	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	MEXICO	Mexico	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	NAMIBIA	Namibia	1	1		1		1		1		1		1		1		1	
	NICARAGUA	Nicaragua																	
	NIGERIA	Nigeria																	
	NORWAY	Norway	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	PANAMA	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PHILIPPINES	Philippines																	
	RUSSIA	Russian Federation	0	0	0	0	0	1	0	0	0	0		1	1	1	1	1	1
	S. TOMÉ E PRINCEPE	S. Tomé e Príncipe	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	SENEGAL	Senegal	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
	SIERRA LEONE	Sierra Leone																	
	SOUTH AFRICA	South Africa	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	St VINCENT & GRENADINES	St. Vincent and Grenadines	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	SYRIA	Syria	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	TRINIDAD & TOBAGO	Trinidad and Tobago	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	TUNISIE	Tunisie	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	TURKEY	Turkey	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	UNITED KINGDOM (O.Territories)	UK.Bermuda	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
		UK.British Virgin Islands																	
		UK.Sta Helena	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		UK.Turks and Caicos																	
	UNITED STATES	U.S.A.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	URUGUAY	Uruguay																	
	VANUATU	Vanuatu																	
	VENEZUELA	Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NCC	Bolivia	Bolivia																	
	Chinese Taipei	Chinese Taipei	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Colombia	Colombia																	
	Costa Rica	Costa Rica																	
	Guyana	Guyana																	
	Suriname	Suriname																	
NCO	Non-contracting parties	Jamaica	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2

NOTES: NO FISHING ACTIVITY (flags in green, 14 flags): FR.St Pierre et Miquelon, Honduras, Iceland, Nicaragua, Nigeria, Sierra Leone, UK.British Virgin Islands, UK.Turks and Caicos, Uruguay, Vanuatu, Bolivia, Colombia, Costa Rica, Suriname  
 NO TARGETING ACTIVITIES (some by catch): EU.Denmark, EU.Germany, EU.Netherlands, and, EU.United Kingdom.  
 ERRORS/UNDER REVISION: Côte d'Ivoire, EU-France, EU-España, Guatemala, Panama, etc.



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Table 4. Task 2 size information (forms: ST04-T2SZ: observed samples; ST05-CAS: catch-at-size) submission status for 2019 data ("green": before deadline; "yellow": after deadline; "orange": has not passed Filter 1 (scenario 2); "blank": not submitted or no sampling).

Tableau 4. Situation de la soumission des données de taille de la Tâche 2 (formulaires: ST04-T2SZ - échantillons observés; ST05-CAS: prise par taille) pour les données de 2019 (vert: déclarées dans le respect des délais impartis; jaune: déclarées après la date limite; "orange": n'a pas passé le Filtre 1 (scénario 2); cellule vide: non déclarées ou pas d'échantillonnage).

Tabla 4. Estado de la presentación de los datos de talla de la Tarea 2 (formularios: ST04-T2SZ - muestras observadas; ST05-CAS: captura por talla) para los datos de 2019 ("verde": dentro del plazo; "amarillo": fuera de plazo; "naranja": no pasó el Filtro 1 (escenario 2); "en blanco": no se han enviado datos o sin muestreo).

			Deadline (+1 day tolerance): 2020-08-01															
Status	Party	Flag	Tuna (major sp.)									Small tuna (any of 13 sp)	Sharks (major sp.)					
			ALB	BET	BFT	BUM	SAI	SKJ	SPF	SWO	WHM		YFT	BSH	POR	SMA		
CP	ALBANIA	Albania																
	ALGÉRIE	Algerie			-0.2							1						
	ANGOLA	Angola																
	BARBADOS	Barbados																
	BELIZE	Belize	1	1								1				1		1
	BRAZIL	Brazil	1	1				1				1	1	1		1		
	CANADA	Canada	1	1	1							1	1	1		1		1
	CAP-VERT	Cape Verde		-0.2														
	CHINA PR.	China PR			1													
	CÔTE D'IVOIRE	Côte d'Ivoire																
	CURAÇAO	Curaçao		1								1			1			
	EGYPT	Egypt																
	EL SALVADOR	El Salvador		1								1			1			
	EUROPEAN UNION	EU.Bulgaria																
		EU.Croatia			1							1						
		EU.Cyprus	1		1							1						
		EU.Denmark																
		EU.España	1	1	1			1	1			1		0	1		1	1
		EU.France	1	1	1	1	1	1	1			1		1	1	1		1
		EU.Germany																
		EU.Greece	1		1							1						
		EU.Ireland																
		EU.Italy	1		1							1			1	1		
		EU.Latvia																
		EU.Lithuania																
		EU.Malta	1		1							1			1	1		
		EU.Netherlands																
		EU.Portugal	1	1	1	1	1	1	1			1	1	1	1	1	1	1
		EU.United Kingdom																
	FRANCE (St-Pierre et Miquelon)	FR.St Pierre et Miquelon																
	GABON	Gabon																
	GAMBIA	Gambia																
	GHANA	Ghana																
	GRENADA	Grenada																
	GUATEMALA	Guatemala		0								0		0				
	GUINEA BISSAU	Guinea Bissau																
	GUINEA ECUATORIAL	Guinea Ecuatorial																
	GUINÉE REP.	Guinée Rep.																
	HONDURAS	Honduras																
	ICELAND	Iceland																
	JAPAN	Japan	1	1	1							1						
	KOREA REP.	Korea Rep.	1	1	1	1						1			1		1	1
	LIBERIA	Liberia		0		0	0	0				0		0	0			
	LIBYA	Libya																
	MAROC	Maroc			1													
	MAURITANIA	Mauritania																
	MEXICO	Mexico	1	1	1	1	1	1	1			1	1	1	1			
	NAMIBIA	Namibia	1	1								1				1		0
	NICARAGUA	Nicaragua																
	NIGERIA	Nigeria																
	NORWAY	Norway			1													
	PANAMA	Panama		0														
	PHILIPPINES	Philippines																
	RUSSIA	Russian Federation																
	S. TOMÉ E PRÍNCIPE	S. Tomé e Príncipe																
	SENEGAL	Senegal		0		0	-0.2	0							0	0		
	SIERRA LEONE	Sierra Leone																
	SOUTH AFRICA	South Africa	1	-0.2														
	St VINCENT & GRENADINES	St. Vincent and Grenadines	1	1														
	SYRIA	Syria																
	TRINIDAD & TOBAGO	Trinidad and Tobago		0														
	TUNISIE	Tunisie			1													
	TURKEY	Turkey																
	UNITED KINGDOM (O.Territories)	UK.Bermuda																
		UK.British Virgin Islands																
		UK.Sta Helena		-0.2														
		UK.Turks and Caicos																
	UNITED STATES	U.S.A.	1	1	1	1	1	1	1			1	1	1	1	1	1	1
	URUGUAY	Uruguay																
	VANUATU	Vanuatu																
	VENEZUELA	Venezuela																
NCC	Bolivia	Bolivia																
	Chinese Taipei	Chinese Taipei	1	1			1	1	1	1	1	1	1	1	1	1	1	1
	Colombia	Colombia																
	Costa Rica	Costa Rica																
	Guyana	Guyana																
	Suriname	Suriname																

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Table 5. Consolidated view of the Report Cards for 2019 data (Tables 1 to 4, where at least one cell is not empty). The order of priority given to the colours on the consolidation was: orange/yellow/green.

Tableau 5. Vision consolidée des cartes de déclaration pour les données de 2019 (tableaux 1 à 4, où au moins une cellule n'est pas vide). L'ordre de priorité donné aux couleurs dans la consolidation est : orange/jaune/vert.

Tabla 5. Visión consolidada de los catálogos de comunicación para los datos de 2019 (Tablas 1 a 4, con al menos hay una celda no vacía). El orden de prioridad asignado a los colores en la consolidación es: naranja/amarillo/verde.

Status	Party	Flag	Task I		Task II		
			T1FC	T2NC	T2CE	T2SZ/CS	
CP	ALBANIA	Albania	1	1	-0.2		
	ALGÉRIE	Algerie	1	1	-0.2	-0.2	
	ANGOLA	Angola		-0.2			
	BARBADOS	Barbados	-0.2	-0.2	-0.2	-0.2	
	BELIZE	Belize	1	-0.2	1	1	
	BRAZIL	Brazil	1	1	1	1	
	CANADA	Canada	1	1	1	1	
	CAP-VERT	Cape Verde	-0.2	1	1	-0.2	
	CHINA PR.	China PR	1	1	1	1	
	CÔTE D'IVOIRE	Côte d'Ivoire	1	-0.2	-0.2		
	CURAÇAO	Curaçao	-0.2	-0.2	1	1	
	EGYPT	Égypt					
	EL SALVADOR	El Salvador	1	-0.2	1	1	
	EUROPEAN UNION	EU.Bulgaria	EU.Bulgaria	1	1	1	
		EU.Croatia	EU.Croatia	1	1	1	1
		EU.Cyprus	EU.Cyprus	1	1	1	1
		EU.Denmark	EU.Denmark		1		
		EU.España	EU.España	-0.2	1	-0.2	0
		EU.France	EU.France		-0.2	1	1
		EU.Germany	EU.Germany				
		EU.Greece	EU.Greece	1	1	1	1
		EU.Ireland	EU.Ireland	1	1	1	
		EU.Italy	EU.Italy	1	-0.2	1	1
		EU.Latvia	EU.Latvia	0	0		
		EU.Lithuania	EU.Lithuania				
		EU.Malta	EU.Malta	1	0	0	1
		EU.Netherlands	EU.Netherlands	-0.2	1		
		EU.Portugal	EU.Portugal	1	1	1	1
		EU.United Kingdom	EU.United Kingdom	1	1	1	
		FRANCE (St-Pierre et Miquelon)	FR.St Pierre et Miquelon				
	GABON	Gabon		0			
	GAMBIA	Gambia					
	GHANA	Ghana	1	1			
	GRENADA	Grenada					
	GUATEMALA	Guatemala	-0.2	0	0	0	
	GUINEA BISSAU	Guinea Bissau					
	GUINEA ECUATORIAL	Guinea Ecuatorial		0			
	GUINÉE REP.	Guinée Rep.					
	HONDURAS	Honduras					
	ICELAND	Iceland					
	JAPAN	Japan	1	1	1	1	
	KOREA REP.	Korea Rep.	1	1	1	1	
	LIBERIA	Liberia	0	0		0	
	LIBYA	Libya					
	MAROC	Maroc	0	0	-0.2	0	
	MAURITANIA	Mauritania		-0.2			
	MEXICO	Mexico	-0.2	1	1	1	
	NAMIBIA	Namibia	1	1	1	0	
	NICARAGUA	Nicaragua					
	NIGERIA	Nigeria					
NORWAY	Norway	-0.2	1	1	1		
PANAMA	Panama	0	0	-0.2	-0.2		
PHILIPPINES	Philippines						
RUSSIA	Russian Federation	1	0	1	0		
S. TOMÉ E PRINCIPE	S. Tomé e Príncipe		-0.2				
SENEGAL	Senegal	0	0	0	-0.2		
SIERRA LEONE	Sierra Leone						
SOUTH AFRICA	South Africa		1	1	-0.2		
St VINCENT & GRENADINES	St. Vincent and Grenadines		-0.2	1	1		
SYRIA	Syria	1	1	1			
TRINIDAD & TOBAGO	Trinidad and Tobago	1	1	0	0		
TUNISIE	Tunisie	1	1	1	1		
TURKEY	Turkey	1	1	1	1		
UNITED KINGDOM (O.Territories)	UK.Bermuda	1	-0.2	1			
	UK.British Virgin Islands						
	UK.Sta Helena	1	1	1	-0.2		
	UK.Turks and Caicos						
UNITED STATES	U.S.A.	1	1	1	1		
URUGUAY	Uruguay						
VANUATU	Vanuatu						
VENEZUELA	Venezuela	0	0				
NCC	Bolivia	Bolivia					
	Chinese Taipei	Chinese Taipei	1	1	1	1	
	Colombia	Colombia					
	Costa Rica	Costa Rica					
	Guyana	Guyana					
Suriname	Suriname						

NOTES: NO FISHING ACTIVITY (Flags in green, 14 flags): FR.St Pierre et Miquelon, Honduras, Iceland, Nicaragua, Nigeria, Sierra Leone, UK.British Virgin Islands, UK.Turks and Caicos, Uruguay, Vanuatu, Bolivia, Colombia, Costa Rica, Suriname

NO TARGETTING ACTIVITIES (some by-catch): EU.Denmark, EU.Germany, EU.Netherlands, and, EU.United Kingdom.  
 ERRORS/UNDER REVISION: Côte d'Ivoire, EU-France, EU-España, Guatemala, Panama, etc.

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Table 6. SCRS scorecard on Task 1/2 data availability for all the major ICCAT species by stock/region (methodology in SCRS/2019/045).

Tableau 6. Fiche de score du SCRS sur la disponibilité des données de Tâche 1/2 pour toutes les principales espèces relevant de l'ICCAT, par stock/région (méthodologie détaillée dans SCRS/2019/045).

Tabla 6. Ficha de puntuaciones del SCRS sobre disponibilidad de datos de Tarea 1/2 para todas las especies principales de ICCAT por stock/región (metodología en el SCRS/2019/045).

SCORECARD on Task 1/2 availability for the main ICCAT fisheries (final year: 2019)										
Fishery ID	Species group	Species	Species/stock	SCORES (by time series)			N. flag fisheries ranked			Change (%) against 1989-18 (30 yrs)
				10 years (2010-19)	20 years (2000-19)	30 years (1990-19)	10 years (2010-19)	20 years (2000-19)	30 years (1990-19)	
1	Temperate tunas	ALB	ALB-N stock	7.28	7.38	7.09	11	14	12	-1%
2		ALB-S stock	6.09	5.98	5.65	9	10	10	2%	
3		ALB-M stock	6.63	3.74	2.49	6	9	11	10%	
4		BFT	BFT-E stock (ATE region)	8.46	7.00	5.90	8	8	10	1%
5		BFT-E stock (MED region)	5.80	4.41	3.39	17	21	27	2%	
6		BFT-W stock	9.68	8.88	8.68	7	8	9	1%	
7	Tropical tunas	BET	BET-A stock (AT + MD)	7.64	7.18	6.45	26	28	28	0%
8		YFT	YFT-E region	7.88	7.42	6.50	16	20	23	-1%
9		YFT-W region	5.19	4.92	4.55	21	24	24	-1%	
10		SKJ	SKJ-E stock	7.77	7.74	6.85	15	16	18	0%
11		SKJ-W stock	4.00	4.44	3.96	3	3	4	-13%	
12	SWO & billfish	SWO	SWO-N stock	8.51	8.63	7.83	10	10	11	4%
13		SWO-S stock	7.07	7.26	7.03	9	9	9	3%	
14		SWO-M stock	6.61	5.24	4.42	8	10	11	0%	
15		BUM	BUM-A stock (AT + MD)	3.65	3.90	4.07	31	30	30	-1%
16		WHM	WHM-A stock (AT + MD)	5.68	5.33	5.28	15	18	17	-1%
17		SAI	SAI-E stock	3.30	3.57	3.06	11	13	14	2%
18		SAI-W stock	4.01	3.55	3.59	12	16	18	1%	
19		SPF	SPF-E stock	4.75	5.23	2.81	3	4	3	29%
20		SPF-W stock	3.14	3.76	3.46	6	6	6	-2%	
21		Major shark species	BSH	BSH-N region	6.83	5.03	3.74	3	4	5
22	BSH-S region		6.82	5.81	4.18	7	6	6	6%	
23	POR		POR-ANE stock	1.08	0.63	0.39	11	12	8	4%
24	POR-ANW stock		3.18	2.86	2.73	8	6	4	3%	
25	POR-ASE stock		2.67	1.13	0.70	2	3	4	2%	
26	POR-ASW stock		1.42	0.77	0.44	3	5	6	0%	
27	SMA		SMA-N region	5.77	4.37	2.97	7	6	6	7%
28	SMA-S region		7.33	6.26	3.85	6	8	7	6%	
29	Small tuna species	BLF	A+M	3.85	3.60	2.97	10	12	15	0%
30		BLT	A+M	2.58	1.45	0.89	18	20	22	11%
31		BON	ATL	3.02	2.69	2.13	23	29	36	11%
32		MED	1.54	1.23	0.72	8	8	8	-12%	
33		BRS	A+M	2.50	1.38	0.92	1	3	3	0%
34		DOL	A+M	3.25	2.24	1.53	15	14	14	8%
35		FRI	ATL	5.85	5.44	4.42	21	23	28	3%
36		KGM	A+M	2.65	1.46	1.34	4	7	7	3%
37		LTA	ATL	5.29	4.64	3.75	20	25	32	3%
38		MED	1.07	0.95	0.58	12	15	18	26%	
39		MAW	A+M	1.94	2.17	2.02	12	15	21	0%
40		SSM	A+M	0.00	0.00	0.50	3	3	4	-14%
41		WAH	A+M	2.10	2.23	1.70	20	28	36	1%

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Table 7. Summary of the total number of conventional tags reported (released and/or recovered, covering all ICCAT species) by flag CPC between 2019-10-01 and 2020-09-03. The figures shown include data received directly by ICCAT, as well as those provided by the GBYP and AOTTP projects.  
 Tableau 7. Résumé du nombre total de marques conventionnelles soumises (apposées et/ou récupérées, couvrant toutes les espèces de l'ICCAT) par CPC de pavillon entre 2019-10-01 et 2020-09-03. Les chiffres indiqués incluent les données reçues directement par l'ICCAT ainsi que les données fournies par les projets GBYP et AOTTP.  
 Tabla 7. Resumen de número marcas convencionales comunicadas (colocadas y recuperadas, para todas las especies de ICCAT) por CPC de pabellón entre 2019-10-01 y el 2020-09-03. Las cifras mostradas incluyen los datos recibidos directamente por ICCAT, así como los aportados por los proyectos GBYP y AOTTP.

	Release Flag																	TOTAL
	Brasil	Canada	Côte D'Ivoire	EU.Denmark	EU.España	EU.France	EU.IRL	EU.Italy	EU.Portugal	EU.United Kingdom	Norway	S. Tomé e Príncipe	South Africa	U.S.A.	UK.Sta. Helena	Uruguay	UNCL.FLEETS	
Recovered by					2													2
Algerie					6													6
Bahamas					5													5
Belize																		
Brasil	809				39											2		850
Canada		3															9	12
Cape Verde	2				124				10			8			1			145
Côte D'Ivoire	4		2355		838				2			10			1			3210
Cuba		1																1
Curaçao	5		1		642				3			8			6			665
El Salvador	1		1		354				19			8			3			386
EU.Croatia																	3	3
EU.España	3	9	5		5517	2			121	10		19		65	3	1	31	5786
EU.France	5		35		469				2	1		3			5		7	527
EU.Italy								1									9	10
EU.Malta					1												36	37
EU.Netherlands					5													5
EU.Portugal	1				145				310					2				458
EU.United Kingdom																	1	1
Ghana	8		49		441				1			34			7			540
Guatemala	2				62				1			4			3			72
Kiribati					1													1
Marococ					2				2								3	7
Panama	3		2		430				9			9			2			455
S. Tomé e Príncipe												16						16
Senegal	1		7		4027				35			2			2			4074
South Africa													7					7
St. Vincent and Grenadines														1				1
Tunisie																	7	7
Turkey																	14	14
U.S.A.					2				1					51			3	57
UK.Sta. Helena															884			884
Venezuela																	24	24
<b>Total recovered</b>	<b>844</b>	<b>13</b>	<b>2455</b>	<b>0</b>	<b>13112</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>516</b>	<b>11</b>	<b>0</b>	<b>121</b>	<b>7</b>	<b>119</b>	<b>917</b>	<b>3</b>	<b>147</b>	<b>18268</b>
<b>Not yet recovered (at sea)</b>	<b>32317</b>	<b>549</b>	<b>9213</b>	<b>50</b>	<b>40654</b>	<b>16</b>	<b>26</b>	<b>169</b>	<b>7580</b>	<b>101</b>	<b>4</b>	<b>6886</b>	<b>188</b>	<b>1869</b>	<b>4859</b>	<b>23</b>		<b>104504</b>
<b>TOTAL</b>	<b>33161</b>	<b>562</b>	<b>11668</b>	<b>50</b>	<b>53766</b>	<b>18</b>	<b>26</b>	<b>170</b>	<b>8096</b>	<b>112</b>	<b>4</b>	<b>7007</b>	<b>195</b>	<b>1988</b>	<b>5776</b>	<b>26</b>	<b>147</b>	<b>122772</b>

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Table 8. Summary of the conventional tags distributed by the Secretariat between 2019-10-01 and 2020-09-03.

Tableau 8. Résumé des marques conventionnelles distribuées par le Secrétariat entre le 2019-10-01 et le 2020-09-03.

Tabla 8. Resumen de las marcas convencionales distribuidas por la Secretaría entre 2019-10-01 y el 2020-09-03.

TagAlfa	From	To	Quantity	DateSent	Institution	Principal Investigator	Country
BYP	11075	11574	500	2019-09-25	DINARA-Dirección Nacional de Recursos Acuáticos	Rodrigo Forselledo	URUGUAY
BYP	50050	50549	500	2019-09-25	DINARA-Dirección Nacional de Recursos Acuáticos	Rodrigo Forselledo	URUGUAY
BYP	31876	31975	100	2019-10-17	APR - Alleanza Pescatori Ricreativi	Laura Pisano	EU.ITALY
BYP	11575	11674	100	2020-02-18	IEO-Málaga	David Macias	EU.ESPAÑA
SEC	50550	50649	100	2020-02-18	IEO-Málaga	David Macias	EU.ESPAÑA
BYP	31976	32075	100	2020-05-14	DIRECTORATE OF FISHERIES	Maja K. Rodriguez Brix	NORWAY
BYP	63951	64150	200	2020-05-14	Portuguese Ocean and Atmosphere Institute (IPMA)	Pedro Lino	EU.PORTUGAL
BYP	80051	80550	500	2020-06-10	Marine Institute	Alan Drumm	EU.IRELAND

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Table 9. Summary of information provided in form ST09-DomObPrg on by-catch species (including discards) by CPCs for 2019. Values are in numbers and weight in kg.

Tableau 9. Informations saisies dans le formulaire ST09-DomObPrg sur les espèces de prise accessoire (rejets y compris) par CPC au titre de 2019. Les valeurs sont exprimées en kg et nombre.

Table 9. Información de 2019 sobre especies de captura fortuita (descartados incluidos) proporcionada por las CPC en el formulario ST09-DomObPrg. Los valores están expresados en kg y en número.

Row Labels	1-Tuna (major sp.)	2-Tuna (small)	3-Tuna (other)	4-Sharks (major)	5-Sharks (other)	7-Turtles	8-Seabirds
<b>Sum of observed catch numbers</b>							
Belize	1488	183		27	42		
Brazil	6956	260	64	12812	52	0	
Canada	2758			102	11	0	
Cape Verde	48	335		0	0	0	
China PR	9626	132	17	628	110	0	
Chinese Taipei	80970	507	96	1035	96		
Curaçao	767	4037	0	0	2	1	
EU Cyprus	2434			3	75		
EU España	1326	755	7	2	0	0	0
EU France	1973	13976	2	0	5	1	
EU Greece	1008						
EU Italy	4076						
EU Portugal	2997	54	13	9851	702	59	
Japan					0	0	0
Korea Rep.	27797	115	20467	7897			
Mexico	24770	2449	52	31	165		
Norway	233						
Russian Federation	9781	875883		0	0		
Tunisie	18754						
Turkey	208						
U.S.A.	25205	10045	1	1151	136	0	0
<b>Sum of live discards (numbers)</b>							
Belize	0	0		0	0		
Brazil	104	0	0	0	38	26	
Canada	66			1441	201	1	
Cape Verde	0	0		1	41	1	
China PR	21	43	4	702	947	11	
Chinese Taipei	39	0	0	6	0		
Curaçao	5	45	0	19	1264	113	
EU Cyprus	0			3	6		
EU España	1	0	0	0	0	4	6
EU France	9	198	0	20	1402	187	
EU Greece	0						
EU Italy	0						
EU Portugal	11	0	1	47	177	43	
Japan					1458	146	20
Korea Rep.	3	0	0	1323			
Mexico	1771	57	1	13	23		
Norway	0						
Russian Federation	0	0		0	0		
Tunisie	0						
Turkey	0						
U.S.A.	2535	1240	231	3688	5531	123	6
<b>Sum of dead discards (numbers)</b>							
Belize	0	0		0	0		
Brazil	112	0	0	0	26	2	
Canada	38			92	50	0	
Cape Verde	0	0		0	19	0	
China PR	180	81	22	797	155	5	
Chinese Taipei	810	3	0	69	0		
Curaçao	62861	25067	23609	6	561	0	
EU Cyprus	0			0	0		
EU España	0	0	0	0	0	0	1
EU France	119589	184852	19	21	905	0	
EU Greece	90						
EU Italy	0						
EU Portugal	63	3	12	9	414	16	
Japan					936	76	1156
Korea Rep.	0	0	0	4596			
Mexico	558	19	0	0	1		
Norway	0						
Russian Federation	0	0		0	0		
Tunisie	11						
Turkey	0						
U.S.A.	5419	1971	169	301	1660	3	3
<b>Sum of discards of unknown fate (numbers)</b>							
Belize	0	0		0	0		
Brazil	0	0	0	0	0	0	
Canada	0			29	3	0	
Cape Verde	0	0		0	0	0	
China PR	0	0	0	0	0	0	
Chinese Taipei	12	0	0	3	0		
Curaçao	0	0	0	0	0	0	
EU Cyprus	15			0	75		
EU España	145	13	2	44	1107	0	0
EU France	0	0	0	0	0	0	
EU Greece	0						
EU Italy	0						
EU Portugal	43	0	0	0	22	0	
Japan					8	12	58
Korea Rep.	0	0	0	0			
Mexico	0	0	0	0	0		
Norway	0						
Russian Federation	0	0		0	0		
Tunisie	0						
Turkey	0						
U.S.A.	0	0	0	0	0	0	0
<b>Sum of observed fish weight (kg)</b>							
Belize	44520	1590		585	600		
Brazil	0	0	0	0	0	0	
Canada	165783			3875	678	0	
Cape Verde	4253	2294		0	0	0	
China PR	358899	2194.4	210	2865	847.6	0	
Chinese Taipei	1804110	2556	2553	30741	1470		
Curaçao	41070	37255	0	0	152	53	
EU Cyprus	20230			90	858		
EU España	49272.87	7938.94	58	17.85	0	0	0
EU France	62000	192030	2043	0	59	40	
EU Greece	19858						
EU Italy	185217						
EU Portugal	0	0	0	0	0	0	
Japan					0	0	0
Korea Rep.	821255	1343	1201905	176790			
Mexico	922532	23879	956	2059	11944		
Norway	47699						
Russian Federation	25000	1475000		0	0		
Tunisie	1880016						
Turkey	11595.9						
U.S.A.	0	0	0	0	0	0	0
<b>Total Sum of observed catch number</b>	<b>221175</b>	<b>908731</b>	<b>20719</b>	<b>33539</b>	<b>1396</b>	<b>61</b>	<b>0</b>
<b>Total Sum of live discards (numbers)</b>	<b>4565</b>	<b>1583</b>	<b>237</b>	<b>7263</b>	<b>11088</b>	<b>655</b>	<b>32</b>
<b>Total Sum of dead discards (numbers)</b>	<b>189731</b>	<b>211996</b>	<b>23831</b>	<b>5891</b>	<b>4727</b>	<b>102</b>	<b>1160</b>
<b>Total Sum of discards of unknown fate (numbers)</b>	<b>215</b>	<b>13</b>	<b>2</b>	<b>76</b>	<b>1215</b>	<b>12</b>	<b>58</b>
<b>Total Sum of observed fish weight (kg)</b>	<b>6463310.77</b>	<b>1746080.34</b>	<b>1207725</b>	<b>217022.85</b>	<b>16608.6</b>	<b>93</b>	<b>0</b>

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Table 10. Information on dead discards (DD), live discards (DL) reported in T1NC by CPCs for 2019. Values are expressed in tons.

Tableau 10. Informations fournies sur les débarquements (T1NC) d'espèces accessoires, par CPC, pour 2019. Les valeurs sont exprimées en tonnes.

Tabla 10. Información facilitada sobre desembarques (T1NC) de especies de captura fortuita por CPC para 2019. Los valores están expresados en toneladas.

Row Labels	CANADA		Chinese Taipei		EUROPEAN UNION		JAPAN		KOREA REP.		MEXICO		UK (O.Territories)		UNITED STATES		VENEZUELA		TOTAL		
	DD	DL	DD	DL	DD	DL	DD	DL	DD	DL	DD	DL	DD	DL	DD	DL	DD	DL			
1-Tuna (major sp.)	5	35			94		339	0	95			4	15		0	15	337	106	205	1250	
ALB	0	0							39						0				151	190	
BET	0	2					10		15					0	0					27	
BFT	3	21					4		9				1				6			44	
BUM		0			22		9	0	8			0	1		0	13	31	67		151	
SAI					5		2	0				0	0				5	3		15	
SKJ							208					0	0			0				208	
SPF					8				9						0	0				17	
SWO	2	9			57		89		8			0	0		0	0	291	36		493	
WHM	0	3			3				1			0	0		1		4	0	54	66	
YFT	0	0					17		5			3	13		0	1				40	
2-Tuna (small)							103	1				0	0		0					104	
FRI							26													26	
BLF													0		0					0	
DOL							2	0				0	0		0					3	
LTA							69								0					69	
WAH							6	1				0	0		0					7	
3-Tuna (other)					3		5						0							8	
GES							0													0	
SSP					3								0							3	
TUN							5													5	
4-Sharks (major)	8	506			179		1	1	330		49	12		1		1	43			1131	
BSH	4	446			176		0	1	298		44	12			1		29			1010	
POR	3	47			0							0					13			64	
SMA	1	12			3		1	1	32		5		1		0		2			57	
5-Sharks (other)	2	31			10		28	135				0	1		0	1	66		1	276	
ALV					8															8	
BSK	2	19															17		0	21	
BTH					1															18	
CCG														0						0	
FAL					0		13	19				1		0	0		7		0	41	
LMA																	13			13	
MAN							0													0	
OCS					1		0					0					2		0	3	
PLS	0	1					0	0						0						2	
RHN							81													81	
RMB		0					1													1	
RMM							4	11												16	
RMT							0	1												2	
RSK														0	0					1	
SPK		2			0			3												5	
SPL					0		0	3									4		0	8	
SPN								0				0	0				7			7	
SPZ					0		10	14									1			24	
THR	0	1										0					16			18	
TIG		8																		8	
6-Other Species							99	246							0					345	
ALM							0	0												0	
CFW							0													0	
CNT							23	39												62	
DIY								0												0	
GBA							1	0												1	
LGH							0	0												0	
MOX							0	2						0						2	
MRW								0												0	
NAU							0	0												0	
POA							0													0	
RRU							27	107							0					134	
RUB							44	94												139	
TRG							0	0												0	
YTL							3	3												6	
7-Sea turtles		11						9												20	
DKK		11						2												13	
LKV								3												3	
LKY								0												0	
TTL		0						4												4	
TUG								0												0	
9-Mammals		0						2												2	
DWH		0																		0	
SHW								2												2	
TOTAL	16	583			286		574	395	425		49	12	4	17	0	17	447	106	205	0	3136

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Table 11. Sea turtle species dead discard (DD) and live discards (DL) data reported on form ST09-DomObPrg by CPCs and cooperating parties for 2019.

Tableau 11. Informations saisies dans le formulaire ST09-DomObPrg sur les espèces de tortues marines (rejets y compris) par CPC au titre de 2019.

Table 11. Información de 2019 sobre especies de tortugas marinas (descartes incluidos) proporcionada por las CPC en el formulario ST09-DomObPrg.

Row Labels	Green turtle	Hawksbill turtle	Kemp's ridley turtle	Leatherback turtle	Loggerhead turtle	Marine turtles nei	Olive Ridley turtle	Grand Total
<b>Sum of observed catch numbers</b>								
Brazil				0			0	0
Canada				0				0
Cape Verde				0				0
China PR				0			0	0
Curaçao		0	0	0	1	0	0	1
EU.España					0			0
EU.France	0		0	0	0	1	0	1
EU.Portugal				21	4		34	59
Japan				0	0	0	0	0
U.S.A.				0	0			0
<b>Sum of live discards (numbers)</b>								
Brazil				14			12	26
Canada				1				1
Cape Verde				1				1
China PR				10			1	11
Curaçao		2	5	7	61	1	37	113
EU.España					4			4
EU.France	11		1	8	83	0	84	187
EU.Portugal				21	4		18	43
Japan				22	42	4	78	146
U.S.A.				87	36			123
<b>Sum of NoDD</b>								
Brazil				0			2	2
Canada				0				0
Cape Verde				0				0
China PR				4			1	5
Curaçao		0	0	0	0	0	0	0
EU.España					0			0
EU.France	0		0	0	0	0	0	0
EU.Portugal				0	0		16	16
Japan				2	54	2	18	76
U.S.A.				2	1			3
<b>Sum of discards of unknown status (numbers)</b>								
Brazil				0			0	0
Canada				0				0
Cape Verde				0				0
China PR				0			0	0
Curaçao		0	0	0	0	0	0	0
EU.España					0			0
EU.France	0		0	0	0	0	0	0
EU.Portugal				0	0		0	0
Japan				6	2	2	2	12
U.S.A.				0	0			0
<b>Sum observed catch weight (kg)</b>								
Brazil				0			0	0
Canada				0				0
Cape Verde				0				0
China PR				0			0	0
Curaçao		0	0	0	53	0	0	53
EU.España					0			0
EU.France	0		0	0	0	40	0	40
EU.Portugal				0	0		0	0
Japan				0	0	0	0	0
U.S.A.				0	0			0
<b>Total Sum of observed catch number</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>5</b>	<b>1</b>	<b>34</b>	<b>61</b>
<b>Total Sum of live discards (numbers)</b>	<b>11</b>	<b>2</b>	<b>6</b>	<b>171</b>	<b>230</b>	<b>5</b>	<b>230</b>	<b>655</b>
<b>Total Sum of NoDD</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>55</b>	<b>2</b>	<b>37</b>	<b>102</b>
<b>Total Sum of discards of unknown status (numbers)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>12</b>
<b>Total Sum observed catch weight (kg)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>53</b>	<b>40</b>	<b>0</b>	<b>93</b>

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Table 12. Seabird by-catch data (kg) reported on form ST09-DomObPrg by CPCs for 2019.

Tableau 12. Informations saisies dans le formulaire ST09-DomObPrg sur les espèces de d'oiseaux marins (rejets y compris) par CPC au titre de 2019.

Table 12. Información de 2019 sobre especies de aves marinas (descartes incluidos) proporcionada por las CPC en el formulario ST09-DomObPrg.

Row Labels	8-Seabirds																			
	Albatrosses nei	Antarctic giant petrel	Audouin's gull	Balearic shearwater	Black-browed albatross	Cory's shearwater	Great shearwater	Grey petrel	Grey-headed albatross	Hall's giant petrel	Herring gull	Light-mantled sooty albatross	Northern fulmar	Northern gannet	Sooty albatross	Spectacled petrel	Tristan albatross	Wandering albatross	White-chinned petrel	Yellow-legged gull
<b>Sum of observed catch numbers</b>																				
EU.España			0	0		0														
Japan	0	0			0		0	0	0	0		0	0	0	0	0	0	0	0	0
U.S.A.											0		0	0						
<b>Sum of live discards (numbers)</b>																				
EU.España			1	2		1														2
Japan	4	0			2		2	0	2	2		0	0	0	0	0	4	4	0	
U.S.A.											1		0	5						
<b>Sum of dead discards (numbers)</b>																				
EU.España			0	1		0														0
Japan	194	46			106		316	68	110	36		46	2	10	100	20	8	50	44	
U.S.A.											2		1	0						
<b>Sum of discards of unknown status (numbers)</b>																				
EU.España			0	0		0														0
Japan	58	0			0		0	0	0	0		0	0	0	0	0	0	0	0	0
U.S.A.											0		0	0						
<b>Sum of observed catch weight (kg)</b>																				
EU.España			0	0		0														0
Japan	0	0			0		0	0	0	0		0	0	0	0	0	0	0	0	0
U.S.A.											0		0	0						
<b>Total Sum of observed catch number</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Sum of live discards (numbers)</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>2</b>
<b>Total Sum of dead discards (numbers)</b>	<b>194</b>	<b>46</b>	<b>0</b>	<b>1</b>	<b>106</b>	<b>0</b>	<b>316</b>	<b>68</b>	<b>110</b>	<b>36</b>	<b>2</b>	<b>46</b>	<b>3</b>	<b>10</b>	<b>100</b>	<b>20</b>	<b>8</b>	<b>50</b>	<b>44</b>	<b>0</b>
<b>Total Sum of discards of unknown status (numbers)</b>	<b>58</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Sum of observed catch weight (kg)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



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Table 14. Task 1 catches (t), by flag, species, fleet and year, which were not integrated into the ICCAT-DB system due to various reasons. Those series require SCRS guidance and approval.

Tableau 14. Prises de Tâche 1 (t) par pavillon, espèce, flottille et année, qui n'ont pas été saisies dans le système de bases de données de l'ICCAT pour divers motifs. Ces séries doivent être soumises à l'orientation et approbation du SCRS.

Tabla 14. Capturas de Tarea 1 (t) por pabellón, especie, flota y año, que no fueron integradas en el sistema de bases de datos de ICCAT debido a diversas razones. Estas series requieren la orientación y aprobación del SCRS.

Flag	SpeciesGrp	Species	GearGrp	Fleet	decade/year																								Remarks						
					1980					1990					2000					2010															
					1985	1986	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	...
EU.France	1-Tuna (major sp.)	BUM	LL	EU.FRA-FR-GP					10	24	29	43	90	95	100	133	143	148	162	171	181	181	181	181	181	176	176	203	208	18	88	84	103		Revision officially reported (no SCRS document received)
		PS		EU.FRA-FR-MQ	11	11	36	36	36	40	45	45	49	54	54	64	89	109	123	134	148	159	159	164	179	179	176		124	125	158	125	67		
				EU.FRA-FR-ETRO																						1	6	12	8	42	25	42	18		
Costa Rica	1-Tuna (major sp.)	ALB	LL	CRI																														26	Reported by Costa Rica after the SCRS (possibly including catches from the Pacific Ocean)
		BET	LL	CRI																														12	
		BUM	LL	CRI																														0	
		SWO	LL	CRI																														146	
		WHM	LL	CRI																														242	
		YFT	LL	CRI																														664	
	4-Sharks (major)	BSH	LL	CRI																														11	<b>WAITING Costa Rica REVISION</b>
	5-Sharks (other)	FAL	LL	CRI																													480		
		SPL	LL	CRI																														7	
		SPZ	LL	CRI																														1	

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Table 15. Flag CPCs who reported "zero" catches in the new Task 1 nominal catches sub-form ST02B (of ST02-T1NC) for 2019, by major species/stock

Tableau 15. CPC de pavillon ayant déclaré des captures « zéro » dans le nouveau sous-formulaire de prises nominales de la Tâche 1 ST02B (du ST02-T1NC) pour 2019, par espèce/stock principal(e).

Tabla 15. CPC del pabellón que han comunicado capturas "cero" en el nuevo subformulario ST02B (del ST02-T1NC) de capturas nominales de Tarea 1 para 2019, por especie/stock principal.

Status	Flag	Tuna (major sp.)												Tuna (small)					Sharks (major)			Sharks (other)													
		ALB			BET	BFT		BUM	SAI		SKJ		SPF		SWO			WHM	YFT		FRI	BON	BRS	KGM	LTA	SSM	BSH	POR	SMA	ALV	BTH	FAL	OCS	SPK	SPL
		ALB-M	ALB-N	ALB-S	BET-A	BFT-E	BFT-W	BUM-A	SAI-E	SAI-W	SKJ-E	SKJ-W	SPF-E	SPF-W	SWO-M	SWO-N	SWO-S	WHM-A	YFT-E	YFT-W	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
CP	Albania	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Algerie	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Barbados	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Belize	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Brazil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Canada	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Cape Verde	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	China PR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Curaçao	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	El Salvador	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Bulgaria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Croatia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Cyprus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Denmark	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.España	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.France	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Greece	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Ireland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Italy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Malta	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Netherlands	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.Portugal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EU.United Kingdom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Ghana	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Guatemala	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Iceland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Japan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Korea Rep.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Maroc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Mauritania	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Norway	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Russian Federation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	S. Tomé e Príncipe	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Senegal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	South Africa	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	St. Vincent and Grenadines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Syria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Trinidad and Tobago	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Tunisie	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Turkey	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	U.S.A.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	UK.Bermuda	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	UK.Sta Helena	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Venezuela	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NCC	Chinese Taipei	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Suriname	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓





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Table 18. Bluefin tuna catches (t) report from the Bluefin Catch Document Program (e-BCD, 2018-2020). Updated as of 2020-08-18.

Tableau 18. Déclaration de capture du thon rouge (t) du programme de documentation des captures de thon rouge (e-BCD, 2018-2020). Actualisé au 2020-08-18

Tabla 18. Informes de capturas (t) de atún rojo del Programa de documentación de capturas de atún rojo (e-BCD, 2018-2020). Actualizado a 2020-08-18.

Year (catch)	Month	Fishing Flag														TOTAL	
		ALBANIA	ALGÉRIE	CHINA REP	EGYPT	EUROPEAN UNION	ICELAND	JAPAN	KOREA REP.	LIBYA	MAROC	NORWAY	SYRIA	TUNISIE	TURKEY		
2018	1					40	0										40
2018	2					61											61
2018	3					220						0				0	221
2018	4					522										0	522
2018	5					8529				65	1781		764	290			11429
2018	6	100	1300		181	4682			1729	661		66	1328	982			11029
2018	7					361				16				2			379
2018	8					426				14	1			5			446
2018	9					346		6		38	11			1			402
2018	10			79		190		1649	174	55	1			1			2148
2018	11					87		677						3			766
2018	12					62											62
<b>2018 Total</b>		<b>100</b>	<b>1300</b>	<b>79</b>	<b>181</b>	<b>15526</b>	<b>0</b>	<b>2326</b>	<b>179</b>	<b>1795</b>	<b>2565</b>	<b>12</b>	<b>66</b>	<b>2092</b>	<b>1284</b>		<b>27504</b>
2019	1					69	0										69
2019	2					131											131
2019	3					367						0					367
2019	4					448								1			449
2019	5				59	6178				1823		72	241	425			8800
2019	6	156	1437		204	7991			2044	856			2133	1336			16157
2019	7					572				126				1			699
2019	8					421				57	3			2			482
2019	9					309				35	47			3			394
2019	10			27		220		1615	183	24	0			1			2069
2019	11			62		149		918	18								1147
2019	12					142		50						3			196
<b>2019 Total</b>		<b>156</b>	<b>1437</b>	<b>89</b>	<b>263</b>	<b>16998</b>	<b>0</b>	<b>2583</b>	<b>200</b>	<b>2044</b>	<b>2920</b>	<b>51</b>	<b>72</b>	<b>2374</b>	<b>1771</b>		<b>30959</b>
2020	1			0		84	0	0	0								84
2020	2					159											159
2020	3					225											225
2020	4					460								0			460
2020	5	168				9936			112	2111			572	607			13506
2020	6		1350		122	5999			1902	795		79	2016	1645			13909
2020	7		299			901			221	250			60				1731
2020	8					386				72	0			0			458
<b>2020 Total</b>		<b>168</b>	<b>1649</b>	<b>0</b>	<b>122</b>	<b>18150</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2235</b>	<b>3228</b>	<b>0</b>	<b>79</b>	<b>2648</b>	<b>2252</b>		<b>30532</b>

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Table 19. Reported catch (t) of BFT-E according to the Weekly Catch Reports (2019 is incomplete) as of 14 August 2020.  
 Tableau 19 Prises déclarées (t) de thon rouge de l'Est d'après les rapports hebdomadaires de capture (l'année 2019 est incomplète) au 14 août 2020.  
 Tabla 19. Captura declarada (t) de atún rojo del Este según los informes de captura semanales (2019 está incompleto) a 14 de agosto de 2020.

Catch(t)		Gear Group	LL					PS					BB					GN	HL	TW	TP	OT	UN	MULTIPURPOSE VESSELS					AUX					Total		
Season Year	Reported flag	Fishing Flag	<=15	>15 - <20	>=20 - <40	>=40	UNK	<=15	>15 - <20	>=20 - <40	>=40	UNK	<=15	>15 - <20	>=20 - <40	>=40	UNK							<=15	>15 - <20	>=20 - <40	>=40	UNK	<=15	>15 - <20	>=20 - <40	>=40	UNK			
2018	Albania	Albania						0		58																										58
	Algerie	Algerie						539	289	332	141																									1300
	China PR	China PR	27	15	36																														79	
	Egypt	Egypt						134		47																									181	
	European Union	EU.Croatia						145	19	75	25																								687	
		EU.Cyprus	21	3	27	4	2													59				190	43	104	27							121		
		EU.España	39	13	18	1	2											12	0	36	0	0	1	444		1746	32							2343		
		EU.France	244	39	95	51	7	1694	403	1414	417	0						0	44	304			0	44	304		1746	32							4735	
		EU.Italy	217	56	103	12	4	1468	137	298	347															254									2985	
		EU.Malta	70	20	18	6	0	48		64	66																								292	
		EU.Portugal																								330									330	
	Japan	Japan	1111	233	686	229																													2259	
	Korea Rep	Korea Rep	79	20	57	23																													179	
	Libya	Libya						934	94	382	106																									1765
	Maroc	Maroc	6	3	10	4	5	68	31	36	7									222						2013	22								2426	
	Norway	Norway									11																								12	
	Syria	Syria						66	0	0																									66	
	Tunisie	Tunisie						863	125	612	87																									2028
	Turkey	Turkey						395	43	261	128	17																								1296
2018 Total			1813	402	1051	330	19	6354	1141	3591	1324	17	12	0	36	0	0	2	769	304	4342	20	57													862
												156																							156	
2019	Albania	Albania						908	24	98	216	4																							1250	
	China PR	China PR	78		11																														89	
	Egypt	Egypt						116		34	8	13																							172	
	European Union	EU.Croatia						211	29	31	35	6								64																814
		EU.Cyprus	46	6	10	3	0																												150	
		EU.España	28	4	15	3	0	1057	327	591	132							142	6	51	11	5	1	582		1734	142								4832	
		EU.France	329	26	69	18	5	1806	290	1375	718	16						9	89	299						43	0								5248	
		EU.Italy	184	12	149	67	13	1780	0	432	478	0														358									3842	
		EU.Malta	16	0	7	4	1	256	0	0	0																									285
		EU.Portugal																3		4	0					225									233	
	Japan	Japan	1983	114	385	32																													2514	
	Korea Rep	Korea Rep	138	8	39	11																													195	
	Libya	Libya						1079	147	299	177																									1959
	Maroc	Maroc	12	1	3	2		46	9	57	18									199						2476	12								2834	
	Norway	Norway	0					22		9	17																								50	
	Syria	Syria						72		0																									72	
	Tunisie	Tunisie						134	21	182	125	13																								559
	Turkey	Turkey						722	152	278	205	19																								1760
2019 Total			2813	171	687	140	19	8211	998	3386	1953	404	146	6	54	11	5	10	934	299	4793	43	156	8												931
												169																							169	
	Algerie	Algerie						1394	189		66																									1649
	Egypt	Egypt						122			0																									122
	European Union	EU.Croatia	0					303	21	11	36	1																								849
		EU.Cyprus	36	0	0	2																														124
		EU.España	24	0	3			768		256	0							66	0	9	1					416		2499	67							4110
		EU.France	200	7	27	8	3	3150	0	490	195	7						2	87	185						20	6									4556
		EU.Greece																																		301
		EU.Italy	519	16	48	9		2803	66	93	122																									4173
		EU.Malta	106	2	16	7		128		53	45																									360
		EU.Portugal	91		4	0												100	0	17	0															572
	Libya	Libya						671			207																									878
	Maroc	Maroc	1																	79																3079
	Syria	Syria						79																												79
	Tunisie	Tunisie						1963	102		206																									2648
	Turkey	Turkey						1816	90	103	243																									2252
2020 Total			978	25	97	26	3	13366	468	1005	1120	8	166	1	25	2		2	607	188	6138	20	94	254	3	25	14	5							1094	

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Table 20. Reported catch (t) of BFT (Eastern and Western stocks) according to the Monthly Catch Reports (2019 is incomplete) as of 14 August 2020.

Tableau 20. Prises déclarées (t) de thon rouge (stocks de l'Est et de l'Ouest) d'après les rapports mensuels de capture (l'année 2019 est incomplète) au 14 août 2020.

Tabla 20. Captura declarada (t) de atún rojo (stocks del Este y del Oeste) según los informes de captura mensuales (2019 está incompleto) a 14 de agosto de 2020.

Catch (t)			Eastern Stock Unit														Grand Total			
Season Year	Fishing Year	Month	Albania	Algerie	China PR	Egypt	European Union	Iceland	Japan	Korea Rep	Libya	Maroc	Norway	Syria	Tunisie	Turkey				
2018	2018	1						43									0	43		
		2						60										60		
		3							229					0				0	229	
		4							528										0	528
		5							8658				84	1781		0	765	290	11578	
		6			1300				4718				1682	661		66	1328	982	10738	
		7							416	0				16		0	0	2	434	
		8							272	0				14	0	0	2	5	293	
		9							318	0			6	38	12	0	3	1	377	
		10					79		175	0	1880	174		55			5	1	2368	
		11							67	0	291							3	361	
		12							55	0								0	55	
2018 Total				1300	79		15539	0	2171	179	1767	2564	12	66	2104	1284	27065			
2019	2019	1						25									0	25		
		2						133										133		
		3							368									0	368	
		4							442				0					1	442	
		5	0	0		59	6025					0	1837		72	259	425	8678		
		6	156	1437		204	6967					2044	856	0	0	2117	1336	15116		
		7					496						126		0			1	623	
		8					419	0					57			4	2	484		
		9					329	0					34					3	366	
		10					236	0				183	24					1	443	
		11					104	0				18						0	122	
		12					66	0										3	69	
2019 Total			156	1437		263	15610	0		200	2044	2934	3	72	2380	1771	26870			
2020	2020	1						81										81		
		2						154										154		
		3							225									225		
		4							438									438		
		5	169	0	0		7695					112	2048			572	607	11203		
		6		1350	122		5649					765	765		79	2016	1645	12392		
		7		299			792						250			60		1401		
		8					9						16					25		
2020 Total			169	1649	122		15043				878	3079		79	2648	2252	25919			

Catch (t)			Western Stock Unit						Grand Total	
Season Year	Fishing Year	Month	Canada	FR.St Pierre et Miquelon	Japan	Mexico	U.S.A.	UK. Bermuda		
2018	2018	1		0			2	11		12
		2		0			2	68		71
		3		0			33	17		50
		4		0			26	6		31
		5		0			14	13		27
		6	3	0			0	52		55
		7	5	0			0	196		201
		8	48	0			0	223		271
		9	123	0			0	253		376
		10	235	0	122		0	126		484
		11	88	0	273		0	47		409
		12	4	0			2	16		23
2018 Total			506	0	396	79	1029		2009	
2019	2019	1		0			3	28		31
		2		0			5	97		102
		3		0			21	17		38
		4		0			13	6		20
		5		0			0	21		21
		6	43	0			0	72		115
		7	4	0			0	319		323
		8	68	0			0	167		235
		9	240	0			0	249		489
		10	228	0	147		0	203		578
		11	57	0	259		0	12		328
		12	2	0			1	24		27
2019 Total			642	0	406	44	1215		2307	
2020	2020	1		0			0	29	1	30
		2					2	114	1	117
		3		0			11	9	0	20
		4		0			13	5	0	18
		5		0			2	5	0	7
		6		0			0	58		58
		7		0						0
2020 Total				0		29	220	1	250	

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Table 21. Quantity (t) of BFT caged by fishing and farming flag CPCs, between 2018 and 2020, as reported under Rec. [08-05] as of 14 August 2020.

Tableau 21. Volumes (t) de thon rouge mis en cages, par CPC de pavillon de pêche ou CPC de ferme, entre 2018 et 2020, tels que déclarés en vertu de la Rec. 08-05 au 14 août 2020.

Tabla 21. Cantidades (t) de atún rojo por CPC del pabellón pesquero o CPC de la granja introducido en jaulas entre 2018 y 2020 tal y como se declararon con arreglo a la Rec. 08-05 a 14 de agosto de 2020.

Caging Wgt (t)		Farming Flag							Grand Total
Farming Year	Fishing Flag	EU.Croatia	EU.España	EU.Malta	EU.Portugal	Maroc	Tunisie	Turkey	
2018	EU.España		2711						2711
	EU.France		175						175
	EU.Italy		34						34
	EU.Malta		233						233
	Eu.Portugal	673	2385	9266	125				12448
	Maroc					4054			4054
	Tunisie						655		655
	Turkey							1736	1736
	Unknown/Unclassified flag		250						250
<b>2018 Total</b>		<b>673</b>	<b>5788</b>	<b>9266</b>	<b>125</b>	<b>4054</b>	<b>655</b>	<b>1736</b>	<b>22296</b>
2019	EU.España		2713					190	2903
	EU.France		123						123
	EU.Malta		176					160	337
	Eu.Portugal	745	2868	12014	72				15700
	Libya							239	239
	Maroc					5491			5491
	Tunisie						1299		1299
	Turkey							2445	2445
<b>2019 Total</b>		<b>745</b>	<b>5882</b>	<b>12014</b>	<b>72</b>	<b>5491</b>	<b>1698</b>	<b>2634</b>	<b>28537</b>
2020	EU.España		479						479
	Eu.Portugal			482	190				672
	Maroc					1165			1165
	Tunisie						2177		2177
	Turkey							2599	2599
<b>2020 Total</b>			<b>479</b>	<b>482</b>	<b>190</b>	<b>1165</b>	<b>2177</b>	<b>2599</b>	<b>7092</b>

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Table 22. Bi-annual Statistical Documents (SD) and Re-export Certificates (RC) reported to ICCAT, by species, between 2019-10-01 and 2020-08-18.

Tableau 22. Documents statistiques (SD) et Certificats de réexportation (RC) semestriels déclarés à l'ICCAT, par espèce, entre le 2019-10-01 et le 2020-08-18.

Tabla 22. Documentos estadísticos (DE) y Certificados de reexportación (CR) semestrales comunicados a ICCAT, por especies, entre el 2019-10-01 y el 2020-08-18.

Reporting CPC	Year	Semester	Date reported	BET		SWO		* Other
				SD	RC	SD	RC	
Canada	2019	2	2020-04-02	√		√		
China PR	2019	2	2020-03-31	√	√	√		
Chinese Taipei	2019	2	2020-04-01	√		√		
Côte d'Ivoire	2019	1	2019-10-01	√				
		2	2020-02-25	√				
EU (all flags combined)	2019	2	2020-03-31	√	√	√	√	
Ghana	2019	1	2020-07-29		√			
		2	2020-07-29		√			
Japan	2019	2	2020-03-25	√	√	√	√	
Korea Rep.	2019	2	2020-06-03	√	√	√	√	
Panama	2019	1	2019-11-13	√		√		
		2	2019-11-13	√		√		
Senegal	2019	2	2020-01-28					√
Turkey	2019	2	2020-04-01	√		√		
U.S.A.	2019	1	2020-03-30			√	√	
		2	2020-03-30	√		√		√

\* Cannot be classified into SD or RC documents types (includes all 2 species).





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Table 25. Amounts (t) of various tuna and tuna-like species transhipped at sea as reported under Rec. [06-11] by product type.  
 Tableau 25. Volumes (t) de divers thonidés et espèces apparentées transbordés en mer tels que déclarés en vertu de la Rec. 06-11, par type de produit.  
 Tabla 25. Cantidades (t) de varios túnidos y especies afines transbordadas en el mar y declaradas con arreglo a la Rec 06-11, por tipo de producto.

Year	Fishing Flag	Species Code	Product Type (t)											Grand Total				
			Dressed weight	Gilled & gutted	Number	Fillet	Live weight	Shark fins	Rounded Weight	Belly meat	Other	Head off	Roes					
2018	Chinese Taipei	ALB		10009.51							18.36					18.36		
		BET	10.74														10009.51	
		BUM		0.17														10.74
		MLS																0.17
		SWO	262.59															262.59
		YFT		546.12		0.39												546.50
	China, P.R.	ALB	7.44	7.36							182.27						197.07	
		BET		4964.96													4964.96	
		BUM	45.00	8.14													53.14	
		COM	2.18							0.78							2.96	
		MAK	0.50														0.50	
		OIL	18.83	0.37								9.47					28.67	
		OTF										3.86					3.86	
		SAI	6.35	0.32													6.66	
		SSM								1.19			0.23				1.42	
		SSP	3.37														3.37	
		SWO	226.11	8.44													234.56	
		YFT		401.40													401.40	
		MAW	6.09														6.09	
		OPA	4.52									5.66					10.18	
		BRA	18.50									32.00					50.50	
	DOL										6.20					6.20		
	LEC	0.38										0.36				0.74		
	Korea, Republic of	ALB		424.09							81.97						81.97	
		BET	58.14														424.09	
		BUK	3.38														58.14	
		BUM		0.33													3.38	
		MLS		424.18													424.18	
		SWO	9.22														9.22	
	YFT		365.25													365.25		
	Japan	ALB	36.32						20.01		1786.30						1842.63	
		BET	0.29	5617.38							0.93	0.22	2.40				5621.22	
		BIL	0.06														0.06	
		BLM	0.73	1.44													2.17	
		BSH		28.24													28.24	
		BUK	193.28														193.28	
		BUM	98.49	63.46		0.71											162.67	
		COM	2.26														2.26	
		MAK				1.34											1.34	
		MLS	0.87	3.09						0.05							4.01	
		OIL	1.93														2.37	
		OTF	10.59		0.08	0.15				0.51		7.55	0.44				18.88	
		SAI	2.19	0.23						0.50							2.92	
		SBF		1636.50													1636.50	
		SKJ	0.01								0.77						0.78	
		SMA		1.86		2.45							0.02				4.32	
		SSM	3.06							0.22							3.28	
		SSP	2.27														2.27	
		SWO	376.57	14.80		142.68							0.53				534.58	
		TUN											0.79				0.79	
		WAH	6.05														6.05	
		YFT		1856.07													1856.07	
		SKH								1.31							1.31	
		OPA	47.61								1.39						49.00	
	DOL	0.02								1.69						1.72		
	SFA	9.74														9.74		
	TUS											0.27				0.27		
	LEC	1.17											0.07			1.23		
	Belize	BET		225.09													225.09	
		SWO	12.46														12.46	
		YFT		12.70													12.70	
	St. Vincent and Grenadines	BET		381.42													381.42	
		SWO	12.97														12.97	
	YFT		29.06													29.06		
	Côte d'Ivoire	BET		314.71													314.71	
		SWO	35.26														35.26	
	YFT		43.60													43.60		
Senegal	ALB									7.94						7.94		
	BET		230.42													230.42		
	SWO	38.59														38.59		
YFT		12.84													12.84			
Namibia	BET		24.01													24.01		
	YFT		148.08													148.08		
<b>2018 Total</b>			<b>1576.12</b>	<b>27805.64</b>	<b>0.08</b>	<b>147.72</b>	<b>20.01</b>	<b>1.31</b>	<b>2123.05</b>	<b>0.22</b>	<b>31.13</b>	<b>0.51</b>				<b>31705.77</b>		
2019	Chinese Taipei	ALB	1.81					6.38		197.64						205.82		
		BET		8674.15													8674.15	
		BSH	30.44														30.44	
		BUM	9.72														9.72	
		OIL	13.40														13.40	
		OTF	0.05			0.11						5.50		4.09			9.76	
		SAI	3.14														3.14	
		SPF	0.26														0.26	
		SSP	2.27														2.27	
		SWO	221.99														221.99	
		WAH	0.53								1.29						1.82	
		WHM		0.37													0.37	
	YFT		410.59													410.59		
	OPA	10.99														10.99		
	DOL									0.71						1.40		
	China, P.R.	ALB	5.09								114.83						119.92	
		BET		4699.67													4699.67	
		BUM	27.94	0.22													28.17	
		COM	3.66							0.35							4.01	
		MLS	0.08														0.08	
		OIL	12.82									1.49					14.32	
		OTF	0.33														0.33	
		SAI	0.24														0.24	
		SSM	0.11														0.11	
SWO		174.68										23.00				197.68		
WAH		0.08														0.08		
YFT			227.66													227.66		
OPA	3.15										2.59				5.74			
SFA	0.06														0.06			
Korea, Republic of	ALB									37.59						37.59		
	BET		141.40													141.40		

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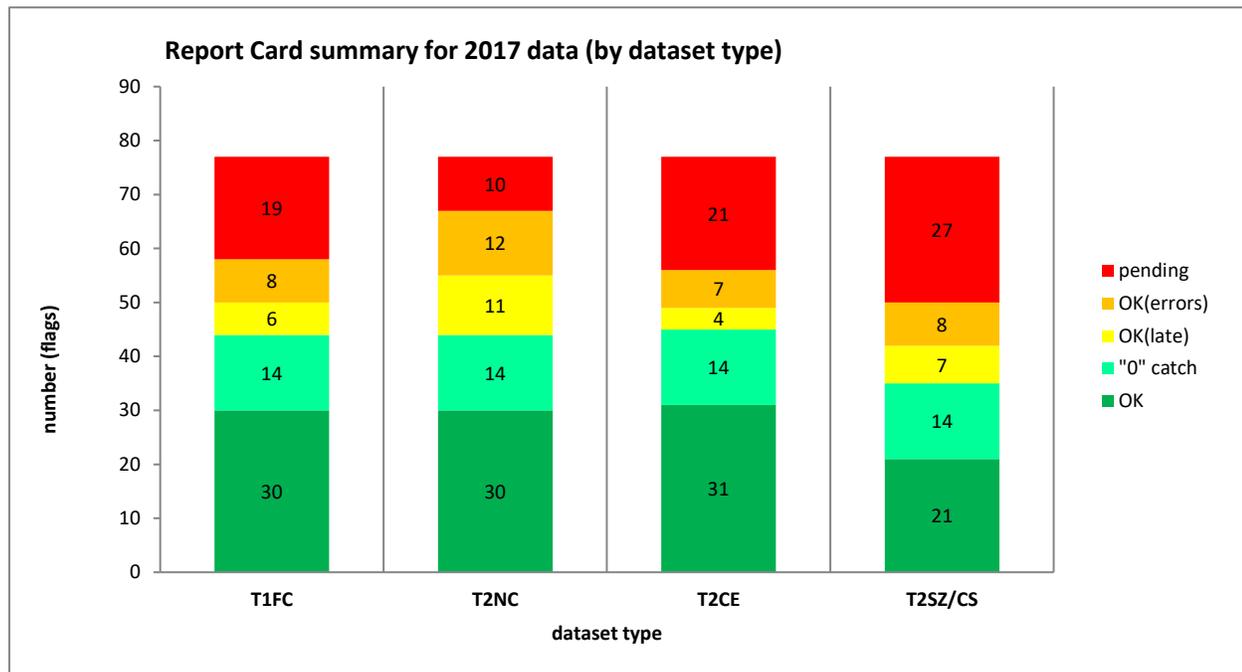
Year	Fishing Flag	Species Code	Dressed weight	Gilled & gutted	Number	Fillet	Live weight	Shark fins	Rounded Weight	Belly meat	Other	Head off	Roes	Grand Total	
2019	Japan	MLS		0.35										0.35	
		SBF		40.94											40.94
		SWO		4.72											4.72
			YFT		282.60										282.60
			ALB						1221.75						1221.75
			BET	1.91	3634.92						0.02				3636.85
			BIL	0.14											0.14
			BLM	3.25	0.39										3.64
			BSH	8.24				0.38							8.62
			BUK	70.73	10.72										81.45
			BUM	69.37	56.45										125.82
			COM	2.90											2.90
			MAK				0.17								0.17
			MLS	0.86	1.26										2.12
			OIL	0.95											0.95
			OTF				0.17			1.02	0.19	11.54			12.92
			SAI	9.11					0.02						9.12
			SBF		1142.92										1142.92
			SKJ							0.20					0.20
			SMA	0.91			2.26		0.08						3.25
			SSM	3.77											3.77
			SSP	0.64											0.64
			SWO	238.70			76.83								315.52
			WAH	3.52											3.52
			WHM		0.17										0.17
			YFT	0.57	1963.98										1964.55
			MAW	1.10											1.10
			OPA	32.38									0.08		32.46
			DOL							1.48					1.48
			SFA	11.64											11.64
		Belize	BET		68.83										68.83
			YFT		8.09										8.09
		St. Vincent and Grenadines	BET		342.24										342.24
			YFT		21.19										21.19
		Côte d'Ivoire	BET		247.46										247.46
			SWO	11.94											11.94
			YFT		27.38										27.38
		Senegal	BET		216.97										216.97
		YFT		9.82										9.82	
	Namibia	BET		100.40										100.40	
		YFT		81.48										81.48	
<b>2019 Total</b>			<b>1000.17</b>	<b>22412.61</b>		<b>79.53</b>	<b>7.07</b>	<b>0.48</b>	<b>1576.86</b>	<b>0.19</b>	<b>21.15</b>	<b>23.08</b>	<b>4.09</b>	<b>25125.22</b>	
2020	Chinese Taipei	ALB		6444.16					195.01					195.01	
		BET												6444.16	
		SWO	85.31											85.31	
			YFT		444.40									444.40	
	China, P.R.	ALB								44.56					44.56
		BET			2277.68					272.22					2549.90
		BUM	21.78							3.74					25.52
		COM	1.24							0.02					1.26
		MLS		0.05											0.05
		OIL	5.25							0.36					5.62
		SAI	0.23	0.02											0.25
		SWO	125.02	3.38						21.50		0.94			150.84
		YFT		186.04						15.15					201.20
		OPA	1.29							0.77					2.06
	Korea, Republic of	BET			187.61										187.61
		MLS			0.12										0.12
		SWO	7.12												7.12
		YFT		181.39											181.39
	Japan	ALB								97.43					97.43
		BET			3200.53		0.07								3200.60
		BLM	2.79	0.13											2.92
		BUK	34.65												34.65
		BUM	69.18	53.69						2.00					124.87
		COM	5.37												5.37
		MLS	0.04	1.28											1.32
		OTF	1.14				0.80								1.94
		SAI	3.42	0.11							1.59				3.53
		SBF		336.40											336.40
		SKJ								0.01					0.01
		SPF	0.05												0.05
		SSM	0.17												0.17
		SSP	0.31												0.31
		SWO	199.34				101.20						38.75		339.29
		WAH	0.07												0.07
	YFT		997.92											997.92	
	OPA	3.31												3.31	
	DOL									0.99				0.99	
	SFA	0.10												0.10	
St. Vincent and Grenadines	BET			312.21										312.21	
	SWO	5.38												5.38	
	YFT			107.61										107.61	
Senegal	BET			215.44										215.44	
	YFT			5.00										5.00	
Namibia	ALB								157.90					157.90	
	BET			155.63										155.63	
	YFT			17.62										17.62	
<b>2020 Total</b>			<b>572.56</b>	<b>15128.41</b>		<b>102.07</b>			<b>811.65</b>	<b>1.59</b>	<b>39.69</b>			<b>16655.96</b>	

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Table 26. Volumes published in 2019 within the ICCAT series of periodic publications.  
 Tableau 26. Volumes publiés en 2019 dans les séries des publications périodiques de l'ICCAT.  
 Tabla 26. Volúmenes publicados en 2019 dentro de las series periódicas de publicaciones de ICCAT.

Publication			Period	Format			Content
Name	Vol #	No.		Paper	CD	WEB	
Collect. Vol. Sci. Pap.	76		2019			√	Informes de las reuniones intersesiones y los documentos presentados a dichas reuniones
Collect. Vol. Sci. Pap.	77		2020			√	Informes de las reuniones intersesiones y los documentos presentados a dichas reuniones
Informe Bienal	2018- 2019 (Part II)	1	2019			√	Report of the 26th Regular Meeting of the Commission
		2	2019			√	Informe del SCRS
		3	2019			√	Informes anuales
		4	2019			√	Informes de la Secretaría (Investigación y estadísticas, administrativo, financiero, al COC y al PWG)
Boletín estadístico	46		1950-2018			√	Estadísticas ICCAT
Newsletter	31		Feb. 2020			√	Noticias
	32		Sept. 2020			√	

Figure 1. Summary of CPCs reporting status for 2019 data.  
 Figure 1. Résumé de la situation de déclaration des CPC pour les données de 2019.  
 Figura 1. Resumen del estado de comunicación de las CPC para datos de 2019.



As of 2020-09-03 (upper figure)

Values	Rep. status	Dataset type			
		T1FC	T2NC	T2CE	T2SZ/CS
number	OK	30	30	31	21
	"0" catch	14	14	14	14
	OK(late)	6	11	4	7
	OK(errors)	8	12	7	8
	pending	19	10	21	27
	TOTAL	77	77	77	77
%	OK	39%	39%	40%	27%
	"0" catch	18%	18%	18%	18%
	OK(late)	8%	14%	5%	9%
	OK(errors)	10%	16%	9%	10%
	pending	25%	13%	27%	35%

As of 2020-08-18

Values	Rep. status	Dataset type			
		T1FC	T2NC	T2CE	T2SZ/CS
number	OK	34	30	31	23
	"0" catch	14	14	14	14
	OK(late)	1	4	7	5
	OK(errors)	4	14	3	7
	pending	24	15	22	28
	TOTAL	77	77	77	77
%	OK	44%	39%	40%	30%
	"0" catch	18%	18%	18%	18%
	OK(late)	1%	5%	9%	6%
	OK(errors)	5%	18%	4%	9%
	pending	31%	19%	29%	36%



**Addendum 1 to Appendix 8.** Standard SCRS catalogues on statistics (Task-I and Task-II) of the 13 major ICCAT species (10 tuna & tuna like species and 3 shark species) by stock, major fishery (flag/gear combinations ranked by order of importance) and year (1990 to 2019). Only the most important fisheries (representing ±97.5% of Task-I total catch) are shown. For each data series, Task I (DSet= "t1", in t) is visualised against its equivalent Task II availability (DSet= "t2") scheme. The Task-II colour scheme, has a concatenation of characters ("a"= T2CE exists; "b"= T2SZ exists; "c"= T2CS exists) that represents the Task-II data availability in the ICCAT-DB. See the legend for the colour scheme pattern definitions.

**Addendum 1 de l'appendice 8.** Catalogues standard du SCRS sur les statistiques (Tâche I et Tâche II) des 13 espèces principales de l'ICCAT (10 espèces de thonidés et espèces apparentées et 3 espèces de requins) par stock, pêche principale (combinaisons pavillon-engin classées par ordre d'importance) et année (1990 à 2019). Seules les pêcheries les plus importantes (représentant ±97,5% de la prise de Tâche I) sont présentées. Chaque série de données de la Tâche I (DSet= "t1", en tonnes) est représentée par rapport au schéma de disponibilité équivalent de la Tâche II (DSet= "t2"). Le schéma de couleurs de Tâche II présente une concaténation de caractères ("a"= T2CE existe; "b"= T2SZ existe; "c"= T2CS existe) qui représente la disponibilité des données de Tâche II dans la base de données de l'ICCAT. Veuillez vous reporter aux légendes pour les définitions du schéma de couleurs.

**Adenda 1 al Apéndice 8.** Catálogos estándar del SCRS sobre estadísticas (Tarea I y Tarea II) de las 13 especies principales de ICCAT (10 especies de túnidos y especies afines y 3 especies de tiburones) por stock, pesquería principal (combinaciones arte/pabellón clasificadas por orden de importancia) y año (1990 a 2019). Solo se muestran las pesquerías más importantes (que representan ±97,5% de la captura total de Tarea I). Cada serie de datos de Tarea I (DSet= "t1", en t) se visualiza con respecto a su esquema equivalente de disponibilidad de Tarea II (DSet= "t2"). En el esquema de colores de Tarea II, se incluye una concatenación de caracteres ("a"= T2CE existe; "b"= T2SZ existe; "c"= T2CS existe) que representa la disponibilidad de datos de Tarea II en la base de datos de ICCAT. Véase la leyenda para las definiciones del patrón del esquema de

**Table # Fishery**

- 1 ALB-N stock
- 2 ALB-S stock
- 3 ALB-M stock
- 4 BFT-E stock (ATE region)
- 5 BFT-E stock (MED region)
- 6 BFT-W stock
- 7 BET-A stock (AT + MD)
- 8 YFT-E region
- 9 YFT-W region
- 10 SKJ-E stock
- 11 SKJ-W stock
- 12 SWO-N stock
- 13 SWO-S stock
- 14 SWO-M stock
- 15 BUM-A stock (AT + MD)
- 16 WHM-A stock (AT + MD)
- 17 SAI-E stock
- 18 SAI-W stock
- 19 SPF-E stock
- 20 SPF-W stock
- 21 BSH-N region
- 22 BSH-S region
- 23 *POR-NE region*
- 24 *POR-NW region*
- 25 *POR-SE region*
- 26 *POR-SW region*
- 27 SMA-N region
- 28 SMA-S region

**LEGEND and color schemes used to show Task II (t2) availability**

as of 2020-09-03

character	represents
a	T2CE
b	T2SZ
c	T2CS (*)

(\*) Only 6 species require T2CS data: ALB, BFT, BET, YFT, SKJ, SWO

color scheme	
Concatenated string	represents
-1	no T2 data
a	t2ce only
b	t2sz only
c	t2cs only
bc	t2sz + t2cs
ab	t2ce + t2sz
ac	t2ce + t2cs
abc	all

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Table 1. ALB-N stock

		T1 Total	36881	27931	30851	38135	35163	38377	28803	29023	25746	34551	33124	26253	22741	25567	25960	35318	36989	21991	20483	15375	19416	19985	25672	24854	26655	25551	30340	28401	29691	34772													
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum							
ALB	ATN	CP	EU.España	BB	t1	15442	8267	10814	12277	11041	9953	9640	9401	7346	8448	10774	4929	4712	7325	7893	10067	14182	8375	7403	4940	5841	4676	7753	4473	4740	8353	13394	9687	10836	11565	1	31.0%	31%							
ALB	ATN	CP	EU.España	BB	t2	abc	ac	ac	ac	ac	ac	ac	ac	abc	abc	abc	1																												
ALB	ATN	CP	EU.España	TR	t1	10342	8955	7347	6094	5952	10225	6649	7864	5834	6829	5013	4245	3976	5193	7477	10165	10277	6089	5233	4437	7009	3564	5833	5864	6651	5596	3559	4163	4806	4929	2	22.3%	53%							
ALB	ATN	CP	EU.España	TR	t2	abc	ac	ac	ac	ac	ac	ac	ac	abc	abc	abc	2																												
ALB	ATN	CP	EU.France	TW	t1	1032	463	2459	1706	1967	2904	2570	2874	1178	4723	3466	4740	4275	3252	2194	6743	5878	2842	2806	773	1216	3249	3126	4327	6699	3379	3961	4118	5718	7601	3	12.0%	65%							
ALB	ATN	CP	EU.France	TW	t2	abc	abc	ab	a	ab	ac	ac	a	ac	ac	ac	ac	ac	abc	a	abc	abc	abc	abc	abc	abc	3																		
ALB	ATN	NCC	Chinese Taipei	LL	t1	1651	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4330	4557	4278	2540	2357	1297	1107	863	1587	1367	1180	2394	947	2857	3134	2385	2926	2770	4	10.9%	76%							
ALB	ATN	NCC	Chinese Taipei	LL	t2	ab	ab	ab	ab	ab	4																																		
ALB	ATN	CP	EU.Portugal	BB	t1	3182	700	1622	3369	926	6458	1622	393	76	281	255	1137	1913	516	224	391	21	80	517	54	179	855	1063	502	2601	912	1061	2509	494	2459	5	4.3%	80%							
ALB	ATN	CP	EU.Portugal	BB	t2	abc	ab	abc	abc	abc	ab	abc	abc	abc	a	abc	abc	abc	ab	abc	ab	abc	ab	ab	ab	5																			
ALB	ATN	CP	EU.Ireland	TW	t1									57	319	80	634	1100	594	172	258	505	586	1514	1997	785	3595	3551	2231	2485	2390	2337	2492	3102	3213	6	4.0%	84%							
ALB	ATN	CP	EU.Ireland	TW	t2									-1	b	a	a	abc	bc	a	abc	abc	6																						
ALB	ATN	CP	EU.France	GN	t1	2268	3660	4465	4587	3967	2400	2048	1717	2393	1723	1864	1150	13									2	1		21		7	3	0	0	1	7	3.8%	88%						
ALB	ATN	CP	EU.France	GN	t2	abc	abc	ab	ab	ab	ac	ac	ac	a	ac	ac	ac	a																				7							
ALB	ATN	CP	EU.Ireland	GN	t1	40	60	451	1946	2534	918	874	1913	3639	4523	3374	1430																						8						
ALB	ATN	CP	EU.Ireland	GN	t2	-1	-1	-1	ab	-1	-1	c	c	c	bc	ab	ab																						8						
ALB	ATN	CP	Japan	LL	t1	737	691	466	485	505	386	466	414	446	425	688	1126	711	680	893	1336	781	288	402	288	525	336	400	1745	267	276	297	366	196	350	9	2.0%	93%							
ALB	ATN	CP	Japan	LL	t2	ab	ab	abc	abc	abc	abc	abc	abc	abc	9																														
ALB	ATN	CP	St. Vincent and Grenadines	LL	t1																																		10	0.9%	94%				
ALB	ATN	CP	St. Vincent and Grenadines	LL	t2																																			10					
ALB	ATN	CP	U.S.A.	RR	t1	175	251	103	224	324	23	309	335	601	90	251	122	323	334	500	356	284	394	125	23	56	117	137	561	137	121	43	28	9	30					11	0.7%	94%			
ALB	ATN	CP	U.S.A.	RR	t2	ab	ab	ab	ab	ab	b	ab	ab	ab	ab	abc	abc	abc	abc	abc	abc	ab	ab	11																					
ALB	ATN	CP	Venezuela	LL	t1	93	75	51	18	0	0	52	49	16	36	106	35	67	135	116	111	155	146	138	290	242	247	292	274	437	560	587	601	326	372					12	0.7%	95%			
ALB	ATN	CP	Venezuela	LL	t2	b	ab	ab	ab	ab	ab	b	ab	ab	b	b	ab	a	a	a	a	a	a	a	a	a	a	a			12														
ALB	ATN	CP	U.S.A.	LL	t1	148	201	116	192	230	373	123	184	179	192	146	191	146	106	120	108	103	127	127	158	160	240	261	255	309	229	203	209	93	190						13	0.6%	96%		
ALB	ATN	CP	U.S.A.	LL	t2	ab	abc	abc	abc	abc	abc	abc	abc	abc	abc			13																											
ALB	ATN	CP	Venezuela	PS	t1	1	221	139	228	278	278	263	26	91	55	191	260	93	211	341	63	162	198	70	84	16		21													14	0.4%	96%		
ALB	ATN	CP	Venezuela	PS	t2	a	b		ab	ab	ab	b	a	ab	a	ab	ab	ab	ab	ab	ab	ab	ab			14																			
ALB	ATN	CP	EU.España	LL	t1	8	11	13	8	5	19	35	30	105	86	214																									15	0.3%	96%		
ALB	ATN	CP	EU.España	LL	t2	ab	ab	ab	ab	ab	ab	ab	ab	ab			15																												
ALB	ATN	CP	Belize	LL	t1																																					16	0.3%	97%	
ALB	ATN	CP	Belize	LL	t2																																					16			

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Table 2. ALB-S stock

		T1 Total	28714	26016	36562	32813	35300	27552	28426	28022	30595	27656	31387	38796	31746	28005	22545	18916	24453	20283	18867	22265	19225	24129	25282	19457	13702	15199	14336	13825	17098	15640								
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum		
ALB	ATS	NCC	Chinese Taipei	LL	t1	20442	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351	13288	10730	12293	13146	9966	8678	10975	13032	12813	8519	6675	7157	8907	9090	9227	9626	1	57.8%	58%		
ALB	ATS	CP	South Africa	BB	t1	5220	3355	6306	6845	6842	5204	5425	6581	8401	5010	3463	6715	6057	3323	4153	2856	3365	2024	2334	2967	2446	2029	3466	3395	3620	3898	2001	1640	2353	2190	2	16.8%	75%		
ALB	ATS	CP	South Africa	BB	t2	ab	b	ab	ab	abc	a	ab	a	a	a	2																								
ALB	ATS	CP	Namibia	BB	t1					915	950	982	1192	1422	1072	2240	2969	2858	2432	3079	2031	2426	1058	1856	4936	1263	3711	2275	838	1016	1008	893	205	874	206	3	6.1%	81%		
ALB	ATS	CP	Namibia	BB	t2				abc	ac	abc	ab	abc	abc	abc	abc	abc	abc	abc	3																				
ALB	ATS	CP	Brazil	LL	t1	485	1095	2710	3600	835	723	807	589	3013	1478	3758	6240	2865	1844	285	359	267	222	233	150	207	920	824	778	326	431	494	383	311	412	4	5.0%	86%		
ALB	ATS	CP	Brazil	LL	t2	a	a	ab	ab	ab	a	ab	ab	ab	ab	a	ab	a	a	a	a	a	a	a	ab	ab	4													
ALB	ATS	CP	Japan	LL	t1	587	654	583	467	651	389	435	424	418	601	554	341	231	322	509	312	316	238	1370	921	973	1194	2903	3106	1131	1752	1096	1189	2985	1566	5	3.8%	89%		
ALB	ATS	CP	Japan	LL	t2	ab	ab	abc	ac	abc	ab	ab	ab	ab	ab	ab	ab	ab	5																					
ALB	ATS	CP	EU.España	LL	t1	0	1	127	135	149	202	180	190	20	871	282	573	829	183	81	261	358	758	908	997	266	250	235	369	256	354	195	259	301	186	6	1.3%	91%		
ALB	ATS	CP	EU.España	LL	t2	ab	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	6										
ALB	ATS	CP	South Africa	RR	t1	60	55	54	36	89	10	209	127	73	58	377	323	82	201	288	324	1696	1028	1855	1529	1268			b	b	b	b	b	b	7	1.3%	92%			
ALB	ATS	CP	South Africa	RR	t2	a	a	a	a	a	-1	a	a	a	a	-1	-1	-1	-1	-1	-1	a	a	a	a	a	a	-1							7					
ALB	ATS	CP	Brazil	BB	t1	29	18		13	392	200	12	63	405	394	627	619	363	803	235	197	85	a	a	71	51	31	94	92	97	110	100	107	101	98	31	8	1.1%	93%	
ALB	ATS	CP	Brazil	BB	t2	a	a	a	a	-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	8				
ALB	ATS	CP	St. Vincent and Grenadines	LL	t1											2116	4292	44					65	160	71	51	31	94	92	97	110	100	107	101	98	31	9	1.0%	94%	
ALB	ATS	CP	St. Vincent and Grenadines	LL	t2											-1	-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	10				
ALB	ATS	CP	EU.Portugal	BB	t1											732	81	184	483	1185	655	494	256	124	232	486	40	433	415	9								10		
ALB	ATS	CP	EU.Portugal	BB	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	10			
ALB	ATS	CP	Namibia	LL	t1					196			7	7	90	178	450	105	721	250	313	2674	138	102													11	0.8%	96%	
ALB	ATS	CP	Namibia	LL	t2											-1	ab	ac	ac	-1	ab	ab	ab	a	ab	ab	abc	a	ab	a	a	a	a	abc	abc	11				
ALB	ATS	CP	EU.España	PS	t1		279	1816	648	682	255	4	66	173	156	7	193				24	9		25	64	28	64	116	3	64		88	2			12	0.6%	96%		
ALB	ATS	CP	EU.España	PS	t2	b	abc	ac	abc	abc	abc	abc	abc	12																										
ALB	ATS	CP	EU.France	PS	t1		50	449	564	129	82	190	38	40	13	23	11	18	63	16	478	347	12	50	60	109	53	161	73	38	53	17	79	16	3		13	0.4%	97%	
ALB	ATS	CP	EU.France	PS	t2	a	ac	ac	abc	ac	ac	ac	ac	ac	abc	a	abc	13																						
ALB	ATS	CP	Vanuatu	LL	t1																0	684	1400	96	131	64	104	85	35	83	91					14	0.4%	97%		
ALB	ATS	CP	Vanuatu	LL	t2																a	a	a	-1	-1	-1	a	ab	ab	a	a					14				
ALB	ATS	CP	South Africa	LL	t1											11	18	89	144	127	64	52	55	46	78	107	125	83	82	86	115	99	132	65	145	220	265	15	0.3%	98%
ALB	ATS	CP	South Africa	LL	t2										a	ab	ab	ab	abc	ab	ab	ab	ab	ab	15															
ALB	ATS	CP	Belize	LL	t1						2																										15			
ALB	ATS	CP	Belize	LL	t2										8	2																						16	0.3%	98%
ALB	ATS	CP	Belize	LL	t2					a	a	a	a	a																								16		

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Table3. ALB-M stock

		T1 Total	1896	2379	2202	2138	1349	1587	3150	2541	2698	4856	5577	4870	5608	7898	4874	3529	5965	6520	2970	4024	2124	4628	2047	1503	2400	3554	4319	2780	2434	2402							
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum	
ALB	MED	CP	EU.Italy	LL	t1	624	523	436	402	347	81	366	172	172	307	2712	2445	3631	3786	1555	1189	1995	2721	2083	1497	1109	1634	1117	605	1342	1356	1480	1322	1029	1268	1	37.5%	37%	
ALB	MED	CP	EU.Italy	LL	t2	-1	-1	-1	b	a	a	a	a	a	a	a	ab	ab	a	ab	b	b	ab	b	bc	abc	bc	abc	2	12.1%	50%								
ALB	MED	CP	EU.Italy	GN	t1	565	668	1025	873	759	1027	1383	1222	1222	2254	916	379	397																					
ALB	MED	CP	EU.Italy	GN	t2	a	a	a	ab	a	-1	-1	-1	-1	-1	ab	b	-1	b																				
ALB	MED	CP	EU.Italy	PS	t1													3079	2100	1046	2589	1249	15	1230			866		10	9	244	4	26	13	17	3	11.9%	62%	
ALB	MED	CP	EU.Italy	PS	t2													-1	-1	-1	b																		
ALB	MED	CP	EU.Greece	UN	t1	500	500	500	1	1			952	741	1152	1950	1735	1786	1304																				
ALB	MED	CP	EU.Greece	UN	t2	-1	-1	-1	-1	-1			-1	-1	-1	-1	-1	-1	-1																				
ALB	MED	CP	EU.Cyprus	LL	t1														17	243	337	451	695	204	220	206	247	321	357	385	505	558	568	624	652	5	6.3%	78%	
ALB	MED	CP	EU.Cyprus	LL	t2														a	a	a	ab	abc	abc	abc	abc	abc	ab	a	abc	5								
ALB	MED	CP	EU.Greece	LL	t1										35	33	40	36	445	427	323	242	257	191	116	125	126	126	165	287	541	1332	608	522	297	6	6.0%	84%	
ALB	MED	CP	EU.Greece	LL	t2										-1	-1	-1	-1	a	a	ab	ab	-1	a	a	-1	-1	-1	b	b	a	-1	a	ab	ab	6			
ALB	MED	CP	EU.España	LL	t1		1	6	8	3	6	25	176	22	74	51	112	37	1	109	148	322	421	208	204	277	338	385	238	270	52	48	206	70	60	7	3.7%	88%	
ALB	MED	CP	EU.España	LL	t2	ab	ac	ac	ab	ac	ac		-1	-1	a	a	a	abc	abc	abc	a	abc	ab	abc	abc	ab	abc	abc	-1										
ALB	MED	CP	Turkey	GN	t1																			208	631	402	1396												
ALB	MED	CP	Turkey	GN	t2																			a	a	ab	ab												
ALB	MED	CP	EU.España	BB	t1	83	499	171	231	81	163	205			33	96	88	77	29				0																
ALB	MED	CP	EU.España	BB	t2	ac	ac	ac	c	ac	ac	ac			ac	ac	a	-1	ac																				
ALB	MED	CP	Libya	LL	t1																																		
ALB	MED	CP	Libya	LL	t2																																		
ALB	MED	CP	EU.Greece	PS	t1																																		
ALB	MED	CP	EU.Greece	PS	t2															478	326	287	141	123															
ALB	MED	CP	EU.España	TR	t1																																		
ALB	MED	CP	EU.España	TR	t2																																		
ALB	MED	CP	Turkey	PS	t1		48	50	59	129	306	119	202	45	73																								
ALB	MED	CP	Turkey	PS	t2	abc			117										a	2							6		1.1%	96%									
ALB	MED	CP	Turkey	PS	t1																																		
ALB	MED	CP	Turkey	PS	t2																																		
ALB	MED	CP	Turkey	PS	t2																																		

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Table 4. BFT-E stock (ATE region)

		T1 Total	6313	6543	7396	9317	7054	9780	12098	16379	11630	10247	10061	10086	10347	7394	7402	9023	7529	8441	8243	6684	4379	3984	3834	4163	3918	4841	5968	7216	8157	9326									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
BFT	ATE	CP	Japan	LL	t1	1464	2981	3350	2484	2075	3971	3341	2905	3195	2690	2895	2425	2536	2695	2015	2598	1896	1612	2351	1904	1155	1089	1093	1129	1134	1386	1578	1911	2270	2524	1	28.0%	28%			
BFT	ATE	CP	Japan	LL	t2	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	2				
BFT	ATE	CP	EU.España	BB	t1	1614	1200	1046	3718	1999	2878	4979	6634	2605	1278	1939	2319	2478	1278	1847	2207	1190	2307	2326	1197	641	562	197	163	92	130	983	1109	617	754	2	22.0%	50%			
BFT	ATE	CP	EU.España	BB	t2	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	ac	ac	abc	a	2																		
BFT	ATE	CP	EU.España	TP	t1	2181	1040	1271	1244	1136	941	1207	2723	1926	3106	1416	1240	1548	784	862	880	1126	1348	1194	1209	887	902	1106	1370	1173	1466	968	1299	1764	1892	3	17.3%	67%			
BFT	ATE	CP	EU.España	TP	t2	ac	ac	ab	ab	ac	ab	ab	ac	ac	ab	ac	ac	c	c	bc	b	a	abc	abc	abc	abc	abc	ab	abc	abc	abc	abc	bc	bc	bc	bc	3				
BFT	ATE	CP	Maroc	TP	t1	323	482	94	387	494	210	699	1240	1615	852	1540	2330	1670	1305	1098	1518	1744	2417	1947	1909	1348	1055	990	960	959	1176	1433	1703	2164	2476	4	16.0%	83%			
BFT	ATE	CP	Maroc	TP	t2	-1	-1	-1	-1	-1	-1	-1	a	a	a	a	-1	-1	-1	-1	bc	4																			
BFT	ATE	CP	EU.France	TW	t1	101	70	441	436	224	400		57	259	247	394	456	599	518	289	423	829	501	180	295	122	28	36	120	118	166	211	228	315	309	5	3.5%	87%			
BFT	ATE	CP	EU.France	TW	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	5				
BFT	ATE	CP	Maroc	PS	t1	54	46	462	24	213	458	323	828	692	709	660	150	884	490	855	871	179																6	3.3%	90%	
BFT	ATE	CP	Maroc	PS	t2	b	b	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	6			
BFT	ATE	CP	EU.France	BB	t1	367	448	372	164	66	181	310	134	282	270	91	105	150	130	47	69	65	128	67	62	83	74	85	74	2	42	99	77	71	88	7	1.8%	92%			
BFT	ATE	CP	EU.France	BB	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	a	a	a	a	a	a	a	a	a	a	a	a	a	ab	7				
BFT	ATE	CP	EU.Portugal	LL	t1	14	98	124	89	143	134	97	246	18	404	398	383	160	33	1	66	72	6	12	5												8	1.2%	93%		
BFT	ATE	CP	EU.Portugal	LL	t2	-1	a	a	-1	a	-1	a	a	-1	a	a	-1	a	a	a	a	ab	a	a	a	a	a	a	a	a	a	a	a	a	a	ab	8				
BFT	ATE	CP	EU.Portugal	TP	t1						1	15	19	45	2	40	15	17	27	18	9	25	23	24	46	57	180	215	233	243	263	315	361	330	225	9	1.2%	94%			
BFT	ATE	CP	EU.Portugal	TP	t2					b	abc	ac	ac	ab	ab	ab	ab	ab	ab	b	b	b	b	b	b	ab	ab	b	ab	9											
BFT	ATE	NCC	Chinese Taipei	LL	t1				6	20	4	61	226	350	222	144	304	158																			10	0.6%	95%		
BFT	ATE	NCC	Chinese Taipei	LL	t2				-1	-1	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	10			
BFT	ATE	CP	EU.France	GN	t1	42	47	74	497	21	144	253	3	72	71	57	68	6																			11	0.6%	96%		
BFT	ATE	CP	EU.France	GN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	11			
BFT	ATE	CP	Korea Rep.	LL	t1				4	205	92	203				6	1				0	3															12	0.5%	96%		
BFT	ATE	CP	Korea Rep.	LL	t2				-1	-1	a	a									a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	12				
BFT	ATE	CP	China PR	LL	t1											85	103	80	68	39	19	41	24	42	72	119	42	38	36	36	38	37	45	54	64	79	89	13	0.5%	97%	
BFT	ATE	CP	China PR	LL	t2											a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	13			
BFT	ATE	CP	EU.España	HL	t1											162	28	33	126	61	63	109	87	11	4	10	6	2	21	19	25	21	16	59	35	101	107	82	14	0.5%	97%
BFT	ATE	CP	EU.España	HL	t2											ab	ac	ac	ac	ab	ac	ac	c	c	ab	ab	abc	14													
BFT	ATE	CP	EU.Portugal	BB	t1		12	5	4	2	219	34	80	447	252	5	2	2	7	1	8	6	7	1													15	0.5%	98%		
BFT	ATE	CP	EU.Portugal	BB	t2	a	-1	a	ab	ab	ab	abc	abc	ab	ab	a	a	a	ab	abc	ab	a	a	a														15			



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Table 6. BFT-W stock

		T1 Total	2782	2929	2296	2384	2113	2448	2512	2334	2657	2772	2775	2784	3319	2305	2125	1756	1811	1638	2000	1980	1857	2007	1754	1482	1627	1842	1901	1850	2027	2305									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
BFT	ATW	CP	U.S.A.	RR	t1	752	696	324	540	462	844	840	931	777	760	683	1244	1523	991	716	425	376	634	658	860	682	592	568	365	478	694	867	795	880	980	1	33.1%	33%			
BFT	ATW	CP	U.S.A.	RR	t2	abc	abc	abc	abc	abc	bc	abc	abc	abc	abc	abc	abc	ab	ab	ab	ab	abc	2	18.6%	52%																
BFT	ATW	CP	Japan	LL	t1	550	688	512	581	427	387	436	330	691	365	492	506	575	57	470	265	376	277	492	162	353	578	289	317	302	347	345	346	407	406	3					
BFT	ATW	CP	Japan	LL	t2	abc	4																																		
BFT	ATW	CP	Canada	RR	t1	28	32	30	88	71	195	155	245	303	348	433	402	508	407	421	497	629	abc	abc	abc	abc	324	295	347	325	331	389	323	344	382	470	5	14.4%	66%		
BFT	ATW	CP	Canada	RR	t2	a	ab	ab	ab	ab	ab	ab	bc	abc	6																										
BFT	ATW	CP	U.S.A.	LL	t1	275	305	347	177	185	211	235	191	156	222	242	130	224	299	275	211	205	173	233	335	239	241	295	208	222	89	105	115	103	92	7	9.6%	76%			
BFT	ATW	CP	U.S.A.	LL	t2	abc	b	ab	abc	ab	abc	8																													
BFT	ATW	CP	U.S.A.	PS	t1	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32	b	b	178	4	28		11		2	43	42	39				9	6.1%	82%			
BFT	ATW	CP	U.S.A.	PS	t2	bc	bc	abc	ab	ab	b	b	bc	bc	bc				bc	bc	bc	bc	bc					10													
BFT	ATW	CP	Canada	TL	t1	404	447	403	284	203	262	298	138	172	125	81	79	39	42	49	44	35	23	24	37	40	30	34	52	40	35	15	23	3	12	6	5.2%	87%			
BFT	ATW	CP	Canada	TL	t2	ab	7																																		
BFT	ATW	CP	U.S.A.	HP	t1	129	129	105	88	68	77	96	98	133	116	184	102	55	88	41	32	30	30	66	29	70	52	45	68	77	53	82	44	118	7	3.5%	91%				
BFT	ATW	CP	U.S.A.	HP	t2	bc	b	b	b	b	bc	8																													
BFT	ATW	CP	Canada	LL	t1	4	6	9	25	5	4	22	12	32	31	47	20	53	28	43	36	48	58	30	64	89	112	65	67	61	74	85	74	91	143	8	2.2%	93%			
BFT	ATW	CP	Canada	LL	t2	ab	a	a	a	ab	9																														
BFT	ATW	CP	U.S.A.	HL	t1	210	341	218	224	228	66	33	17	29	15	3	9	4																			9	2.1%	95%		
BFT	ATW	CP	U.S.A.	HL	t2	bc	b	b	b	b	c				c	bc	10																								
BFT	ATW	CP	Canada	TP	t1	2		1	29	79	72	90	59	68	44	16	16	28	84	32	8	3	4	23	23	39	26	17	11	20	6	10	13	3	4	10	1.3%	96%			
BFT	ATW	CP	Canada	TP	t2	ab		ab	11																																
BFT	ATW	NCO	NEI (Flag related)	LL	t1											429	270	49																			11	1.1%	97%		
BFT	ATW	NCO	NEI (Flag related)	LL	t2											1	1	1																			12				
BFT	ATW	CP	Canada	HP	t1				33	34	43	32	55	36	38	18	20	13	10	7	14	20	17	24	18	37	30	31	25	11	26	25	17	30	38		1.1%	98%			
BFT	ATW	CP	Canada	HP	t2				ab	ab	12																														
BFT	ATW	CP	Mexico	LL	t1	2	9	15	17	4	23	19	2	8	14	29	10	12	22	9	10	14	7	7	10	14	14	52	23	51	53	55	34	80	39	13	1.0%	99%			
BFT	ATW	CP	Mexico	LL	t2	1	1	1	1	ab	b	ab	13																												







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Table 10. SKJ-E stock

		T1 Total																				Rank	%	%cum																
Species	Stock	Status	FlagName	GearGrp	DSet	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					
SKJ	ATE	CP	EU.España	PS	t1	45077	78877	50579	66402	49987	48733	33947	33428	29976	42714	37145	27798	21596	39396	33421	18718	14975	17675	27918	30041	34175	46823	48185	57594	43139	38754	41085	46867	39807	37626	1	23.7%	24%		
SKJ	ATE	CP	EU.España	PS	t2	abc	1																																	
SKJ	ATE	CP	Ghana	PS	t1							4090	6065	17717	22954	13598	13076	21677	16341	13595	28167	11337	12574	24755	24179	31773	28157	37528	36861	40035	49745	41464	48458	58284	51824	2	13.1%	37%		
SKJ	ATE	CP	Ghana	PS	t2						abc	2																												
SKJ	ATE	CP	Ghana	BB	t1	23663	24464	18379	19637	21258	18607	20115	20315	25895	31134	22919	44464	18516	18094	34151	26042	20597	22845	13893	19743	13731	16012	16736	11269	10111	12369	13420	9450	11097	8355	3	11.8%	49%		
SKJ	ATE	CP	Ghana	BB	t2	ac	abc	3																																
SKJ	ATE	CP	EU.France	PS	t1	16393	36875	25738	39637	37806	28059	23856	16736	17850	22317	21426	15829	15899	21505	23224	13523	5770	3580	3948	7722	14582	13569	13395	16022	17085	20253	18164	15392	21983	19357	4	11.4%	60%		
SKJ	ATE	CP	EU.France	PS	t2	ab	abc	4																																
SKJ	ATE	CP	Curacao	PS	t1						7096	8444	8553	9932	10008	13370	5427	10092	8708	88	3213	1703	6541	10060	9594	12380	13324	18312	18437	19621	22180	20660	24539	17360	5	5.6%	66%			
SKJ	ATE	CP	Curacao	PS	t2						ab	ab	ab	a	ab	ab	ab	ab	ab	ab	b	ab	abc	5																
SKJ	ATE	CP	Panama	PS	t1	4839	8247	8719	12939	12845	14853	5855	1300	572	1117	1374	281	342		7126	12286	14016	19798	8946	9199	9944	13119	11211	15520	14565	8372	11510	8815	9089	9962	6	5.2%	71%		
SKJ	ATE	CP	Panama	PS	t2	b	ab	a	ab	ab	ab	ab	ab	ab	a	ab	6																							
SKJ	ATE	CP	EU.España	BB	t1	4645	5907	7195	3217	5270	5760	5044	7075	8593	5607	3780	3156	3836	7174	7207	10119	7633	6378	8345	8647	8405	11674	19445	10185	9951	7269	10994	10560	13085	10734	7	4.8%	76%		
SKJ	ATE	CP	EU.España	BB	t2	abc	ac	7																																
SKJ	ATE	CP	EU.Portugal	BB	t1	3954	7987	7412	5598	7510	4986	8276	4395	4519	1800	1285	2135	2940	4276	8459	4687	11001	8604	5734	904	12859	4078	2758	4039	1703	1296	695	1752	6985	2558	8	2.9%	78%		
SKJ	ATE	CP	EU.Portugal	BB	t2	abc	8																																	
SKJ	ATE	CP	Cape Verde	PS	t1							8	18	21	1		300	366	54	1040	7498	4862	5434	4872	5387	5823	8277	5680	16135	16307	17292	9425	5895	6698	5067	9	2.5%	81%		
SKJ	ATE	CP	Cape Verde	PS	t2			a			a	a	a	a		a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	9				
SKJ	ATE	CP	Belize	PS	t1																																10			
SKJ	ATE	CP	Belize	PS	t2							720				229	278									1488	3109	7797	15733	6854	11080	12599	7730	9958	20748	17063	10	2.3%	83%	
SKJ	ATE	NCO	Mixed flags (EU tropical)	PS	t1	1192	5176	2959	3858	3568	4543	1316	2345	1508	1119	2194	218	65	1547	2953	1708	1478	3003	2998	2624	3427	2372										11	2.0%	85%	
SKJ	ATE	NCO	Mixed flags (EU tropical)	PS	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	11			
SKJ	ATE	CP	Guatemala	PS	t1																																12	1.9%	87%	
SKJ	ATE	CP	Guatemala	PS	t2																																12			
SKJ	ATE	CP	Senegal	PS	t1	8																															13	1.9%	89%	
SKJ	ATE	CP	Senegal	PS	t2	a																															13			
SKJ	ATE	CP	El Salvador	PS	t1																																14	1.5%	91%	
SKJ	ATE	CP	El Salvador	PS	t2																																14			
SKJ	ATE	CP	Maroc	PS	t1	6831	1745	598	3637	3996	6740	2728	5468	4116	4033	3072	1568	1148	3289	3476	3660	536	131	108	654	892	1061	1076	1121	583	92	20	150	1076	378	15	1.3%	92%		
SKJ	ATE	CP	Maroc	PS	t2	b	ab	a	ab	15																														
SKJ	ATE	CP	Senegal	BB	t1	123	343		55	64	282	238	429	1699	1632	1357	1284	1178	639	1446	5033	3858	4552	3045	4506	2707	5383	4414	4490	3092	1895	2495	2740	1085	1419	16	1.2%	93%		
SKJ	ATE	CP	Senegal	BB	t2	ab	a		a	a	a	ac	a	a	ab	a	ab	16																						
SKJ	ATE	CP	EU.France	BB	t1	3352	1147	1507	2153	2546	2697	1698	3701	4179	2343	1497	2550	2305	1878	1752	2240	1610	795	778	1186	904	932	1382	682	750	939	1270	1275	933	1287	17	1.0%	94%		
SKJ	ATE	CP	EU.France	BB	t2	ab	abc	17																																
SKJ	ATE	CP	Vanuatu	PS	t1		5281	5468	10808	10896	8477	5992	1233			1192																					18	1.0%	95%	
SKJ	ATE	CP	Vanuatu	PS	t2		a	a	a	a	a	a	a			a																					18			
SKJ	ATE	CP	Guinée Rep.	PS	t1						975	6432	2408																								19	0.9%	96%	
SKJ	ATE	CP	Guinée Rep.	PS	t2						a	a	a																								19			

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Table 11. SKJ-W stock

		T1 Total	26110	33404	30155	33221	29949	21860	27562	31712	29087	27356	29193	31451	21600	24749	27461	28517	26453	25443	22022	25774	25907	32411	32835	35081	27196	20711	22083	23569	21965	19272									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
SKJ	ATW	CP	Brazil	BB	t1	20130	20548	18533	17762	20582	16530	22517	25821	23570	22948	24691	24038	18185	20416	23036	25269	23029	23783	20632	23077	22627	29322	30569	32127	24787	17499	16418	14577	14886	15355	1	80.2%	80%			
SKJ	ATW	CP	Brazil	BB	t2	ab	ab	ab	ab	ab	ab	a	ab	a	a	-1	a	ab	a	a	a	a	a	a	ab	a	a	1													
SKJ	ATW	CP	Venezuela	PS	t1	3014	6186	6893	10049	5692	2059	3348	3604	3607	2696	2590	5189	2000	2296	2769	848	1806	806	688	1808	1931	1308	1573	908	1081	1974	1912	2150	1226	868	2	10.2%	90%			
SKJ	ATW	CP	Venezuela	PS	t2	a	ab	2																																	
SKJ	ATW	CP	Brazil	HL	t1							0											5		4	4	159	244	222	369	465	1169	5293	4461	2195	3	1.8%	92%			
SKJ	ATW	CP	Brazil	HL	t2							-1											-1		-1	-1	-1	a	-1	-1	ab	ab	ab	a	4						
SKJ	ATW	NCO	Cuba	BB	t1	1443	1596	1638	1017	1268	886	1000	1000	651	651	651			b	624	545	514	536													4	1.7%	94%			
SKJ	ATW	NCO	Cuba	BB	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1																				4				
SKJ	ATW	CP	Venezuela	BB	t1	777	1952	941	1123	1005	328	224	224	506	282	299	1104	552	950	501	245	201	115	69	441	177	146	124	60	27	39	393	70	41	55	5	1.6%	96%			
SKJ	ATW	CP	Venezuela	BB	t2	a	a	a	ab	ab	5																														
SKJ	ATW	CP	Brazil	PS	t1								743	219	240	473	108	116					1119	239	403	213	223		552	9					6	0.6%	96%				
SKJ	ATW	CP	Brazil	PS	t2								-1	-1	a	-1	-1	-1				a	a	a	a	a		-1	-1						6						
SKJ	ATW	CP	EU.España	PS	t1		1592	1120	397																									641	223	109	192	7	0.5%	97%	
SKJ	ATW	CP	EU.España	PS	t2		-1	ac	-1			ac	ac	a	ac		a	ac				ac			abc	abc	abc	abc	ac	abc	ac	-1	ac	a	ab	7					
SKJ	ATW	CP	Brazil	LL	t1	0	2	9	6	30	9							38			1						3	825	323	41	88	39	170	645	199	260	374	8	0.4%	97%	
SKJ	ATW	CP	Brazil	LL	t2	-1	b	a		-1	-1	-1						-1	a	a					-1	a	b	a		-1	-1	-1	-1	a	-1	-1	8				
SKJ	ATW	CP	U.S.A.	RR	t1	66	86	49	81	66	21	82	64	86	99	30	49	70	61	74	15	49	52	49	102	86	98	91	323	172	92	176	195	76	42	9	0.3%	97%			
SKJ	ATW	CP	U.S.A.	RR	t2	ab	ab	ab	ab	ab	b	ab	ab	ab	ab	ab	ab	abc	abc	abc	abc	abc	abc	ab	abc	ab	ab	ab	9												
SKJ	ATW	NCC	Colombia	UN	t1					789	1583																										10	0.3%	98%		
SKJ	ATW	NCC	Colombia	UN	t2					-1	-1																											10			
SKJ	ATW	NCO	Sta. Lucia	TR	t1																																	11	0.3%	98%	
SKJ	ATW	NCO	Sta. Lucia	TR	t2																																		11		
SKJ	ATW	NCC	Colombia	PS	t1																																		12	0.3%	98%
SKJ	ATW	NCC	Colombia	PS	t2					2074																													12		

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Table 12. SWO-N stock

		T1 Total	15672	14934	15394	16738	15501	17105	15222	13025	12329	11622	11453	10011	9654	11442	12068	12377	11478	12302	11050	12081	11558	12523	13868	12069	10678	10673	10376	10171	8895	10146									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
SWO	ATN	CP	EU.España	LL	t1	5736	6506	6351	6392	6027	6948	5519	5133	4079	3993	4581	3967	3954	4585	5373	5511	5446	5564	4366	4949	4147	4885	5620	4082	3750	4013	3915	3586	3186	3112	1	39.0%	39%			
SWO	ATN	CP	EU.España	LL	t2	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	1												
SWO	ATN	CP	U.S.A.	LL	t1	4967	4399	4124	4044	3960	4452	4015	3399	3433	3364	3316	2498	2598	2757	2591	2273	1961	2474	2405	2691	2204	2572	3347	2812	1816	1593	1389	1301	1106	1458	2	22.9%	62%			
SWO	ATN	CP	U.S.A.	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	2												
SWO	ATN	CP	Canada	LL	t1	819	953	1487	2206	1654	1421	646	1005	927	1136	923	984	954	1216	1161	1470	1238	1142	1115	1061	1182	1351	1502	1290	1383	1489	1473	1034	753	965	3	9.7%	72%			
SWO	ATN	CP	Canada	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	3											
SWO	ATN	CP	EU.Portugal	LL	t1	463	757	497	1950	1579	1593	1702	902	772	776	731	731	765	1032	1319	900	949	778	747	898	1054	1202	882	1438	1241	1420	1459	1871	1670	2346	4	9.2%	81%			
SWO	ATN	CP	EU.Portugal	LL	t2	ab	abc	ac	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	4			
SWO	ATN	CP	Japan	LL	t1	1051	992	1064	1126	933	1043	1494	1218	1391	1089	759	567	319	263	575	705	656	889	935	778	1062	523	639	300	545	430	379	456	325	369	5	6.1%	87%			
SWO	ATN	CP	Japan	LL	t2	abc	abc	abc	bc	bc	bc	bc	bc	bc	bc	bc	5																								
SWO	ATN	CP	Maroc	LL	t1	24	92	41	27	7	28	35	239	101	35	38	264	154	223	255	325	333	229	428	720	963	700	700	1000	1000	800	800	750	950	950	6	3.3%	90%			
SWO	ATN	CP	Maroc	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	-1	-1	-1	-1	-1	-1	-1	-1	6				
SWO	ATN	NCC	Chinese Taipei	LL	t1	269	577	441	127	507	489	521	509	286	285	347	299	310	257	30	140	172	103	82	89	88	192	193	115	85	133	152	96	169	122	7	1.9%	92%			
SWO	ATN	NCC	Chinese Taipei	LL	t2	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	abc	7										
SWO	ATN	CP	Canada	HP	t1	92	73	60	28	22	189	93	89	240	18	95	121	38	147	87	193	203	267	258	248	176	208	97	275	233	98	85	175	34	33	8	1.1%	93%			
SWO	ATN	CP	Canada	HP	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	8											
SWO	ATN	CP	China PR	LL	t1				73	86	104	132	40	337	304	22	102	90	316	56	108	72	85	92	92	73	75	59	96	60	141	135	81	86	92	9	0.8%	94%			
SWO	ATN	CP	China PR	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	-1	-1	-1	-1	-1	9				
SWO	ATN	CP	Trinidad and Tobago	LL	t1	66	71	562	11	180	150	158	110	130	138	41	75	92	78	83	91	19	29	48	30	21	16	14	16	26	17	13	36	3	6	10	0.6%	95%			
SWO	ATN	CP	Trinidad and Tobago	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	-1	-1	-1	-1	-1	-1	-1	-1	10				
SWO	ATN	CP	EU.España	GN	t1	646	124	316	202	150	223	20																									11	0.5%	95%		
SWO	ATN	CP	EU.España	GN	t2	ac	ab	b																													11				
SWO	ATN	CP	U.S.A.	HL	t1				38			0	1																								12	0.5%	96%		
SWO	ATN	CP	U.S.A.	HL	t2				-1																												12				
SWO	ATN	CP	EU.France	TW	t1					13	13	97	164			60	74	138	102	178	91	46	14	12	32	15	13	35	25	63	87	76	74	70			13	0.4%	96%		
SWO	ATN	CP	EU.France	TW	t2				a																												13				
SWO	ATN	CP	Maroc	GN	t1	19	9	4	2	13	32	322	13	179	60	51	243	64	98	76	9																14	0.3%	96%		
SWO	ATN	CP	Maroc	GN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	14				
SWO	ATN	CP	Belize	LL	t1																																15	0.3%	97%		
SWO	ATN	CP	Belize	LL	t2																																	15			
SWO	ATN	CP	U.S.A.	GN	t1	535	82	86	92	88	74	78	0	36		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0.3%	97%		
SWO	ATN	CP	U.S.A.	GN	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	16										
SWO	ATN	CP	Korea Rep.	LL	t1	51	3	3	19	16	16	19	15																									17	0.3%	97%	
SWO	ATN	CP	Korea Rep.	LL	t2	ab	a	ab	a	a	a	a	a																									17			
SWO	ATN	CP	Venezuela	LL	t1	4	73	101	68	60	45	74	11	7	9	30	12	25	29	46	48	15	19	5	8	16	13	18	20	18	29	53	52	31	31	18	0.3%	97%			
SWO	ATN	CP	Venezuela	LL	t2	b	b	b	b	b	b	b	b	b	ab	ab	b	b	ab	ab	ab	ab	ab	ab	ab	ab	18														



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Table 14. SWO-M stock

		T1 Total	16018	15746	14709	13265	16082	13015	12053	14693	14369	13699	15569	15006	12814	15694	14405	14622	14915	14227	13683	13235	14754	12640	11046	10070	10969	11983	12300	10390	8677	8150							
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum	
SWO	MED	CP	EU.Italy	LL	t1	2617	2442	3518	3260	3844	3035	2617	2458	2458	2680	2639	2236	1841	5844	5452	5560	5253	4564	5246	5438	5919	5313	4474	3304	3921	4883	4540	3882	2289	2461	1	28.6%	29%	
SWO	MED	CP	EU.Italy	LL	t2	b	ab	ab	b	ab	b	ab	ab	b	bc	abc	abc	abc	abc	abc	abc	abc	abc	abc	bc	ac	1												
SWO	MED	CP	EU.Italy	GN	t1	6105	5698	4077	3070	3921	4264	2657	3632	3632	3632	4863	4152	1698	2540	1483	1891	2373	1948													2	15.5%	44%	
SWO	MED	CP	EU.Italy	GN	t2	ab	ab	ab	ab	ab	b	b	b	b	b	ab	b	b	b	b	b	b	b													2			
SWO	MED	CP	EU.España	LL	t1	1438	1132	790	1293	1402	1351	1040	1184	1409	867	1396	1402	1421	1165	930	860	1405	1648	2063	1994	1785	1730	1580	1605	2019	2289	1732	1487	1470	1548	3	10.9%	55%	
SWO	MED	CP	EU.España	LL	t2	ac	abc	abc	abc	abc	abc	abc	abc	3																									
SWO	MED	CP	EU.Greece	LL	t1	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1230	1129	1424	1374	1907	989	1132	1494	1306	877	1731	1344	761	761	392	350	745	4	9.8%	65%	
SWO	MED	CP	EU.Greece	LL	t2	ab	b	ab	ab	ab	ab	ab	ab	4																									
SWO	MED	CP	Maroc	GN	t1	866	1186	1883	2068	2109	1518	2461	4653	2905	2979	2503	2266	2230	1629	1299	722	603	615	587	477	410	387									5	9.1%	74%	
SWO	MED	CP	Maroc	GN	t2	-1	-1	-1	-1	b	-1	-1	c	bc	abc	abc	b	b	b	b	b	b	abc	abc	abc	abc	abc	abc	5										
SWO	MED	CP	Maroc	LL	t1	371	508	807	517	527	169	273	245	323	259	205	754	1149	1670	1954	1801	1455	1107	1713	1388	1501	800	1003	963	968	604	1395	1350	1368	982	6	7.1%	81%	
SWO	MED	CP	Maroc	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	bc	abc	abc	abc	abc	abc	abc	abc	6			
SWO	MED	CP	Tunisie	LL	t1	176	181	178	354	298	378	352	346	414	468	483	567	1138	285	791	949	1024	1232	1233	1238	1267	1265	1262	1302	1307	1273	1377	1338	934	7	6.1%	87%		
SWO	MED	CP	Tunisie	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	-1	-1	-1	-1	-1	-1	-1	7			
SWO	MED	CP	Algerie	LL	t1	173	173	6	173	185	247	247	178	126	166	439	347	238	174	93	496	492	977	570	560	234	433	467	693	705	842	755	725	517	8	2.9%	90%		
SWO	MED	CP	Algerie	LL	t2	b	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	a	a	-1	-1	ab	ab	ab	ab	ab	ab	ab	ab	8			
SWO	MED	CP	Algerie	GN	t1	539	389	389	389	415	560	560	590	531	599	642	467	427	233	311	87	108															9	2.0%	92%
SWO	MED	CP	Algerie	GN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	9			
SWO	MED	CP	EU.Malta	LL	t1	135	129	85	91	47	72	72	100	153	187	175	102	257	163	195	362	239	213	260	266	423	532	503	460	376	489	410	330	308	407	10	1.9%	94%	
SWO	MED	CP	EU.Malta	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	abc	bc	ab	abc	ab	ab	ab	abc	ab	abc	abc	abc	abc	ab	10			
SWO	MED	CP	Turkey	GN	t1	243	100	136	292	533	306	320	350	450	230	370	360	300	274	317	341	337	352														11	1.4%	95%
SWO	MED	CP	Turkey	GN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	ab	ab	ab	ac	c								11			
SWO	MED	CP	Turkey	LL	t1																															12	0.9%	96%	
SWO	MED	CP	Turkey	LL	t2																																12		
SWO	MED	CP	EU.Italy	UN	t1																															13	0.7%	97%	
SWO	MED	CP	EU.Italy	UN	t2																																13		
SWO	MED	NCO	NEI (MED)	LL	t1	918	733	733																													14	0.6%	97%
SWO	MED	NCO	NEI (MED)	LL	t2	-1	-1	-1																													14		
SWO	MED	CP	EU.Cyprus	LL	t1	173	162	56	116	159	89	40	51	61	92	82	135	104	47	49	53	43	67	67	38	31	35	35	51	59	54	53	50	45	24	15	0.5%	98%	
SWO	MED	CP	EU.Cyprus	LL	t2	a	a	-1	a	a	a	a	a	a	a	-1	a	a	a	a	a	ab	abc	abc	abc	abc	abc	ab	abc	abc	abc	abc	abc	abc	abc	abc	15		

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Table 15. BUM-A stock (AT + MD)

		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	1181								
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum		
BUM	A+M	CP	Japan	LL	t1	1217	900	1017	926	1523	1409	1679	1349	1185	790	883	335	267	442	540	442	490	920	1028	822	731	402	430	189	280	293	430	293	371	1	20.3%	20%			
BUM	A+M	CP	Japan	LL	t2	ab	a	a	a	a	a	1																												
BUM	A+M	NCC	Chinese Taipei	LL	t1	1704	1672	824	685	663	467	660	1478	578	486	485	240	294	319	315	151	99	233	148	195	153	199	165	78	62	85	102	99	90	62	2	11.8%	32%		
BUM	A+M	NCC	Chinese Taipei	LL	t2	ab	2																																	
BUM	A+M	CP	Ghana	GN	t1	324	126	123	236	441	471	422	491	447	624	639	795	999	415	470	759	405	683	191	140	116	332	234	163	236	88	44	162	60	44	3	9.9%	42%		
BUM	A+M	CP	Ghana	GN	t2	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	3					
BUM	A+M	CP	EU.France	HL	t1	85	98	115	179	191	197	252	299	333	370	397	428	443	443	450	470	470	461	584	498	344	461	395	212	a	a	a	a	a	a	4	7.6%	50%		
BUM	A+M	CP	EU.France	HL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	4				
BUM	A+M	CP	Brazil	LL	t1	50	60	125	146	79	169	308	165	340	509	467	780	387	577	194	610	241	149	120	75	47	62	47	112	105	89	79	64	37	20	5	5.8%	55%		
BUM	A+M	CP	Brazil	LL	t2	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	5					
BUM	A+M	CP	Liberia	LL	t1																															6	4.3%	60%		
BUM	A+M	CP	Liberia	LL	t2																																6			
BUM	A+M	NCO	NEI (ETRO)	LL	t1																															7	3.9%	64%		
BUM	A+M	NCO	NEI (ETRO)	LL	t2																																7			
BUM	A+M	NCO	Mixed flags (FR+ES)	PS	t1	199	137	116	146	133	126	96	82	80	83	147	151	131	148	171	150	136	135	139	164	178	186	181	191	173	176					8	3.5%	67%		
BUM	A+M	NCO	Mixed flags (FR+ES)	PS	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	8				
BUM	A+M	CP	Côte d'Ivoire	GN	t1	67	76	56	104	151	134	113	157	66	189	288	208	111	171	115	21	8	132	66	49	44	15	45	42	87	15	48	25	18	24	9	2.4%	70%		
BUM	A+M	CP	Côte d'Ivoire	GN	t2	ab	9																																	
BUM	A+M	CP	EU.España	LL	t1	6	14	43	44	55	40	158	122	195	125	140	94	28	12	51	24	91	38	55	60	165	16	34	44	137	212	140	233	0	10	2.2%	72%			
BUM	A+M	CP	EU.España	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	-1	-1	-1	-1	-1	-1	-1	10				
BUM	A+M	CP	Venezuela	GN	t1	13	13	21	24	58	48	71	86	175	190	80	57	50	55	57	110	118	184	105	69	94	63	88	60	98	89	102					11	2.1%	74%	
BUM	A+M	CP	Venezuela	GN	t2	b	ab	11																																
BUM	A+M	CP	U.S.A.	LL	t1	160	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	12	1.9%	76%		
BUM	A+M	CP	U.S.A.	LL	t2	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	12				
BUM	A+M	CP	China PR	LL	t1																																13	1.7%	77%	
BUM	A+M	CP	China PR	LL	t2																																13			
BUM	A+M	CP	Korea Rep.	LL	t1	324	537	24	13	56	144	56	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	1.6%	79%	
BUM	A+M	CP	Korea Rep.	LL	t2	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	14				
BUM	A+M	NCO	Dominican Republic	HL	t1																																15	1.5%	81%	
BUM	A+M	NCO	Dominican Republic	HL	t2																																	15		
BUM	A+M	CP	Venezuela	LL	t1	57	38	34	52	59	64	72	56	51	50	45	27	38	65	44	51	53	37	25	51	57	53	56	52	41	60	83	97	62	60	16	1.5%	82%		
BUM	A+M	CP	Venezuela	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	-1	-1	-1	-1	-1	-1	-1	-1	16			
BUM	A+M	CP	Mexico	LL	t1																																17	1.5%	83%	
BUM	A+M	CP	Mexico	LL	t2	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	17				
BUM	A+M	NCO	NEI (BIL)	LL	t1																																18	1.4%	85%	
BUM	A+M	NCO	NEI (BIL)	LL	t2																																18			
BUM	A+M	CP	Grenada	LL	t1	30	36	30	33	52	50	26	47	60	100	87	104	69	72	45	42	33	49	54	32	69	53	32	63	63							19	1.2%	86%	
BUM	A+M	CP	Grenada	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	-1	-1	-1	-1	-1	-1	-1	-1	19			
BUM	A+M	CP	EU.Portugal	LL	t1																																20	1.1%	87%	
BUM	A+M	CP	EU.Portugal	LL	t2																																	20		
BUM	A+M	NCO	Togo	GN	t1																																21	1.1%	88%	
BUM	A+M	NCO	Togo	GN	t2																																	21		
BUM	A+M	NCO	Cuba	LL	t1	202	189	204	69	39	85	43	53	12																										

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Table 16. WHM-A stock (AT + MD)

		T1 Total	1739	1743	1557	1681	2202	1880	1679	1513	1945	1786	1535	1078	1012	845	841	768	612	748	711	753	504	530	464	640	436	480	442	422	247	240									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
WHM	A+M	NCC	Chinese Taipei	LL	t1	895	803	598	616	1350	907	566	441	506	465	437	152	178	104	172	56	44	54	38	28	20	28	17	7	7	12	12	7	7	5	1	27.5%	27%			
WHM	A+M	NCC	Chinese Taipei	LL	t2	ab	1																																		
WHM	A+M	CP	Venezuela	LL	t1	154	154	265	348	206	271	258	168	297	210	166	176	198	158	116	143	169	103	47	109	108	154	106	63	74	104	158	150	94	106	2	15.6%	43%			
WHM	A+M	CP	Venezuela	LL	t2	-1	b	ab	b	ab	a	ab	ab	ab	ab	ab	b	-1	2																						
WHM	A+M	CP	Brazil	LL	t1	201	377	211	301	91	101	70	105	102	158	106	172	342	266	80	243	87	63	41	32	29	74	67	241	98	121	67	47	62	76	3	13.0%	56%			
WHM	A+M	CP	Brazil	LL	t2	a	a	a	a	114	214	237	285	359	526	498	322	180	11	9	a	ab	ab	ab	ab	ab	ab	a	a	a	a	a	a	a	ab	3					
WHM	A+M	NCO	NEI (ETRO)	LL	t1					-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	4	8.9%	65%			
WHM	A+M	CP	EU.España	LL	t1	12	26	15	26	7	36	141	93	101	119	186	61	6	22	64	58	51	46	32	16	111	5	34	37	93	113	89	108	0	5	5.5%	70%				
WHM	A+M	CP	EU.España	LL	t2	-1	-1	a	b	ab	b	b	ab	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	5					
WHM	A+M	CP	Japan	LL	t1	126	122	248	82	92	57	112	58	56	40	83	56	16	33	36	34	39	21	34	43	41	31	42	24	6	8	9	10	8	12	6	5.1%	76%			
WHM	A+M	CP	Japan	LL	t2	ab	6																																		
WHM	A+M	NCO	NEI (BIL)	LL	t1					1	1	1					34	78	4	30	134	42	38	180	214	210	2	13	2	1	0	4	6	3	7	3.2%	79%				
WHM	A+M	NCO	NEI (BIL)	LL	t2					-1	-1	-1					-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	7					
WHM	A+M	CP	U.S.A.	LL	t1	82	90	88	66	44	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	8	3.1%	82%			
WHM	A+M	CP	U.S.A.	LL	t2	a	a	a	a	a	a	a	a	a	a	ab	a	ab	abc	ab	8																				
WHM	A+M	CP	S. Tomé e Príncipe	TR	t1	19	26	24	17	21	21	30	45	40	36	37	37	37	37	21	33	29	35	36	37	38	39	40	41	42	17	15	13	9	9	2.8%	85%				
WHM	A+M	CP	S. Tomé e Príncipe	TR	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	9				
WHM	A+M	CP	Korea Rep.	LL	t1	81	57	10	8	43	23	59	23	35	39	0		11	40	7		113	96	78	45	45		0							0	10	2.6%	87%			
WHM	A+M	CP	Korea Rep.	LL	t2	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	10					
WHM	A+M	CP	Barbados	LL	t1	39	17	24	29	26	43	15	41	33	25	25	24	15	15	18	16	33	22	24	26	3	2	4	5	5	10	12	14	15	10	11	1.9%	89%			
WHM	A+M	CP	Barbados	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	-1	-1	-1	-1	-1	-1	-1	-1	11				
WHM	A+M	CP	Mexico	LL	t1																															12	1.4%	91%			
WHM	A+M	CP	Mexico	LL	t2	ab	9																																		
WHM	A+M	CP	Trinidad and Tobago	LL	t1	6	3	6	1	11	18	8	32	10	13	4	2	5	12	6	6	5	12	10	11	15	14	39	33	38	32	20				13	1.2%	92%			
WHM	A+M	CP	Trinidad and Tobago	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	-1	-1	-1	-1	-1	-1	-1	-1	13				
WHM	A+M	CP	Venezuela	GN	t1	4	3	4	12	5	2	3	13	18	12	7	17	10	19	13	21	28	16	19	8	6	15	12	15	14	14	14	14	14	14	14	14	14	14	1.1%	93%
WHM	A+M	CP	Venezuela	GN	t2	ab	a	a	a	a	a	a	a	a	a	a	14																								
WHM	A+M	NCO	Mixed flags (FR+ES)	PS	t1	37	11	10	12	11	9	7	7	9	8	12	13	12	13	13	11	10	9	10	12	12	37										15	0.9%	94%		
WHM	A+M	NCO	Mixed flags (FR+ES)	PS	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	15			
WHM	A+M	CP	EU.Portugal	LL	t1													1	1																		16	0.8%	95%		
WHM	A+M	CP	EU.Portugal	LL	t2																																	16			
WHM	A+M	CP	China PR	LL	t1					9	11	9	11	15	30	2	20	23	8	6	9	6	10	5	9	8	3	4	2								17	0.7%	95%		
WHM	A+M	CP	China PR	LL	t2					-1	-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	a	17			
WHM	A+M	CP	Brazil	UN	t1												115					0	0	4	8	15	21	6	0	1							18	0.5%	96%		
WHM	A+M	CP	Brazil	UN	t2																																	18			
WHM	A+M	CP	Uruguay	LL	t1	1	1	3	2	3	0	1	24	22	16	21	20	1	9	2	5	9	3	6	5	5											19	0.5%	96%		
WHM	A+M	CP	Uruguay	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	-1	-1	-1	-1	-1	-1	-1	-1	-1	19			

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Table 17. SAI-E stock

		T1 Total	2315	1474	1776	1814	1171	1231	1880	1347	1363	1342	1980	2805	2351	2639	2612	2220	1916	2577	2229	2129	1853	1553	1591	1339	1163	1246	1421	1648	936	2008									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
SAI	ATE	CP	Ghana	GN	t1	395	463	297	693	450	353	303	196	351	305	275	568	592	566	521	542	282	420	342	358	417	299	201	220	191	99	238	267	82	78	1	19.2%	19%			
SAI	ATE	CP	Ghana	GN	t2	-1	-1	-1	-1	a	-1	-1	b	ab	b	ab	a	a	a	a	a	a	a	a	a	a	a	-1	1												
SAI	ATE	CP	Senegal	HL	t1	957	429	692	448	67	135	182	488	228	186	551	767	98	282	219	143	46	189	108	575	439	136	58	117	9	53		94		2	14.3%	33%				
SAI	ATE	CP	Senegal	HL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	2					
SAI	ATE	NCO	Mixed flags (FR+ES)	PS	t1	595	174	150	182	160	128	97	110	138	131	353	400	365	413	336	264	274	205	251	308	265	275	275	275	275						3	12.4%	46%			
SAI	ATE	NCO	Mixed flags (FR+ES)	PS	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	3					
SAI	ATE	CP	EU.España	LL	t1	0	13	3	42	8	13	42	48	15	20	8	195	245	197	169	202	214	227	239	318	206	197	257	229	302	333	225	233	277	324	4	8.9%	55%			
SAI	ATE	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	b	b	b	b	b	b	b	b	b	4					
SAI	ATE	CP	S. Tomé e Príncipe	TR	t1	97	84	78	81	88	92	96	139	141	141	136	136	136	136	515	346	292	384	114	119	121	124	127	131	134	312	212	219			5	8.8%	64%			
SAI	ATE	CP	S. Tomé e Príncipe	TR	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	5				
SAI	ATE	CP	Senegal	TR	t1	53	27	141	11	90	29	52	59	24	44	213	155	123	337	343	296	177	512	158	18			104	25		213	120	246	264	6	7.1%	71%				
SAI	ATE	CP	Senegal	TR	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	6				
SAI	ATE	CP	Côte d'Ivoire	GN	t1	58	38	69	40	54	66	91	65	35	80	45	47	65	121	73	93	78	52	448	74	24	108	192	80	99	52	38	400	17	482	7	5.9%	77%			
SAI	ATE	CP	Côte d'Ivoire	GN	t2	ab	7																																		
SAI	ATE	CP	Japan	LL	t1	31	6	15	27	45	52	47	19	58	16	26	6	20	22	70	50	62	144	199	94	115	143	157	71	59	36	52	45	47	63	8	3.3%	80%			
SAI	ATE	CP	Japan	LL	t2	ab	ab	-1	-1	a	ab	a	a	a	ab	a	ab	ab	ab	ab	ab	a	a	a	a	a	a	8													
SAI	ATE	CP	Liberia	GN	t1						33	85	43	136	122	154	56	133	127	106	122	118	115										59	11	50	9	2.7%	83%			
SAI	ATE	CP	Liberia	GN	t2						-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	9					
SAI	ATE	NCC	Chinese Taipei	LL	t1	5	4	80	157	38	58	24	56	44	66	45	50	62	49	15	25	36	109	121	80	21	52	59	42	17	27	24	30	23	20	10	2.7%	85%			
SAI	ATE	NCC	Chinese Taipei	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	-1	-1	-1	-1	-1	-1	-1	-1	10				
SAI	ATE	CP	Senegal	GN	t1	30	10	14	2	3	3	6	3	5	0	8	28	19	15	1	22	27	28	180	35	45	38	85	21	26	7	373	87	67	132	11	2.4%	88%			
SAI	ATE	CP	Senegal	GN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	11				
SAI	ATE	NCO	Cuba	LL	t1	61	184	200	77	83	72	533																									12	2.2%	90%		
SAI	ATE	NCO	Cuba	LL	t2	-1	-1	-1	-1	-1	-1	-1																									12				
SAI	ATE	NCO	NEI (BIL)	LL	t1											28	269	408	213	55	1	105	43	20	11										44	13	2.2%	92%			
SAI	ATE	NCO	NEI (BIL)	LL	t2											-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	13					
SAI	ATE	CP	EU.Portugal	LL	t1										27	42			9	1	5	10	6	11	137	43	49	112	142	96	70	108	33	41	30	27	123	65	14	2.2%	94%
SAI	ATE	CP	EU.Portugal	LL	t2										-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	14					
SAI	ATE	NCO	NEI (ETRO)	LL	t1					27	51	57	69	86	127	120	77	43	3	2	16	7	8	10													15	1.3%	96%		
SAI	ATE	NCO	NEI (ETRO)	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	-1	-1	-1	-1	15				
SAI	ATE	NCO	Togo	GN	t1										9	22	36	23	62	55	95	135	47	31	71											16	1.1%	97%			
SAI	ATE	NCO	Togo	GN	t2										-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	16				

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Table 18. SAI-W stock

		T1 Total	1235	1226	1463	1414	1121	1214	1143	1257	1615	1580	1996	1797	2060	1498	1727	1839	1939	1561	1733	1624	1229	1335	1275	985	859	898	1214	1080	1369	1258								
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum		
SAI	ATW	CP	Venezuela	LL	t1	94	129	170	271	148	139	167	165	333	227	190	186	188	233	387	476	907	363	269	320	409	498	404	262	112	152	246	387	381	373	1	20.2%	20%		
SAI	ATW	CP	Venezuela	LL	t2	b	b	ab	b	ab	a	a	a	-1	-1	1																								
SAI	ATW	CP	EU.España	LL	t1	0	8	13	13	19	36	5	20	42	7	14	309	414	183	160	89	134	214	361	412	275	190	184	203	244	311	207	454	256	228	2	11.8%	32%		
SAI	ATW	CP	EU.España	LL	t2	-1	-1	b	b	-1	b	-1	b	-1	b	b	b	b	-1	b	b	b	b	b	b	-1	-1	-1	-1	b	b	b	b	b	2					
SAI	ATW	CP	Grenada	LL	t1	218	316	310	246	151	119	56	83	151	148	164	187	151	171	112	147	159	174	216	183	191	191	191	191	191	191	191	191	191	3	10.8%	43%			
SAI	ATW	CP	Grenada	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	-1	-1	-1	-1	-1	-1	3					
SAI	ATW	CP	Brazil	LL	t1	98	65	285	201	60	97	76	69	106	278	531	412	325	347	208	415	82	59	75	73	70	135	106	76	57	72	59	39	43	17	4	10.7%	53%		
SAI	ATW	CP	Brazil	LL	t2	a	a	ab	a	a	a	a	a	ab	ab	ab	a	a	a	ab	a	a	a	a	a	a	ab	4												
SAI	ATW	CP	U.S.A.	RR	t1	242	341	290	201	179	342	230	349	267	163	76	58	103	b	b	b	0	0	0	0	0	0	0	7	3	2	3	3	3	3	5	6.8%	60%		
SAI	ATW	CP	U.S.A.	RR	t2	ab	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	5															
SAI	ATW	CP	Brazil	UN	t1	184	33	21	41	143	224	67	78	78	67	222	238	326	0	58	60	193	360	1	0	0	0	0	0	0	0	0	0	0	0	6	5.6%	66%		
SAI	ATW	CP	Brazil	UN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	6				
SAI	ATW	CP	Venezuela	GN	t1	41	25	60	65	41	88	114	182	140	71	64	88	93	122	131	135	186	113	96	89	92	139	79	98						7	5.5%	71%			
SAI	ATW	CP	Venezuela	GN	t2	ab	7																																	
SAI	ATW	NCO	Dominican Republic	LL	t1								101	89	27	67	81	260	91	144	165	133	147													8	3.1%	74%		
SAI	ATW	NCO	Dominican Republic	LL	t2								-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	8					
SAI	ATW	NCO	Cuba	LL	t1	126	83	70	42	46	37	37	40	28	196	208	68	32	18	50	72	47	56													9	3.0%	77%		
SAI	ATW	NCO	Cuba	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	-1	-1	-1	-1	-1	-1	-1	9				
SAI	ATW	CP	Panama	LL	t1																														10	2.9%	80%			
SAI	ATW	CP	Panama	LL	t2																															10				
SAI	ATW	CP	Barbados	LL	t1	45	29	42	50	46	74	25	71	58	44	44	42	26	27	26	42	58	42														11	2.6%	83%	
SAI	ATW	CP	Barbados	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	-1	-1	-1	-1	-1	-1	-1	11				
SAI	ATW	CP	Mexico	LL	t1			2	19	19	10	9	65	40	118	36	34	45	51	55	42	47		45	48	34	32	51	63	42	35	47	51	24	27	12	2.6%	85%		
SAI	ATW	CP	Mexico	LL	t2			a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	abc	a	a	a	a	a	a	a	a	a	a	a	a	12				
SAI	ATW	NCO	NEI (BIL)	LL	t1																		68	81	252	17	21									13	2.4%	88%		
SAI	ATW	NCO	NEI (BIL)	LL	t2																		-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	13				
SAI	ATW	CP	U.S.A.	LL	t1	62	67	44	65	29	30	69	57	27	72	45	11	7	5	7	3	5	7	9	10	4	10	18	11	11	6	7	6	6	5	14	1.7%	90%		
SAI	ATW	CP	U.S.A.	LL	t2	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	14				
SAI	ATW	NCC	Chinese Taipei	LL	t1	42	37	17	112	117	19	19	2	65	17	11	33	31	13	8	21	5	14	10	11	6	8	27	6	3	6	5	5	6	5	15	1.6%	91%		
SAI	ATW	NCC	Chinese Taipei	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	-1	-1	-1	-1	-1	-1	-1	-1	15			
SAI	ATW	CP	Trinidad and Tobago	LL	t1	4	1	2	1	2	1	4	10	25	37	3	7	6	7	10	9	17	13	32	16	16	32	60	28	23	51	48	58	46	51	16	1.5%	93%		
SAI	ATW	CP	Trinidad and Tobago	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	-1	-1	-1	-1	-1	-1	-1	-1	16			
SAI	ATW	CP	St. Vincent and Grenadines	LL	t1																																17	1.3%	94%	
SAI	ATW	CP	St. Vincent and Grenadines	LL	t2																																17			
SAI	ATW	CP	EU.Portugal	LL	t1																																18	1.0%	95%	
SAI	ATW	CP	EU.Portugal	LL	t2																																18			
SAI	ATW	NCO	Dominican Republic	UN	t1	40	31	98	50	90	40	40																									19	0.9%	96%	
SAI	ATW	NCO	Dominican Republic	UN	t2	-1	-1	-1	-1	-1	-1	-1																										19		

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Table 19. SPF-E stock

		T1 Total	417	131	255	419	198	207	128	194	192	257	181	81	84	54	51	68	84	66	60	78	128	73	170	95	16	18	15	29	36	60									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
SPF	ATE	NCC	Chinese Taipei	LL	t1	8	6	135	263	63	97	41	94	73	112	75	52	62	25	15	25	37	22	2	6	16	9	6	0	0	1	1	1	2	3	1	32.6%	33%			
SPF	ATE	NCC	Chinese Taipei	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	a	ab	ab	ab	ab	ab	ab	a	a	ab	ab	3	1			
SPF	ATE	NCO	Mixed flags (FR+ES)	PS	t1	373	107	92	112	98	78	59	68	86	81	60																					2	31.6%	64%		
SPF	ATE	NCO	Mixed flags (FR+ES)	PS	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	2			
SPF	ATE	CP	Japan	LL	t1	32	10	27	31	36	26	25	30	22	33	29	20	16	25	36	40	21	36	53	59	49	39	134	85	3	0	4	2	15	11	3	24.7%	89%			
SPF	ATE	CP	Japan	LL	t2	b	-1	b	b	ab	ab	a	a	ab	ab	ab	ab	a	a	a	a	ab	a	a	a	a	a	a	a	3											
SPF	ATE	CP	EU.España	LL	t1			0	12		5	1	1	9	31	17	9	6	5		3	3		2	7	32	12	10	9	13	17	10	13	13	19	4	6.7%	96%			
SPF	ATE	CP	EU.España	LL	t2			-1	b		-1	b	b	b	b	b	b	b	b	-1		b	b		-1	b	b	-1	-1	b	b	-1	-1	-1	b	-1	4				
SPF	ATE	CP	EU.Portugal	LL	t1																	24	8	2	6	25	9	20								5	3.3%	99%			
SPF	ATE	CP	EU.Portugal	LL	t2																	a	a	a	a	a	a	a	a	a	a	a	a	a	a	5					
SPF	ATE	CP	Korea Rep.	LL	t1	4	8	1	1	1	1	1	3	1																							6	0.5%	99%		
SPF	ATE	CP	Korea Rep.	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	a																								6			
SPF	ATE	CP	St. Vincent and Grenadines	LL	t1																																7	0.3%	100%		
SPF	ATE	CP	St. Vincent and Grenadines	LL	t2																																	7			
SPF	ATE	CP	Senegal	LL	t1																																	8	0.1%	100%	
SPF	ATE	CP	Senegal	LL	t2																																	8			
SPF	ATE	CP	China PR	LL	t1																																	9	0.1%	100%	
SPF	ATE	CP	China PR	LL	t2																																		9		
SPF	ATE	NCO	NEI (BIL)	LL	t1																																	10	0.1%	100%	
SPF	ATE	NCO	NEI (BIL)	LL	t2																																		10		

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Table 20. SPF-W stock

		T1 Total	64	83	19	120	122	33	37	7	74	50	97	107	95	79	137	101	256	102	106	62	117	80	58	352	36	62	62	321	138	58									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
SPF	ATW	NCC	Chinese Taipei	LL	t1	41	36	16	111	116	19	18	2	64	16	11	24	39	12	11	20	17	20	0		5	12	3	1	3	3	1	2	2	5	1		20.8%	21%		
SPF	ATW	NCC	Chinese Taipei	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	-1	-1	-1	-1	-1	-1	-1	-1	1				
SPF	ATW	CP	EU.España	LL	t1		0	5		1		0	0	22	47	20	5	21			5	14		2	5		10	10	9	11	19	14	259	19	17	2		17.0%	38%		
SPF	ATW	CP	EU.España	LL	t2		-1	b	b	-1	b	b	-1	b	b	b	b	b			b	b		-1	b	b	-1	b	b	-1	-1	b	-1	-1	-1	-1	3		16.2%	54%	
SPF	ATW	CP	Japan	LL	t1	13	46	1	1	2	3	4	1	8	11	11	3	12	40	41	58	54	25	45	26	57	12	13	3	1			0	0	3	4		15.8%	70%		
SPF	ATW	CP	Japan	LL	t2	b	-1	b	-1	a	a	a	a	ab	ab	ab	ab	ab	a	a	a	a	a	ab	ab	ab	ab	ab	ab	a	ab	b					4				
SPF	ATW	CP	Brazil	LL	t1											27	56	39	3			0	5	4			24	4	310		6					4		14.5%	84%		
SPF	ATW	CP	Brazil	LL	t2											-1	-1	-1	a	a	a	a	a	ab	a	a	a	a	a	a	a	a	a	a	a	a	5				
SPF	ATW	CP	St. Vincent and Grenadines	LL	t1											82				135	23	13	7	8	5	4	3	3	1	7	52	84	12	5	7			14.5%	84%		
SPF	ATW	CP	St. Vincent and Grenadines	LL	t2											a			a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	5				
SPF	ATW	CP	Venezuela	LL	t1				1	0		1	0	1	0				4	0	3	3	17	5	15	3	14	24	11	24	11	13	32	35	6	10	4	6		7.8%	92%
SPF	ATW	CP	Venezuela	LL	t2		b	ab	ab	b	a	ab	ab	ab					-1	-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	6			
SPF	ATW	CP	EU.Portugal	LL	t1																	26	15	44	10	10	0	1							19	18	7		4.7%	97%	
SPF	ATW	CP	EU.Portugal	LL	t2																	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	7			
SPF	ATW	CP	Korea Rep.	LL	t1	9	0	1	2	4	4	10	4																									8		1.1%	98%
SPF	ATW	CP	Korea Rep.	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1																									8		
SPF	ATW	CP	Brazil	HL	t1																					15	6											9		0.7%	99%
SPF	ATW	CP	Brazil	HL	t2																					-1	-1											9			
SPF	ATW	CP	Belize	LL	t1																					12	3											10		0.5%	99%
SPF	ATW	CP	Belize	LL	t2																					a	a											10			
SPF	ATW	CP	Mexico	LL	t1											1																						11		0.3%	99%
SPF	ATW	CP	Mexico	LL	t2					a						-1																							11		

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Table 21. BSH-N region

		T1 Total	3038	4306	3561	9591	8592	8468	7396	29285	26764	26172	28174	21128	20066	23006	21741	22359	23218	26927	30725	35199	37239	38092	36783	37087	36579	39627	44068	39664	33995	27279								
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum		
BSH	ATN	CP	EU.España	LL	t1								24497	22504	21811	24112	17362	15666	15975	17314	15006	15464	17038	20788	24465	26094	27988	28666	28562	29041	30078	29019	27316	21685	16314	1	68.9%	69%		
BSH	ATN	CP	EU.España	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	2	16.6%	85%		
BSH	ATN	CP	EU.Portugal	LL	t1	1387	2257	1583	5726	4669	4722	4843	2630	2440	2227	2081	2110	2265	5642	1751	4026	4337	5283	6164	6248	8256	6508	3725	3694	2994	3808	7679	5610	5162	4475	3	6.3%	92%		
BSH	ATN	CP	EU.Portugal	LL	t2	-1	-1	-1	-1	-1	a	a	a	a	a	a	a	a	ab	ab	4																			
BSH	ATN	CP	Japan	LL	t1					1203	1145	618	489	340	357	273	350	386	558	1035	1729	1434	1921	2531	2007	1763	1227	2437	1808	3287	4011	4217	4444	4111	3917	5				
BSH	ATN	CP	Japan	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	-1	-1	-1	-1	6			
BSH	ATN	CP	Canada	LL	t1	680	774	1277	1702	1260	1494	528	831	612	547	624	581	836	346	965	1134	977	843	0	0	0	0	1	0	1	5	16	32	71	4	7	2.2%	94%		
BSH	ATN	CP	Canada	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	a	a	a	a	a	8			
BSH	ATN	CP	U.S.A.	LL	t1	742	772	186	1146	582	623	608	181	173	96	138	106	68	56	70	68	47	54	138	107	178	238	127	117	147	82	43	42	11	29	9	0.9%	95%		
BSH	ATN	CP	U.S.A.	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	-1	-1	-1	-1	-1	-1	-1	-1	10			
BSH	ATN	CP	Belize	LL	t1																				114	461	1039	903	1216	392	4	6	201	317	369	11	0.7%	96%		
BSH	ATN	CP	Belize	LL	t2																				ab	ab	ab	ab	a	a	a	a	a	a	a	12				
BSH	ATN	NCC	Chinese Taipei	LL	t1					487	167	132	203	246	384	165	59			171	206	240	588	292	110	73	99	148	107	123	83	238	287	76	153	38	13	0.6%	96%	
BSH	ATN	NCC	Chinese Taipei	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	-1	-1	-1	-1	-1	14		
BSH	ATN	CP	Panama	LL	t1												9																				15			
BSH	ATN	CP	Panama	LL	t2												-1																				16			
BSH	ATN	CP	Maroc	PS	t1																																17			
BSH	ATN	CP	Maroc	PS	t2																																18			
BSH	ATN	CP	EU.France	UN	t1	130	187	276	322	350	266	278	213	163	399	395	207	221	57	95	120	99	50	46	30	3	6	0	0	105	573	863	875	975	915	19	0.5%	98%		
BSH	ATN	CP	EU.France	UN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	20		
BSH	ATN	CP	Maroc	LL	t1																																21			
BSH	ATN	CP	Maroc	LL	t2																																	22		
BSH	ATN	CP	U.S.A.	RR	t1	87	308	214	672	21	19	277	210	252	217	291	39																					23	0.4%	99%
BSH	ATN	CP	U.S.A.	RR	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	24		
BSH	ATN	CP	Korea Rep.	LL	t1																						537	299	327	113	18	11	132	123	148		25	0.2%	99%	
BSH	ATN	CP	Korea Rep.	LL	t2																																	26		
BSH	ATN	CP	China PR	LL	t1												185	104	148																			27	0.2%	99%
BSH	ATN	CP	China PR	LL	t2												-1	-1	-1																			28		

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Table 22. BSH-5 region

		T1 Total	0	8	107	10	2704	3108	4252	10145	8797	10829	12444	14044	12682	14966	14440	20642	20493	23487	23097	23459	27799	35069	26421	20672	26148	22498	25417	28373	34383	34784										
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum				
BSH	ATS	CP	EU.España	LL	t1								5272	5574	7173	6951	7743	5368	6626	7366	6410	8724	8942	9615	13099	13953	16978	14348	10473	11447	10133	10107	11486	13515	18497	1	45.9%	46%				
BSH	ATS	CP	EU.España	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							
BSH	ATS	CP	EU.Portugal	LL	t1								847	867	1336	876	1110	2134	2562	2324	1841	1863	3184	2751	4493	4866	5358	6338	7642	2424	1646	1622	2420	5609	6663	8015	6753	2	17.1%	63%		
BSH	ATS	CP	EU.Portugal	LL	t2								-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	2						
BSH	ATS	CP	Brazil	LL	t1								743	1103		179	1683	2173	1966	2160	1568	2520	2533	2309	1625	1268	1500	1913	1607	2013	2551	2420	1334	2177	3010	3784	3	8.8%	72%			
BSH	ATS	CP	Brazil	LL	t2								-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	3					
BSH	ATS	CP	Namibia	LL	t1											0																						4	8.3%	80%		
BSH	ATS	CP	Namibia	LL	t2																																	4				
BSH	ATS	NCC	Chinese Taipei	LL	t1								1232	1767	1952	1737	1559	1496	1353	665																				5	7.9%	88%
BSH	ATS	NCC	Chinese Taipei	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	-1	-1	5				
BSH	ATS	CP	Japan	LL	t1								1388	437	425	506	510	536	221	182	343	331	209	236	525	896	1789	981	1161	1483	3060	2255	3232	2277	2127	3112	3495	2558	6	6.8%	95%	
BSH	ATS	CP	Japan	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	-1	-1	6				
BSH	ATS	CP	Uruguay	LL	t1								8	106.86	10	84	57	259	180	248	118	81	66	85	480	462	376	232	337	359	942	208	725	433	130				7	1.2%	96%	
BSH	ATS	CP	Uruguay	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	-1	-1	7				
BSH	ATS	CP	South Africa	LL	t1																																		8	0.9%	97%	
BSH	ATS	CP	South Africa	LL	t2																																		8			
BSH	ATS	CP	Ghana	GN	t1																																		9	0.7%	97%	
BSH	ATS	CP	Ghana	GN	t2																																		9			
BSH	ATS	CP	China PR	LL	t1																																		10	0.6%	98%	
BSH	ATS	CP	China PR	LL	t2																																		10			
BSH	ATS	CP	Belize	LL	t1																																			11	0.6%	99%
BSH	ATS	CP	Belize	LL	t2																																			11		
BSH	ATS	CP	Korea Rep.	LL	t1																																			12	0.3%	99%
BSH	ATS	CP	Korea Rep.	LL	t2																																			12		
BSH	ATS	CP	Côte d'Ivoire	LL	t1																																			13	0.2%	99%
BSH	ATS	CP	Côte d'Ivoire	LL	t2																																			13		

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Table 23. POR-NE region

		T1 Total	679	467	637	777	1045	749	428	444	371	424	567	506	610	527	578	367	302	421	391	349	21	14	25	10	5	8	9	8	4	0									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
POR	ANE	CP	EU.France	UN	t1	551	300	496	633	820	565	267	315	219	240	410	361	461	303	194	276	194	83	83	153											1	64.5%	64%			
POR	ANE	CP	EU.France	UN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1											1				
POR	ANE	CP	EU.Denmark	UN	t1	46	85	80	91	93	86	72	69	85	107	73	76	42	21	20	4	3	2	1		0											2	9.9%	74%		
POR	ANE	CP	EU.Denmark	UN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1		a	0									2				
POR	ANE	CP	EU.France	LL	t1																																3	6.4%	81%		
POR	ANE	CP	EU.France	LL	t2																																	3			
POR	ANE	CP	EU.France	LL	t1	26	47	15	21	52	19	41	25	25	18	13	24	54	27	11	14	34	8	41	77													4	5.5%	86%	
POR	ANE	CP	EU.España	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1													4			
POR	ANE	CP	Norway	UN	t1	43	32	41	24	24	26	28	17	27	32	22		19					1	8	9	6	12	11	17									5	3.7%	90%	
POR	ANE	CP	Norway	UN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1												5			
POR	ANE	CP	EU.Portugal	LL	t1	2	1	0	1	1	1	1	1	1	0	7	4	10	101	50	14		6	0	3	17	7	0	0									6	2.1%	92%	
POR	ANE	CP	EU.Portugal	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	a	a	a	a	a	a	a	a	a	a	a	a									6		
POR	ANE	NCO	Faroe Islands	LL	t1					48	44	8	9	7	10	13	8	10	14	5	19	21																	7	2.0%	94%
POR	ANE	NCO	Faroe Islands	LL	t2					-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1													7			
POR	ANE	CP	EU.United Kingdom	UN	t1	9					0					1	6	8	12	10	25	24																8	0.9%	95%	
POR	ANE	CP	EU.United Kingdom	UN	t2	-1					-1					-1	-1	-1	-1	-1	-1	-1	-1	-1														8			
POR	ANE	CP	Norway	GN	t1																	8	26	1	2	2													9	0.7%	96%
POR	ANE	CP	Norway	GN	t2																																		9		
POR	ANE	CP	EU.Ireland	UN	t1																																		10	0.7%	96%
POR	ANE	CP	EU.Ireland	UN	t2																																		10		
POR	ANE	CP	EU.France	TW	t1																																		11	0.6%	97%
POR	ANE	CP	EU.France	TW	t2																																		11		
POR	ANE	CP	EU.United Kingdom	GN	t1																																		12	0.5%	97%
POR	ANE	CP	EU.United Kingdom	GN	t2																																		12		



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Table 25. POR-SE region

		T1 Total	0	0	0	0	0	0	3	19	1	6	0	1	1	9	3	1	0	5	30	37	6	7	26	29	38	3	1	0	4	0								
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum		
POR	ASE	CP	Japan	LL	t1							3	13										5	29	25	6	7	25	15	13	3	1	0		1	63.3%	63%			
POR	ASE	CP	Japan	LL	t2							-1	-1										-1	-1	a	a	a	a	a	a	a	a	a		2	13.6%	77%			
POR	ASE	CP	EU.España	LL	t1							2	1	2			1	1	9	3			0	1	11										3					
POR	ASE	CP	EU.España	LL	t2							-1	-1	-1			-1	-1	-1	-1			-1	-1	-1										4					
POR	ASE	CP	Ghana	PS	t1																														5					
POR	ASE	CP	Ghana	PS	t2																															6				
POR	ASE	CP	Korea Rep.	LL	t1																															7				
POR	ASE	CP	Korea Rep.	LL	t2																																8			
POR	ASE	NCO	Benin	UN	t1																																9			
POR	ASE	NCO	Benin	UN	t2							4	0	4																							10			
POR	ASE	NCC	Chinese Taipei	LL	t1							-1	-1	-1																							11			
POR	ASE	NCC	Chinese Taipei	LL	t2																																	12		
POR	ASE	CP	EU.Portugal	LL	t1																																	13		
POR	ASE	CP	EU.Portugal	LL	t2																																	14		
POR	ASE	CP	Guinea Ecuatorial	HL	t1																																	15		
POR	ASE	CP	Guinea Ecuatorial	HL	t2																																	16		
POR	ASE	CP	EU.España	PS	t1																																	17		
POR	ASE	CP	EU.España	PS	t2																																	18		
POR	ASE	CP	Curaçao	PS	t1																																	19		
POR	ASE	CP	Curaçao	PS	t2																																	20		
POR	ASE	CP	Guatemala	PS	t1																																	21		
POR	ASE	CP	Guatemala	PS	t2																																	22		
POR	ASE	CP	El Salvador	PS	t1																																	23		
POR	ASE	CP	El Salvador	PS	t2																																	24		
POR	ASE	CP	Panama	PS	t1																																	25		
POR	ASE	CP	Panama	PS	t2																																	26		

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Table 26. POR-SW region

		T1 Total	328	256	385	213	284	170	327	159	261	172	214	141	181	187	105	133	122	143	55	26	10	14	12	0	0	0	0	0	0	0	0	0	0	0															
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum													
POR	ASW	NCC	Chinese Taipei	LL	t1	142	73	192	85	146	57	168	65	170	73	84	29	93	95	39	43	47	99														0	1	43.6%	44%											
POR	ASW	NCC	Chinese Taipei	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1		a												-1	1												
POR	ASW	CP	Brazil	LL	t1	95	81	128	60	32	49	33	36	38	58	60	67	74	49	37	52	32	23																	2	25.8%	69%									
POR	ASW	CP	Brazil	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	a		-1	-1	-1	-1																2											
POR	ASW	CP	Uruguay	LL	t1	27	18	24	7	5	3	19	5	14	3	4	20	8	34	8	28	34	3	40	14	6		12												2	8.9%	78%									
POR	ASW	CP	Uruguay	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	a	a	b	a																3										
POR	ASW	CP	EU.España	LL	t1	1	13	12	32	35	43	28	25	1	12	7	13	1	0	0	0	3	5	3	2																	3	6.0%	84%							
POR	ASW	CP	EU.España	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1																	4									
POR	ASW	NCO	NEI (Flag related)	LL	t1	13	8	14	10	22	8	46	23	37	11	15	3	1																							5	5.4%	90%								
POR	ASW	NCO	NEI (Flag related)	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1																		5									
POR	ASW	CP	Japan	LL	t1	37	48	12	13	14	6	6	1	1	1	7	4	3	2	11	3	3	4	12	10	2																	6	5.1%	95%						
POR	ASW	CP	Japan	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1		a	a															6								
POR	ASW	CP	Panama	LL	t1	8	14	2	6	24	4	21	3																														7	2.1%	97%						
POR	ASW	CP	Panama	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1																															7							
POR	ASW	CP	China PR	LL	t1				0	1	0									13	36	4																						8	1.9%	99%					
POR	ASW	CP	China PR	LL	t2				-1	-1	-1									-1	-1	-1	-1	-1																					8						
POR	ASW	CP	Korea Rep.	LL	t1	3	3	1	1	2	1	6	1																																9	0.6%	99%				
POR	ASW	CP	Korea Rep.	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1																																	9					
POR	ASW	CP	EU.Portugal	LL	t1								1							1	1	1	4	1	1	2																				10	0.3%	100%			
POR	ASW	CP	EU.Portugal	LL	t2																-1	-1	-1	a	a																					10					
POR	ASW	CP	Philippines	LL	t1								0	0	0	0	0	0	0	0	1	3	1																									11	0.1%	100%	
POR	ASW	CP	Philippines	LL	t2																																												11		

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Table 27. SMA-N region

		T1 Total	2389	2296	3233	4114	3659	5306	5306	3534	3845	2858	2587	2677	3426	3987	4000	3695	3574	4158	3800	4541	4782	3720	4437	3603	3467	3281	3356	3119	2373	1863									
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum			
SMA	ATN	CP	EU.España	LL	t1	1537	1390	2145	1964	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	1	52.6%	53%			
SMA	ATN	CP	EU.España	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	-1	-1	-1	-1	-1	-1	-1	-1	2	17.7%	70%		
SMA	ATN	CP	EU.Portugal	LL	t1	193	314	220	796	649	657	691	354	307	327	318	378	415	1249	399	1109	951	1540	1033	1169	1432	1045	1023	817	209	213	257	270	268	284	2					
SMA	ATN	CP	EU.Portugal	LL	t2	-1	-1	-1	-1	-1	a	a	a	a	a	a	a	a	a	a	a	a	ab	2																	
SMA	ATN	CP	U.S.A.	RR	t1	268	210	250	667	317	1422	232	164	148	69	290	214	248	0	336	282	257	158	156	163	183	180	236	227	816	480	168	192	125	25	3	7.9%	78%			
SMA	ATN	CP	U.S.A.	RR	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	3				
SMA	ATN	CP	Maroc	LL	t1															147	169	215	220	151	283	476	636	390	380	616	580	807	1000	320	423	357	4	6.7%	85%		
SMA	ATN	CP	Maroc	LL	t2																																4				
SMA	ATN	CP	Japan	LL	t1	221	157	318	425	214	592	790	258	892	120	138	105	438	267	572				82	131	98	116	53	56	33	69	45	74	89	20	34	5	6.0%	91%		
SMA	ATN	CP	Japan	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	-1	-1	-1	-1	-1	-1	-1	-1	-1	5			
SMA	ATN	CP	U.S.A.	LL	t1	146	176	273	249	269	259	166	179	146	124	123	135	123	105	140	138	95	167	149	171	168	160	152	140	155	100	108	112	41	33	6	4.2%	95%			
SMA	ATN	CP	U.S.A.	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	-1	-1	-1	-1	-1	-1	-1	-1	-1	6			
SMA	ATN	CP	Canada	LL	t1						93	56	99	55	54	59	60	61	63	69	74	64	64	39	50	39	37	28	35	53	84	82	109	54	62	7	1.4%	96%			
SMA	ATN	CP	Canada	LL	t2						-1	a	a	a	a	a	a	a	a	a	a	a	a	a	a	abc	ab	7													
SMA	ATN	NCC	Chinese Taipei	LL	t1	9	39	16	9	29	32	45	42	47	75	56	47	53	37	70	68	40	6	23	11	14	13	15	8	4	15	8	1	3	1	8	0.8%	97%			
SMA	ATN	NCC	Chinese Taipei	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	-1	-1	-1	-1	-1	-1	-1	-1	-1	8			
SMA	ATN	CP	Maroc	PS	t1																																9	0.7%	98%		
SMA	ATN	CP	Maroc	PS	t2																																	9			
SMA	ATN	CP	Belize	LL	t1																																	10	0.3%	98%	
SMA	ATN	CP	Belize	LL	t2																																		10		

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Table 28. SMA-S region

		T1 Total	1255	1062	1183	1743	2182	3100	2395	2187	2008	1606	2588	2107	2103	3235	2526	3259	3036	2786	1881	2063	2486	3258	2905	2183	3274	2774	2765	2786	3158	2309								
Species	Stock	Status	FlagName	GearGrp	DSet	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	Rank	%	%cum		
SMA	ATS	CP	EU.España	LL	t1	552	327	421	772	552	1084	1482	1356	984	861	1090	1235	811	1158	703	584	664	654	628	922	1192	1535	1207	1083	1077	862	882	1049	1044	1090	1	38.6%	39%		
SMA	ATS	CP	EU.España	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	b	-1	b	b	b	b	b	b	b	b	-1	1				
SMA	ATS	CP	Namibia	LL	t1													a	459	375	509	1415	1243	1002	295	23	306	328	554	9	950	661	799	194	980	2	14.0%	53%		
SMA	ATS	CP	Namibia	LL	t2													-1	-1	ab	a	ab	a	a	a	a	a	a	2											
SMA	ATS	CP	Japan	LL	t1	538	506	460	701	1369	1617	514	244	267	151	264	56	133	118	398					72	115	108	103	132	291	114	182	109	77	96	93	55	3	12.3%	65%
SMA	ATS	CP	Japan	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	ab	ab	ab	a	a	a	a	a	a	a	a	3			
SMA	ATS	CP	EU.Portugal	LL	t1					92	94	165	116	119	388	140	56	625	-1						375	321	502	336	409	176	132	127	158	393	503	300	243	4	9.0%	74%
SMA	ATS	CP	EU.Portugal	LL	t2					-1	a	a	a	a	a	a	a	a	a	a	a	a	ab	4																
SMA	ATS	CP	Brazil	LL	t1	103	79	158	122	95	119	83	190	233	27	219	409	226	283	177	426	183	152	121	92	128	179	193	276	256	172	124	275	396	739	5	8.6%	83%		
SMA	ATS	CP	Brazil	LL	t2	-1	-1	-1	-1	-1	-1	-1	a	-1	-1	ab	a	a	a	a	ab	a	ab	a	ab	ab	ab	a	a	a	a	a	a	a	a	5				
SMA	ATS	CP	South Africa	LL	t1					64	43	23	46	36	29	168	66	103	68	12	115	101	111	86	224	137	146	152	218	108	250	476	613	339	305	244	110	6	6.1%	89%
SMA	ATS	CP	South Africa	LL	t2					-1	-1	-1	-1	-1	-1	-1	ab	a	a	ab	a	ab	a	ab	ab	ab	a	a	a	a	a	a	a	a	a	6				
SMA	ATS	NCC	Chinese Taipei	LL	t1	36	80	44	31	65	87	117	139	130	198	162	120	146	83	180	226	166	166	147	124	117	144	204	158	157	161	154	95	88	66	44	7	5.1%	94%	
SMA	ATS	NCC	Chinese Taipei	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	ab	7																			
SMA	ATS	CP	China PR	LL	t1					34	45	23	27	19	74	126	305	22	208	260	68	45	70	77	6	24	32	29	8	9	9	5	3	1		8	2.1%	96%		
SMA	ATS	CP	China PR	LL	t2					-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	a	a	a	a	a	a	a	a	a	a	a	8				
SMA	ATS	CP	Uruguay	LL	t1	26	13	20	28	12	17	26	20	23	21	35	40	38	188	249	146	68	36	41	106	23	76	36	1							9	1.8%	98%		
SMA	ATS	CP	Uruguay	LL	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	ab	ab	ab	a	-1	ab	9										
SMA	ATS	CP	Côte d'Ivoire	GN	t1	9	13	10	20	13	15	23	10	10	9	15	15	30	15	14	16	25						19	33	19	11	13	161	4	8	10	0.7%	98%		
SMA	ATS	CP	Côte d'Ivoire	GN	t2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	b	b	-1	-1	-1	a			a	a	ab	a	a	b	-1	a	10					

## 2020 ADVICE TO THE COMMISSION

Addendum 2 to Appendix 8: Summary of FAD information received in FAD Management Plans and ST08 forms for 2019 (some datasets could require revisions).

Addendum 2 de l'appendice 8. Résumé des informations sur les DCP consignées dans les plans de gestion des DCP et les formulaires ST08 au titre de 2019 (certains jeux de données sont en attente de révision).

Adenda 2 al Apéndice 8: Resumen de la información sobre DCP recibida en los planes de ordenación de DCP y en los formularios ST08 para 2019 (algunos conjuntos de datos pendientes de revisión).

Tropical Tunas Fishing Management Plan (preliminary)	FAD Management Plan	Reported 2019 Data on ST-08
Belize	Belize	Belize
Brazil	Curacao	Cabo Verde
China	EU.España	Curacao
Chinese-Taipei	EU.Francia	El Salvador
Curacao	Ghana	Eu.Espana
EU.España	Senegal	EU.Francia
EU.Francia	St Vincent &G	Ghana
Ghana	UK-OT	Guatemala
Guatemala		Mexico
Japan		UK-OT
Korea		
Russia		
Senegal		
St Vincent &G		
UK-OT		
USA		

2020 ADVICE TO THE COMMISSION

**Addendum 3 to Appendix 8:** Summary of Domestic Observer Program information

**Addendum 3 de l'appendice 8:** Résumé de l'information sur les Programmes Nationaux d'Observateurs.

**Adenda 3 al Apéndice 8:** Resumen de la información sobre los Programas nacionales de observadores.

CPC	Start year	Fisheries monitored (1 or more)	Coverage	Percent Coverage	Coverage based on
China	2009	LL			0.108 No. of hooks
EU.Malta	2008	LL			0.2 No. Of Vessels
EU.Cyprus	2006	LL			0.02 No. Of annual trips
Maroc	2018	LL,TP			51 No. Of Vessels
Belize	2018	LL, PS			0.1 No. of Vessels
Canada	2018	LL, RR, GN, TW	8, 0.6		No. of sets (LL)
Curacao	2018	PS			100 No. Trips
EU.France	2018	PS			81 No. of sets
Turkey	2012	LL			25 No. Of annual trips
EU.Portugal Madeira	2018	BB, HL			11 No. Of Vessels
EU. Portugal	2018	LL, TP			7.1 No. of sets
Ghana	2006	PS, BB			67 No. of vessels
Korea	2002	LL			22 Other
Mexico	2018	LL			100 Other
El Salvador	2018	PS			100 No. of vessels
Chinese Taipei	2018	LL			10 Days at sea
Tunisia	2012	PS,LL			78 Pcatch
Turkey	2018	LL			25 No. of annual trips
USA	1992	LL			8 No. of sets predefined strata per quarter
EU.Italy	2016	LL, TP	-		No. of vessels
Japan	1992	LL			7 Other
Capo Verde	2005	PS			
EU.Greece	NA	LL			3
Norway	2018	LL, PS			18,100 No. Trips
Russia	2018	TW			10 No. Vessels
Chinese Tai Pei	2002	LL			4 Days at sea

**Addendum 4 to Appendix 8:** CPCs reporting in form ST09-DomObPrg data for 2019.

**Addendum 4 de l'appendice 8:** CPC déclarant dans le formulaire ST09-DomObPrg les données pour 2019.

**Adenda 4 al Apéndice 8:** CPC que comunicaron en el formulario ST09-DomObPrg datos de 2019.

Belize  
Brazil  
Canada  
Cape Verde  
China PR  
Chinese Taipei  
Curaçao  
EU.Cyprus  
EU.España  
EU.France  
EU.Greece  
EU.Italy  
EU.Portugal  
Japan  
Korea Rep.  
Mexico  
Norway  
Russian Federation  
Tunisie  
Turkey  
U.S.A.

**Addendum 5 to Appendix 8:** Summary of reasons submitted by CPCs for not completing form C of ST09.

**Addendum 5 de l'appendice 8:** Résumé des motifs présentés par les CPC pour ne pas remplir le formulaire C de ST09.

**Adenda 5 al Apéndice 8:** Resumen de las razones presentadas por las CPC para no cumplimentar el formulario C de ST09.

FlagName	FlagCode	ST09C Reason
Belize	BLZ	"we do not have the relevant information need to complete this form we are unable to provide same"
Brazil	BRA	"Information on ST09C is not available."
EU.Greece	EU.GRC	"we would like to point out that our observer program on the swordfish fisheries is currently focusing on recording undersized catches of the target species. The fishery is largely monospecific and catches of other species were not systematically recorded. That is why the optional ST09C subform was not completed. However, we plan to enhance our observer program and record all species in the future"
Japan	JPN	ST09C was not provided because ST09A and ST09B covered monitoring role of the data collection required by recommendation 10-09 paragraph 1, 11-09 paragraph 1, and 16-14 paragraph 10f, such as species, discards, dead or alive and location of bycatch species. Sharing biological data could be accepted under the collaboration framework between CPCs, if required.
Korea Rep.	KOR	All weights/lengths data collected by observers onboard in 2019 were submitted by the forms of ST04 and ST05 by species, and there is no biological sampling(genetic, otolith, stomach, gonad etc.) in 2019.
Mexico	MEX	Todos los organismos capturados, subidos a bordo, y embodegados son muestreados para datos biométricos (talla, peso vivo, peso eviscerado, sexo y madurez sexual por especie) debido a que se cuenta con un programa de observadores a bordo en todos los viajes de pesca, y cuyos datos se presentan en los Formularios ST04 y ST05. No obstante, en 2019 no se llevó a cabo la toma de muestras genéticas, otolitos, estomacales, gónadas, etc.
Turkey	TUR	The form was left blank since no sex, genetic, otolith, stomach or gonad data was recorded during monitoring program.
U.S.A.	USA	Filling up the ST09C subform is 'optional' and CPCs that choose not to provide that information are not required to provide an explanation.
Chinese Taipei (foreign obs.)	TAI.Obs	The data in subform ST09C is still under preparation and review. Since ST09C is optional, relevant data is therefore not provided.

**2020 Report of the Sub-Committee on Statistics**  
(Online meeting, 4 September 2020)

**1. Opening, adoption of Agenda and meeting arrangements**

The Sub-committee on Statistics met at the ICCAT Secretariat (Madrid, Spain) on 4 September 2020. The ICCAT Assistant Executive Secretary, Dr. Miguel Neves dos Santos welcomed the Sub-committee and highlighted the importance of its work and the commitment of the Secretariat to support the work of SCRS and the Commission. The meeting was chaired by Dr. Guillermo Diaz (USA). The Agenda was discussed and adopted without any modifications (see **Addendum 1 to Appendix 9**). The List of Participants is attached as **Addendum 2 to Appendix 9**. **Addendum 3 to Appendix 9** contains the List the Documents presented during the meeting and the respective summaries are provided in **Addendum 4 to Appendix 9**.

The Chair of the Sub-Committee highlighted the difficulties that the SCRS is currently facing to conduct its work and, most importantly, the time constraints that result from conducting online meetings. Therefore, the need to work efficiently and to focus on the main items to be discussed was emphasized by the Chair.

**2. Summary of fisheries and biological data submitted during 2020, including historical Task 1, 2 and 3 revisions**

The Secretariat presented information contained in the *2020 Secretariat Report on Statistics and Coordination of Research (Appendix 8)* related to fisheries and biological data submitted in 2019 including revision to historical data.

The activities and information included in this report refer to the period between 1 October 2019 and 18 August 2020 (the reporting period). Furthermore, all the basic fisheries and biological statistics have been presented by the Secretariat to the SCRS Working Groups during the SCRS inter-sessional meetings. After 6 years of consolidated improvements in the data provision, the Secretariat has observed as in 2018, a decline in data completion quality of the latest data submissions. The Secretariat had to correct more datasets, so they pass the SCRS filtering criteria and there were a number of submissions that did not use the 2020 version of the electronic forms.

Regarding the activities conducted by the Secretariat, in the most recent years, in addition to the normal activities developed on statistics, publications, data funds management and others, the Secretariat is dedicating (apart from the usual preparation of the majority of the data sets required by each stock assessment) a lot of additional work to stock assessment activities, whether participating actively in the assessment or coordinating and managing external support to the SCRS work. In addition, the statistical work requested to the Secretariat, together with some lack of adherence to deadlines established for data submission, continues to constitute enormous amount of work for the Secretariat.

The Secretariat applied to the 2019 datasets reported, the SCRS filtering criteria to accept/reject statistical forms (2013 Report of the Sub-Committee on Statistics, Addendum 2 to Appendix 8, Filters 1 & 2) adopted in 2013. The results are based on total of 77 flags related to CPCs (51 CP + 1 CP [16 EU Member States] + 1 CP [4 UK Overseas Territories Member States] + 6 NCC) with reporting obligations. The forms submitted with errors that the Secretariat was unable to correct were considered unreported data and shall require CPC revisions.

**2.1 Basic Task 1 (T1FC and T1NC) and Task 2 (T2CE and T2SZ) statistics**

The Secretariat presented a summary of the 2019 data reporting status of the two datasets of Task 1 statistics, the Fleet Characteristics (T1FC), and, the Nominal Catches (T1NC) using the standard SCRS Report Cards (Table 1 and 2 of **Appendix 8**, respectively).

The T1FC electronic form (ST01) is used to collect information on individual vessels (sub-form ST01A) and summarized information for vessels less than 20 m LOA (sub-form ST01B). The overall reporting of T1FC for 2019 data was 69% (53 flags) in 2020, lower than the 75% (56 flags) observed in 2019. One flag reported after the submission deadline, and the Secretariat made corrections to the information reported by 4 flags CPCs.

The T1NC electronic form (ST02) has 2 sub-forms, ST02A used to report positive catches (landings, dead discards, and live releases), and ST02B used to report “zero” catches. The overall reporting of T1NC data for 2019 was 81% (62 flags) slightly lower than for 2018 data (64 flags corresponding to 84%). Four flags reported late, and the Secretariat made corrections to the datasets of 14 flags. Fifteen CPCs (19%) have yet to report their T1NC 2019 data. The Secretariat reminded the Sub-committee that the new ST02 form version (2020) incorporates two new fields aimed to report the conversion factors used to transform the landings and discards of each species, from product weight (head off, gutted, gilled and gutted, etc.) into round/live weight equivalent. Section 5.1 details the results of this new element.

The T2CE electronic form (ST03) has not suffered any major change in recent years. The T2CE report card is presented in Table 3 of **Appendix 8**. A total of 55 flags (71%), including 4 late reporting flags, reported T2CE. This represents an improvement compared to the 2019 data (49 flags corresponding to 55%). Twenty-two flag CPCs (29%) have yet to report T2CE data for 2019.

The T2SZ report card (containing data from both ST04 and ST05 electronic forms) is presented in Table 4 of **Appendix 8**. A total of 49 flag CPCs (64%), including 5 late reports, submitted 2019 size data. A total of 28 CPCs (36%) have yet to submit 2019 size data. The reporting ratio for 2018 and 2019 size data was similar but was significantly lower compared to 2017 (70%).

The Secretariat informed that 14 flags CPCs reported no fishing activity on ICCAT species (“0” catches in all species) for the 2019 calendar year. The list of flags with “0” catch reports is published in the Table 5 of **Appendix 8**, which presents a summarised view of all the Task 1 and Task 2 reporting status.

The Sub-Committee acknowledged that for the first time the ST02 form required CPCs to report the Conversion Factors used to transform product weight into round weight, and that this new requirement might have contributed to the reduction in data quality reporting. The Sub-Committee hopes that once all CPCs become familiar with this new data field in ST02 the data quality will once again improve. **Table 1** presents a summary of the conversion factors reported with the new ST02 form version (2019 data) by CPC and major species.

The Secretariat also informed the Sub-Committee that it still received ST forms with wrong ICCAT codes. The Sub-Committee inquired if the ST forms could be modified to return an error message when the wrong codes are used. The Secretariat informed the Sub-Committee that this is not possible as macros cannot be included in the electronic forms.

## **2.2 Tagging**

The different laboratories and scientific institutions conducting electronic tagging in the ICCAT Convention area reported a total of 165 releases and 11 recoveries made during the reporting period. With respect to the conventional tagging (summary in Table 7 of **Appendix 8**), a total of 122,772 tags were deployed and 18,262 were recovered during the reporting period. On the same period, the Secretariat distributed about 2,100 conventional tags, primarily under the tagging projects of the GBYP.

## **2.3 Complementary data obtained within ICCAT data collection and research programs (GBYP, AOTTP, EPBR, SMTYP and SRDCP)**

The data recovery activities made within ICCAT research programmes (GBYP, AOTTP, EPBR, SMTYP and SRDCP) have contributed historically with great improvements to the ICCAT fisheries statistics, in particular by recovering missing or incomplete catch series and biological samples.

Two major data recoveries were made during 2020 under these research programmes. The Italian data recovery on Mediterranean swordfish (SCRS/2020/020) covering the period 1972-1991 and various gears, and the Côte d’Ivoire artisanal fishery (SCRS/2020/022) focused on gillnets. The datasets recovered were

revised, adopted intersessionally during the swordfish species group, and integrated into the ICCAT databases. All historical revisions made during the reporting period, are presented in Table 13 (T1NC), Table 16 (T2CE), and Table 17 (T2SZ) of **Appendix 8**, which also contains the supported SCRS documents and the adoption status of the respective Species Group.

The Secretariat and the GBYP already finished the consolidation of the stereoscopic cameras size data (period 2014 to 2018). This information was adopted by the bluefin tuna Species Group and used in the 2020 Stock Assessment.

To be included in ICCAT-DB is the information recovered under the 2016 Spanish artisanal Mediterranean small tuna fisheries historical data recovery (SCRS/2017/004). The Secretariat is working with the EU-Spain scientists on the best way to classify that information with ICCAT gear codes.

#### **2.4 Other relevant statistics (observer data, VMS, BCDs, ISSF, etc.)**

Domestic Observer data is compiled using form ST09. The 2020's version (adopted in 2019) has now merged the information collected by form ST11 (metadata on domestic Observer programmes). The Secretariat indicated that for 2019, 21 CPCs reported observer data using the revised ST09 form (**Addendum 4** of **Appendix 8**). Table 9 of **Appendix 8** provides a summary of ST09-DomObPrg data reported for 2019 by discard fate and Species Group including sharks, sea turtles and seabirds. Table 10 of **Appendix 8** contains T1NC data for by-catch species for 2019. A summary of the information submitted on ST09 forms for seabirds is provided in Table 12 of **Appendix 8**.

The Sub-Committee extensively discussed the latest format of ST09, in particular the requirement to provide LOA information and the spatial resolution of 5x5 degrees. It was pointed out that making the reporting of LOA mandatory and the 5x5 spatial resolution preclude CPCs with domestic confidentiality to report a significant proportion of their data. As such, the Sub-Committee proposed that data could be reported at a spatial resolution of 10x10 degrees and the reporting of LOA be made optional, these modifications should be reviewed by the SC-ECO (see Section 8.3).

As has already been recognized by the Sub-committee on Ecosystems, this Sub-committee once again reminds CPCs of their obligations to report by-catch data collected by their observer programs.

ISSF participating companies continue to provide the Secretariat with detailed information on catches (by vessel trip, species and commercial size category) from all their purchases. These correspond to unloading of catches from tropical tunas (bigeye, yellowfin, skipjack) and albacore to canning plants around the world. This information has previously been used by the SCRS. In 2019, the Secretariat was informed by ISSF that the Secretariat of the Pacific Community (SPC, Science Provider to WCPFC) receives the same types of data files from ISSF participating companies as the ICCAT Secretariat does. SPC has developed code to semi-automatically input the data into their database. SPC has expressed willingness to process the ICCAT data, at no cost to ICCAT, and export them into a format that the Secretariat can effectively use. The Secretariat has already contacted the SPC and this work was planned to start during 2020. In 2019, ISSF also informed that it has amended its requirement for cannery data submissions to RFMOs, so that a single data reporting format must be used starting in 2020. This should solve the problem found with multiple submission formats.

#### **2.5 Historical revisions**

Document SCRS/2020/130 presented a revised time series of U.S. recreational landings for the period 2010 to 2013. This document describes the new methodology that was applied to update recreational landings of highly migratory species other than blue and white marlin, sailfish, swordfish and bluefin tuna. The Sub-committee reviewed and discussed the new information presented by the U.S. and it agreed to officially include the new time series of landings in the ICCAT-DB.

Document SCRS/2020/141 presented revised and updated catches of dolphinfish by the Venezuelan fishing fleets. The information provided covers from 1985 through 2019. The Sub-Committee also agreed to officially incorporate these new data into the ICCAT-DB.

The Sub-Committee discussed these 2 historical revisions and recommended that the Secretariat permanently incorporate them into the ICCAT-DB.

All the other T1NC, T2CE and T2SZ dataset revisions (details in Tables 13, 16 and 17 of **Appendix 8**, respectively) were presented and approved by the respective Species Groups during the 2020 intersessional meetings (SWO, POR, ALB, and BFT).

### **3. Summary of Secretariat's standard (yearly based) data sets estimations**

#### **3.1 CATDIS and EFFDIS**

The CATDIS update, covering the period 1950 to 2018, was postponed to October 2020 due to lack of time. This will also delay the ICCAT annual Statistical Bulletin, which is planned to be completed by the end of October. As in previous estimations, it will not include the estimations of spearfish (SPF), blue shark (BSH), shortfin mako (SMA), and porbeagle (POR) due to the lack of sufficient information in T2CE for those four species.

The Secretariat presented to the Sub-committee on Ecosystems in 2020 a new approach to estimate EFFDIS. The Sub-committee reviewed the progress made by the Secretariat and it concurred that the new estimation of EFFDIS is a significant improvement over the previous methodology.

The Sub-committee on Ecosystems recommended that the Secretariat presents the results of the new EFFDIS estimation to the Sub-committee on Statistics for its review and potential approval. However, given the particular circumstances under which the SCRS and the Secretariat have been working during this year, no progress on further developing EFFDIS has been made.

#### **3.2 CAS (catch-at-size) and CAA (catch-at-age)**

The catch-at-size (CAS) database is complete and fully functional with an active connection between the size data and the substitution tables used for the CAS estimation. This year, the Secretariat has made a full revision of Mediterranean swordfish (period 1972-2018) and a partial update to the bluefin tuna (Eastern/Western stocks) adding the period 2015-2018. Both estimations were used on the respective stock assessments.

### **4. Brief overview of data deficiencies pursuant to Recommendation by ICCAT on compliance with statistical reporting obligations [Rec. 05-09]**

#### **4.1 2019 Report cards with SCRS validation criteria (Filters 1 and 2)**

The Secretariat applied, for the seventh consecutive year, the SCRS filtering criteria (Filter 1 and 2, described in Addendum 2 to Appendix 8 of 2013 SCRS report, updated by the SCRS in 2016) to validate and accept Task 1 (form ST01 and ST02) and Task 2 (forms ST03, ST04 and ST05) statistics received under those official forms. The filtering criteria are also embedded (most updated SCRS version) in each one of these forms.

For 2019 data, Filter 1 was effectively applied, and the results are presented in the SCRS Report Cards (Tables 1, 2, 3, 4, and 5, with a summary in Figure 1 of **Appendix 8**). The "orange" cells indicate the datasets that have not passed Filter 1. However, the majority of the Task 1 forms rejected were corrected by the Secretariat and provisionally (marked for revision) integrated into the ICCAT database system (ICCAT-DB). As in 2019, Task 2 forms not passing Filter 1 were not corrected (left for posterior revisions with the respective CPCs). Filter 2 was used for testing purposes only (results were not presented to the SCRS). Both filters were used on every Task 1 and Task 2 dataset received (scenario 2, methodology described in Palma and Gallego, 2015<sup>1</sup>).

<sup>1</sup> Palma C. and Gallego J.L. 2015. Results of applying Filters 1 and 2 to the 2013 statistical data reported during 2014. ICCAT Col. Vol. Sci. Pap. 71(6): 3070-3084.

Although during the last 2 years the level of reporting has remained relatively constant, overall during the last seven years the Sub-committee and the Secretariat observed a steady improvements in aspects such as the level of reporting (CPCs reporting ratios), the reduction of “late-reporting”, and in the level of completeness of the forms (less errors) and level of detail of some information (in particular Task 2). This tool has proven to be very effective in imposing strict reporting obligations and minimum data quality standards that will benefit the work of ICCAT in the future.

#### **4.2 SCRS Score cards and catalogues of major ICCAT species (last 30 years)**

The SCRS catalogues, contribute to comply with Paragraph 1 of *Recommendation by ICCAT on compliance with statistical reporting obligations* [Rec. 05-09]. The Secretariat presented in Addendum 1 of **Appendix 8**, the Task 1 and Task 2 data SCRS catalogues for the major ICCAT species (1990 to 2019). The small tuna SCRS catalogues were also prepared by the Secretariat and made available to this meeting. The Sub-committee acknowledged that data submissions have greatly improved during the last decade. However, major deficiencies still exist for some ICCAT stocks particularly for the historical data. Once again, the Sub-committee agreed that this information should be reviewed by the Species Groups, in particular by those that are scheduled to conduct Stock Assessments in 2021.

*Recommendation by ICCAT on compliance with statistical reporting obligations* [Rec. 05-09] recognized the need to establish clear process and procedures to identify data gaps, particularly those that limit the ability of SCRS to conduct robust stock assessments and to find appropriate means to address those gaps and evaluate the effectiveness of the ICCAT conservation and management measures. Particularly to evaluate how reducing uncertainty can help reduce the risk of failing to meet management objectives.

The SCRS scorecard, in the format adopted by the SCRS in 2019, is presented in Table 6 of **Appendix 8**, with all the major ICCAT fisheries and covering the period 1990 to 2019.

The Sub-committee discussed the Secretariat’s proposal to publish the data catalogues in the web. The Sub-Committee agreed with the proposal and recommended to publish the data catalogues (See *Section 8.3*).

Despite the multiple recommendations made by the Sub-committee and different Species Groups the reporting of total dead discards and live releases (see *Section 2.4*) continues to be very poor which impact the estimates of total removal and total mortality needed to conduct robust stock assessments.

### **5. Brief overview of ICCAT Online Management System (IOMS) work**

#### **5.1 Progress on the work developed by the ICCAT Online Reporting Technology Working Group**

The ICCAT Online Reporting Technology Working Group (WG-TOR), whose mandate was established under *Recommendation by ICCAT for the Development of an Online Reporting System* [Rec. 16-19], and extended by the Commission in 2019 through the *Recommendation by ICCAT to continue the development of an integrated online reporting system* [Rec. 19-12], will govern all the IOMS implementation process. The WG-TOR did not meet during 2020, but it did maintain discussions through electronic communications.

#### **5.2 Progress on the work on the IOMS**

In May 2019, the Secretariat started the development of the IOMS (a system designed to manage online all the ICCAT data requirements). This is a long-term project that will entirely replace the current ICCAT data reporting system. The IOMS Phase 1 working prototype (core web application and entry portal to all the future modules/web-applications and a module to manage Sections II and III of the CPCs Annual Reports) was presented during the 2019 Commission meeting to a small group of participants. Right now, the Phase 1 development was already completed and the Phase 2 (with the development of new modules, starting by the vessel record manager) has already started. The continuous development of IOMS by the Secretariat, has not suffered major delays, considering that the WG-TOR intersessional meeting of 2020 was cancelled. However, the Secretariat informed the Sub-Committee that, the IOMS Phase 1 still has to be revised and approved by the WG-TOR before entering in production. In addition, the details of IOMS Phase 2 development (module priorities, major characteristics, roadmap, etc) also require a revision and approval of the WG-TOR.

This Sub-committee recognises the IOMS crucial importance in the future of ICCAT and reiterates the support for the IOMS implementation.

## 6. Data Dissemination Policy

The Subcommittee discussed the 'Data Dissemination Policy' document. After reviewing the text, the Sub-Committee endorsed the document only with a very minor change (see **Addendum 5 to Appendix 9, 2020 SCRS Advice to the Commission**).

## 7. Work plan for 2021

The following tasks represent continuous database improvements and maintenance that will continue during 2021 and beyond. The priority tasks (including the ones postponed in 2019/20) for 2021 include:

- Replace the stand-alone MS-ACCESS Task 2 databases on the web by SQLite equivalent ones.
- Improve the "client applications" that manage the databases of ICCAT-DB system.
- Continue the tagging database redesign, including the addition of the model structure for electronic tagging, TG forms standardization, and automatic data integration of TG forms.
- Continue the development of the GIS project (create a PostGIS server and geo-reference all the ICCAT data available in ICCAT-DB).
- The standardization of electronic forms of compliance and statistics for automatic data integration.
- The adaption of all the databases of ICCAT-DB to the ICCAT IOMS system.

## 8. Recommendations

### 8.1 Progress with prior year Recommendations of the Sub-Committee

- The Sub-committee recommends that the Secretariat adopt a new denomination of Task III, as the annual Task to handle (compile and manage) all the datasets (obtained using forms ST07, ST08, ST09, and ST10) that are not included in Task 1 and Task 2, except for the tagging data.

*Task completed.*

- The Sub-committee recommends that the Secretariat adopts 1 September as the end date of the reporting period. However, the official deadline for CPCs to report all required data to ICCAT continues to be 31 July.

*Task completed.* However, due to the 2020 exceptional circumstances for 2020 the "cut-off" date was advanced to 18 August 2020.

- The Sub-committee once again recommends that CPCs make an effort to provide 'fishing days' in their submission of the ST01A from (fleet characteristics).

*Partially completed.* Because not all the CPCs have reported the fishing days.

- The Sub-committee reminds CPCs that the submission of the ST01B sub-form is mandatory (fleet characteristics for vessels <20 m).

*Partially completed.* Because not all the CPCs have reported the fishing days for fishing activity differentiation.

- The Sub-committee reminds CPCs that the submission of the ST02Bsub-form (zero catch matrix) is mandatory *Resolution by ICCAT Establishing Guidelines for the Implementation of the Recommendation 11-15 by ICCAT on Penalties Applicable in the Case of Non-Fulfilment of Reporting Obligations* (Res. 15-09).

*Partially completed.* However, a slight improvement was observed in the number of CPCs reporting ST02B.

- The Sub-committee recommends that the species working groups provide the Secretariat with the range of lengths and weights that are considered biologically acceptable for each species.

*Pending.* Nothing was received from the species groups during 2020.

- The Sub-committee recommends the Secretariat to contact EU National Scientists to obtain a document to support the time series of BUM catches 1985-2013 by Guadeloupe-Martinique. Without such supporting document the data cannot be integrated into the ICCAT-DB.

*Pending.* For the second year, no SCRS document was yet received by EU-France overseas territories (Guadeloupe and Martinique). The Secretariat intends to contact again the EU-France scientists to obtain a response.

- The Sub-committee reminds CPCs of the previous recommendation that only the latest format of the electronic forms should be used to report data.

*Good progress in 2020.* Only two CPCs have reported old form version.

- The Sub-committee recommends that the different species working groups and sub-committees discuss if they have a need for the Secretariat to estimate CAS, CAA, and mean weights for their analyses. This discussion should be included as part of their workplans for 2020.

No work plan for 2020 included this item for discussion.

- The Sub-committee recommends that species working groups and CPCs review the CATDIS, particularly for historical periods and decide the time periods for which CATDIS should be estimated for.

*Work in progress.* The postponed (from June to October) CATDIS estimations will give additional time to the Secretariat to check the weaknesses of certain older decades by species (1950-2018), which can guide the decisions of the Species Groups.

- The Sub-committee recommends that the Secretariat present at the next meeting of SC-ECO an update on the progress made to estimate EFFDIS.

*Task completed.* The new methodological approach presented will required further studies and improvements in the future.

- The Sub-committee recommends that Species Groups do not request data from the previous years for stock assessments conducted before 31 July. This requests greatly increase the Secretariat's workload and the data reported are usually incomplete and, therefore, they are not included in the analyses.

*Improvements were made on this issue.* However, one Species Group still requested 2019 data for an intersessional meeting initially scheduled to take place in 2020.

#### Ongoing Tasks

- The Sub-committee reiterates previous recommendations for CPCs to review their T2SZ/CS data submission in particular for those species for which stock assessments will be conducted.

Some CPCs have conducted such review and some progress on this issue has been made.

- The Secretariat and the SCRS will compile the information and recommendations provided in the reports on artisanal fisheries in West Africa and in the Caribbean/Central America regions to prepare a work plan and provide recommendations to the Commission.

This work is in progress.

- The Sub-committee reiterates once again that CPCs have an obligation to report total discards and live releases. The Sub-committee also recommends that the SCRS explores ways to provide capacity building to those CPCs that need it to comply with the discard reporting requirements.

Very little progress has been made on the reporting of dead discards and live releases. In addition, the SCRS have not taken any steps towards improving CPCs' capabilities to estimate discards.

- The Sub-committee recommends that CPCs that report T2CE data for intersessional meetings for a particular species also include the full species catch composition in the T2CE data submitted by the deadline of 31 July.

The Secretariat informed the Sub-committee that this problem still persists.

- The Sub-committee reiterates its support for the developing of the ICCAT Integrated Online Management System (IOMS) and the work of the Online Reporting Technical Working Group. As such, the Sub-committee recommends that the Commission fully supports this effort.

The Commission is fully supporting the work of the *Online Reporting Technical Working Group*.

## **8.2 Review of Recommendations from 2020 inter-sessional meetings**

The Sub-committee reviewed the recommendations for statistics from the 2020 inter-sessional meetings. The following 3 recommendations were not endorsed by the Sub-committee in their original form and were modified (see *Section 8.3*).

- The Group recommended that the Sub-committee on Statistics should develop a workplan for the meta-database on biological sampling data and call it "Biological sampling data".
- The Group recommends that the Sub-committee on Statistics check with CPCs to identify what level of data resolution they consider confidential.
- The Group agreed that data from the domestic observer programs are essential for assessment and management purposes, as they can provide fine resolution information on undersized catches and discard rates by fishery. Regarding the reporting ST09 form for domestic observer program data the Group recommends: (a) to include the mesopelagic and American style longline in the gear selection list, (b) to clarify better the selection of depth range for the fishing operations, (c) to have all form to be completed without exclusion [remove the "optional" from sub-form C in ST09] and this data should be used exclusively for scientific purposes in line with Rec. [16-14].

The following recommendations were endorsed by the Sub-Committee:

### *8.2.1 SCRS Process and Protocol Meeting*

- The Sub-committee on Statistics should define with the Secretariat the standard structures for Task 3 datasets, with support vessels (ST07), PS FAD deployment (ST08) and Port sampling (ST10) having the same resolution and structure as Task 2, and study the feasibility of having an aggregated format to disseminate the domestic observer data (taking into account the new revision made to ST09).
- A decision on the "Proposal for Amendment of the Rules and Procedures for the protection, access to, and dissemination of data compiled by ICCAT", as described Appendix 11 to the *Report for Biennial Period 2018-2019, Part II (2019)*, Vol. 2, was deferred to the 2020 Sub-committee on Statistics meetings. Furthermore, the Group suggested that the list of issues regarding data dissemination be compiled and that the data dissemination policy be reviewed by the Species Group rapporteurs. The list of issues and the data dissemination policy would be discussed by the Sub-committee on Statistics for adoption during the 2020 SCRS plenary meeting.

### 8.2.2 Swordfish

- The Group recommends and reminds CPCs to submit their 2019 domestic (formerly National) Observer Program data on the 2020 ST09 form and to resubmit both the 2017-2018 data on the 2020 ST09 form, as well as any other un-submitted data to the Secretariat.
- The Group also recommends that the Secretariat provide the SCRS with an overview observers' data submitted to ICCAT by the CPCs after Recommendation by ICCA replacing the Recommendation [13-04] and Establishing a Multi-annual Recovery Plan for Mediterranean Swordfish [Rec. 16-05], independently from the format used to submit the data.
- The Group reminds CPCs that the reporting of discards is required and is essential to assessing the stock status of all swordfish stocks. This is particularly important for Mediterranean swordfish because dead discarded undersized swordfish could be a large component of the fishing mortality.
- The latest Chinese Taipei full revision to their swordfish Task II size frequencies (reported on March 2017) did not contain individuals below 120 cm in size (LJFL). The Group recommends that Chinese Taipei once again report the Task II size frequencies (since 1980) to ICCA, with the inclusion this time of the swordfish samples with LJFL below 120 cm (landed and/or discarded).

### 8.2.3 SC-ECO

- In order for ICCAT to evaluate the effectiveness of its conservation measure in reducing seabird bycatch (Rec. 11-09), data on the use of these mitigation measures, and the combinations of measures used, should be collected, and made available. Both Recommendation 11-09 and 10-10 require such information to be collected and reported.

### 8.2.4 Mediterranean Swordfish

- The Group has noted important improvements in historical T1 and T2 data when comparing to the information available in the 2016 assessment (Anon., 2017). However, the available CPUE data for the earlier period are still limited. Therefore, the early period of the fisheries cannot be fully accounted in the stock assessment models. As such, the Group recommended conducting a recovery of historical data, so that the entire history of the fishery is taken into account when assessing the stock. Particular effort should be dedicated to collecting available information from the major fisheries of the early years, with focus in fisheries with limited data. [*Estimated cost*: €10,000; *Priority*: medium given that will be used for next assessment (priority level to be revised)].

### 8.2.5 Albacore

- The Committee recommends conducting a review and collation of all the available data on age-length from the various studies that have estimated age from spines with the view to update the estimate of the growth curve for Mediterranean albacore. It is also recommended that methods of accounting for selectivity in the year 1 cohort in von Bertalanffy growth function (VBGF) be explored to ensure accurate parameter estimation.
- The Group recommends that, the Secretariat work together with the Statistical Correspondents of ICCAT CPCs having gaps or incomplete Task 1 and Task 2 datasets identified in the three albacore SCRS catalogues (respectively stocks: ALB-N, ALB-S, ALB-M in Tables 3, 4, and 5), to recover and report those missing datasets to ICCAT, foreseeing the 2021 ALB intersessional meeting.

## 8.3 Future Recommendations

### 8.3.1 Recommendations without financial implications

1. The Sub-committee recommends that SC-ECO review the ST09 form to determine if reporting at spatial resolution of 10x10 degrees would be acceptable for use by those CPCs constrained by domestic confidentiality regulations if a requirement to report in smaller areas would result in a substantial proportion of data not being reported.

2. The Sub-committee also recommends that SC-ECO review the ST09 form to determine if the reporting of the vessel size class (LOA) field could be optional instead of mandatory if a requirement to report this field would result in a substantial proportion of data not being reported by those CPCs with domestic confidentiality regulations.
3. The Sub-committee recommends that the Secretariat includes a 'yes/no' question in the ST09A subform for CPCs to declare if they have an observer program.
4. The Sub-committee recommends that the Secretariat continues the development of EFFDIS and present any updates at the next meeting of the SC-ECO.
5. The Sub-committee recommends that the Secretariat publishes Major Shark and Major Tunas as well as Major Small Tuna species' data catalogues for CPCs on the ICCAT website using the same data publication procedure and frequency as for Task 1 and 2.
6. The Sub-Committee recommends that the Secretariat distribute the existing Confidentiality Questionnaire Form among CPCs for their review and update.
7. The Sub-Committee recommends that the Secretariat in coordination with the WGs prepare a draft proposal for a workplan to guide the development of the Task 3 Biological database that will be presented at the next meeting of the Sub-Committee.
8. The Sub-Committee recommends that the Secretariat prepare and make readily available the list of head of scientific delegations including their contact information and maintain it as a living document.
9. The Sub-Committee recommends that the Secretariat include 'mesopelagic' and 'American-style' longline gear categories into the ICCAT database system and update all statistical (ST) forms with the corresponding codes in the 2021 versions.
10. The Sub-Committee recommends that the Secretariat includes 'hooks per basket' in the definition of 'Fishing Operation Depth' on the ST09A form.
11. The Sub-Committee recommends that the SC-ECO provides guidance on the use of the ST09C subform, the species for which the reporting of this information is desirable, and if the use of the ST09C should be mandatory or remain optional.
12. The Sub-Committee recommends that CPCs recover historical catch and effort data and apply the proper units of effort (i.e., number of hooks) and provide information on the type of longline gear deployed (i.e., American style or mesopelagic).
13. The Sub-committee once again recommends that the species working groups provide the Secretariat with the range of lengths and weights that are considered biologically acceptable for each species.

### *8.3.2 Recommendations with financial implications*

In recent years, there has been an increased workload in the Science and Statistics Department, which has led two crucial long-term projects recommended by the SCRS to be postponed for more than 6 years. Accordingly, a new database developer shall be hired to: i) geo-reference all the fisheries statistics; ii) develop and maintain electronic tagging and biological sampling databases. This position is essential for the Secretariat to provide high-quality information available on electronic tagging and biological sampling to the SCRS, otherwise this will be detrimental for scientific advice. To overcome this issue, the Sub-Committee recommends that the Commission provide the necessary means to hire a database expert to the Secretariat.

## **13. Adoption of the report and closure**

The Chair thanked the participants for their attendance to the meeting and he thanked the Secretariat staff for their continued support of the Sub-committee's work. The Sub-committee acknowledged how difficult its work would be without the full assistance of the Secretariat.

The report of the meeting was adopted by correspondence.

**Table 1.** Conversion factors reported in T1NC for 2019 (only when  $\leq 1$ ).

PartyStatus	Flag	CatchTypeCode	1-Tuna (major sp.)										2-Tuna (small)		3-Tuna (other)			4-Sharks (major)		
			ALB	BET	BFT	BUM	SAI	SKJ	SPF	SWO	WHM	YFT	DOL	WAH	MLS	SBF	SSP	BSH	POR	SMA
CP	Canada	L	1.25	1.3	1.3	1.2				1.33	1.2	1.3	1.25					1.22	1.7	1.48
	EU.Cyprus	L			1.1					1.12										
	EU.Greece	L								1.13										
	EU.Malta	L			1.3															
	Japan (*)	L		101	1.2	105	107		108	103	104	102				1.2		2.1		1.6
	Korea Rep.	L		1.1	1.2	1.2	1.2			1.33	1.2	1.1			1.2	1.2				
	Norway	L			1.1															
	South Africa	L	1.13	1.1						1.32		1.1						2.4		1.46
	Trinidad and Tobago	L		1.1			1.2			1.33		1.1								
	U.S.A.	L	1.25	1.3	1.3			1.3		1.33		1.3							1.46	1.46
	UK.Sta Helena	L		1.1		1.2						1.1		1.2						1.16
NCC	Chinese Taipei	L		1.1		1.2	1.2		1.2	1.3	1.2	1.1					1.2	1.54		1.54

(\*) Japan used a  $y=a+bc$  linear equation (not forced to zero) as shown below:

CnvFactorID	CfEquation	CfEquationType	Param_A	Param_B
<100	Various (B) (a=0)	linear (y=bx)	0	1=< b <= 2.4
101	BET: $WW=1.133*PW+2.980$	linear (y=a+bx)	2.98	1.133
102	YFT: $WW=1.100*PW+3.698$	linear (y=a+bx)	3.698	1.1
103	SWO: $WW=1.584*PW-0.479$	linear (y=a+bx)	-0.479	1.584
104	WHM: $WW=1.098*PW+3.655$	linear (y=a+bx)	3.655	1.098
105	BUM: $WW=1.159*PW+1.834$	linear (y=a+bx)	1.834	1.159
107	SAI: $WW=0.793*PW+6.938$	linear (y=a+bx)	6.938	0.793
108	SPF: $WW=1.157*PW+5.517$	linear (y=a+bx)	5.517	1.157

***Addendum 1 to Appendix 9***

**Agenda**

1. Opening, adoption of Agenda and meeting arrangements
2. Summary of fisheries and biological data submitted during 2020, including historical Task 1, 2 and 3 revisions
3. Summary of Secretariat's standard (yearly based) datasets estimations
4. Brief overview of data deficiencies pursuant to Rec. 05-09
5. Brief overview of ICCAT Online Management System (IOMS) work
6. Data dissemination policy
7. Work plan for 2021
8. Recommendations (with special emphasis on those with financial implications)
9. Adoption of the report

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**Addendum 3 to Appendix 9****List of documents**

<b>Reference</b>	<b>Title</b>	<b>Authors</b>
SCRS/2020/130	Revised time series of U.S. recreational landings 2010-2013	Cass-Calay S.L., and Diaz G.A.
SCRS/2020/141	Revised and updated catches of the Common dolphinfish ( <i>Coryphaena hippurus</i> ) from Venezuelan fisheries	Arocha F., Gutierrez X., and Evaristo E.

**Addendum 4 to Appendix 9****Summaries as presented by the authors**

*SCRS/2020/130*: In 2006, the U.S. National Research Council (NRC) conducted a comprehensive review of the methods used to estimate recreational landings. During this review, a number of fundamental changes to NOAA Fisheries data collection techniques were recommended. Between 2008 and 2015, NOAA Fisheries conducted six pilot studies to identify a more accurate and efficient way to estimate recreational fishing effort. Pilot studies supported the use of a mail-based survey (FES) over the Coastal Household Telephone Survey (CHTS) which had previously been used to estimate recreational fishing effort and catch. In 2018, the FES survey officially replaced the CHTS, and all recreational catch estimates were adjusted. This document describes the new methodology that was applied to update recreational landings of highly migratory species other than blue and white marlin, sailfish, swordfish and bluefin tuna for years 2010-2013. The magnitude of the change of the estimated landings varied by species and by year.

*SCRS/2020/141*: The main landed catch of Common dolphinfish (*Coryphaena hippurus*) exploited by Venezuela is primarily caught by artisanal fisheries operating with two types of fleets; in addition to a small fraction landed by the tuna fishery (from pelagic longline) as part of the commercial by-catch which has been reported to ICCAT. The present document intends to update the historical Venezuela's landed catch of dolphinfish (DOL) using National Official Statistics under the current responsibility of the *Instituto Socialista de la Pesca y Acuicultura* (INSOPESCA) and disaggregate the reported landed catch by the fisheries that target and catches dolphinfish as by-catch in tuna and tune-like related fisheries.

**Addendum 5 to Appendix 9****Proposal for amendment of the rules and procedures for the protection, access to, and dissemination of data compiled by ICCAT**

This is an addendum to Annex 6 of the ICCAT Report for biennial period, 2010-2011, Part I (2010) – Vol. 1, “Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled by ICCAT”. This amendment aims to clarify the rules and procedures that apply to data collected by entities contracted under ICCAT research and data collection programmes. As ICCAT and the SCRS continue to promote Scientific Research of ICCAT species through the participation of CPCs, national scientist and Academic and Research Centres, it is important that rules and procedures be defined to ensure that data collected under these research programs are properly evaluated and effectively used for scientific advice.

**ANNEX 6****RULES AND PROCEDURES FOR THE PROTECTION, ACCESS TO, AND DISSEMINATION OF DATA COMPILED BY ICCAT****1. Basic principles relating to the dissemination of data by the ICCAT**

1. Data and information held by the ICCAT Commission or Secretariat, and by service providers or contractors acting on their behalf, shall only be released in accordance with these Rules and Procedures; which reflect the policies of confidentiality and security determined by the Commission.
2. Data may be disseminated if the CPC (Contracting Party or Cooperating non-Contracting Party, Entity or Fishing Entity) providing the data to the ICCAT authorizes its release.
3. Persons duly authorized by the Executive Secretary within the ICCAT Secretariat and service providers, who have read and signed the Commission’s confidentiality protocol, shall have access to the data necessary to perform their ICCAT duties.
4. Officers of the Commission and its subsidiary bodies shall have access to the data necessary to perform their ICCAT duties.
5. CPCs shall have access to data to serve the purposes of the Convention, including data:
  - a) covering vessels flying their flag in the ICCAT Convention area.
  - b) covering any vessels fishing in waters under their jurisdiction.
  - c) covering vessels applying to fish in their national waters, unloading in their ports or transshipping fish within waters under their jurisdiction.
  - d) for the purpose of compliance and enforcement activities on the high seas, consistent with the Convention and the conservation and management measures and other relevant decisions adopted by the Commission, subject to the rules and procedures for access and dissemination of such data that the Commission will adopt under paragraph 23.
  - e) for the purpose of scientific and other research, if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision.
6. To the greatest extent practical, the ICCAT Commission, Secretariat and their service providers, should disseminate data in a timely manner.

**2. Risk classification and definition of confidentiality**

7. Data covered by these Rules and Procedures will be classified in accordance with the risk classification methodology included in **Table 1**, which reflects *inter alia* the damage that would be done to the operations or creditability of the Commission as a consequence of the unauthorized disclosure or modification of such information.

8. Data covered by these Rules and Procedures were determined to be either public domain or non-public domain data in accordance with the definition of confidentiality established in **Table 1**.

*8 (bis) Clarification for data arising from ICCAT Research and Data Collection Programmes*

Associated conventional tagging data: examples: Tag shedding and Tag seeding data are classified as no risk and thus fall under the public domain data category. Associated conventional tagging data includes species, seeding and recovery dates and positions, gear type, flag, and fish information where available. Associated conventional tagging data in this context does not include information identifying the fishing vessel that reported the tag, for example, which would otherwise alter its security classification.

Biological data resulting from ICCAT Research and Data Collection Programmes are classified as medium risk and thus fall under the non-public domain data category. This should include biological samples and initial results from the analyses of such samples; for ageing, genetic, maturity and reproductive studies, stock identification samples such as microconstituents, parasites, stomach content, muscle or any other biological tissue used for scientific analyses.

Fisheries independent indices including aerial surveys, larval sampling, acoustic sonar data, video recording, and sampling from scientific based observer programs are classified as medium risk and thus fall under the non-public domain data category.

All other data types follow the definitions and classification rules outlined in **Table 1 and 2**.

### 3. Dissemination of public domain data

9. Data in the public domain shall not reveal the individual activities of any vessel, company or person and shall not contain private information. Catch and effort data in the public domain shall be aggregated by flag, gear, month and 1° x 1° grid (for surface fisheries) or 5°x5° grid (for longline fisheries).
10. Annual catch estimates and aggregated catch and effort data that can be used to identify the activities of any vessel, company or person are not in the public domain.
11. Except for data as described in Paragraphs 9 and 10, the types of data listed in **Appendix 1 to ANNEX 6** have been designated to be public domain data.
12. Public Domain data shall be available to any persons for (a) downloading from the Commission's website and/or (b) release by the Commission on request.
13. The website should contain a statement describing the conditions associated with the viewing or downloading of public domain data (for example, that the source of the data must be acknowledged), and should require the person requesting the data to "Accept" these conditions before viewing or downloading can begin.

13 (bis) Public domain data collected by entities contracted by ICCAT research and data collection programmes (e.g. conventional tagging) shall be quality controlled and uploaded to the ICCAT website by the Secretariat, on an annual basis. Immediate access to the most up to date quality-controlled data will be granted to respective SCRS working groups and participants of workshops organized by the research programme in question (e.g. capacity building workshops). Any other users wishing to access such data must follow the procedure outlined in section 17bis (c) below.

### 4. Dissemination of non-public domain data

#### 4.1 Definition of non-public domain data

14. Subject to the decisions of the Commission, all types of data not described in paragraph 11 shall be referred to as non-public domain data.

15. A list of examples of non-public domain data can be found in **Appendix 2 to ANNEX 6**.

#### **4.2 General rules for dissemination of, and access to, non-public domain data**

16. Access to and dissemination of non-public domain data shall be authorized in accordance with these Rules and Procedures and the policies of confidentiality and security established in the Commission's Information Security Policy (ISP).

17. The ICCAT Secretariat shall log and report to the Commission all access and dissemination of non-public domain data, including the name and affiliation of the person, the type of data accessed or disseminated, the purpose for which the data were requested, the date when the data were requested, the date when the data were released and authorizations that may have been required.

#### **17 (bis) In the case data gathered within ICCAT Research and Data Collection Programmes:**

a) Data will be accessible, once checked by ICCAT staff for quality control, to related SCRS subsidiary body (e.g. Species group) and the research teams directly involved in data generation, authorizing their use for scientific purposes as stipulated by the terms of the contract related to the collection of these data.

b) Metadata relating to such data should be periodically updated on the ICCAT website.

c) Data requests may be submitted by any person(s) or institutions(s) using the form found in this Addendum. Each request will be considered by an evaluation committee (composed of the Chair and Vice Chair of the SCRS, Rapporteur of the respective Species Group, and programme Coordinator if still available) to guarantee adherence to the ICCAT Publication Policy and alignment with the respective research programme priorities. The Evaluation Committee will consult with the data provider(s) to decide whether to authorize the data request. If the data provider(s) confirm that there is no conflict of interest, the data will be released after signing the Confidentiality Agreement (**Attachment 2 to Appendix 3 of ANNEX 6**). Should the data provider(s) seek preferential use of the data, this request will be considered and maybe granted up to a period of two years, or for the period of time specifically agreed in the contract. The Secretariat will be responsible for coordinating and facilitating this process. The Evaluation Committee will strive to return a decision within 30 days of the request. The Secretariat will provide to the SCRS Plenary meeting a list of data requests and decisions in the annual report of activities.

#### **4.3 Access to non-public domain data by the Staff of the Secretariat, the ICCAT service providers, and Officers of the Commission and its subsidiary bodies**

18. Persons duly authorized by the Executive Secretary, within the ICCAT Secretariat and service providers, including scientific experts within the SCRS, shall have access to the data necessary to perform their ICCAT duties. Officers of the Commission and its subsidiary bodies shall have access to the data necessary to perform their ICCAT duties. All such persons shall sign a Confidentiality Agreement with the Executive Secretary and maintain the data security standards of the Commission in respect of data to which they have access. The Executive Secretary shall maintain a register of all such persons (including the purpose for which they require access to the data) and make the register available to a CPC on written request.

#### **4.4 Access to non-public domain data by CPCs**

19. CPCs shall have access to non-public domain data to serve the purposes of the Convention, including data:

- a) Covering vessels flying their flag in the ICCAT Convention area
- b) Covering any vessels fishing in waters under their jurisdiction
- c) Covering vessels applying to fish in their national waters, unloading in their ports or transshipping fish within waters under their jurisdiction
- d) For the purpose of scientific and other research, if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision.

20. CPCs shall notify the Secretariat of a small number of representatives (preferably only 2) authorized to receive non-public domain data. Such notification will include name, affiliation, and contact information (e.g. telephone, facsimile, email address). The ICCAT Secretariat will maintain a list of such authorized representatives. CPCs and the Secretariat shall ensure the list of CPC representatives is kept up to date and made available.
21. The authorized representative(s) of the CPCs are responsible for ensuring the confidentiality and security of the non-public domain data according to its risk classification and in a manner consistent with security standards established by the Commission for the ICCAT Secretariat.
22. The non-public domain data described in paragraph 19 will be made available by the Secretariat to authorized representatives of the CPCs for release by the Commission on request and, where appropriate, downloading from the Commission's website in accordance with the Commission's ISP.
23. For the purpose of compliance and enforcement activities on the high seas, non-public domain data will be made available subject to separate rules and procedures for the access and dissemination of such data, that the Commission will adopt for these purposes.
24. VMS data will be made available for scientific purposes, subject to the separate rules and procedures referred to in paragraph 23 above.
25. Access to non-public domain data by CPCs shall be administered by the Executive Secretary on the basis of these Rules and Procedures and the framework at **Appendix 3 to ANNEX 6**.
26. The Executive Secretary will implement the Framework and authorize access to and dissemination of non-public domain data.
27. Unless otherwise decided by the Member or CPC responsible for its external affairs, participating Territories shall have the same access rights to data as CPCs.
28. A CPC that has not fulfilled its obligations to provide data to the Commission for two consecutive years shall not be granted access to Non-Public Domain data until all such matters are rectified. A CPC whose representative, authorized in accordance with paragraphs 20 and 21 above, failed to observe the rules stipulated in these Rules and Procedures shall not be granted access to Non-Public Domain data until the appropriate actions have been taken.

#### ***4.5 Exchange of data with other regional fisheries management organizations***

29. If the Commission enters into agreements for the exchange of data with other regional fisheries management organizations (RFMOs) or other organizations, such agreements must include requirements that the other RFMO provides equivalent data on a reciprocal basis and maintains the data provided to them in a manner consistent with the security standards established by the Commission. The data that may be exchanged is specified in **Appendix 4 to ANNEX 6**. At each annual session the Executive Secretary will provide copies of data exchange agreements that exist with other RFMOs and a summary of the data exchanges that occurred during the previous 12 months under such agreements.

#### ***4.6 Disseminations of non-public domain data in other circumstances***

30. Non-Public Domain data will be made available by the Secretariat to any persons if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision. Unless otherwise requested by the provider of the data:

Including universities, researchers, NGOs, media, consultants, industry, federations, etc.

- a) Persons that request non-public domain data shall complete and sign the Data Request Form and sign the Confidentiality Agreement and provide them to the Commission in advance of obtaining access to said data.
- b) The Data Request Form and Confidentiality Agreement shall then be forwarded to the CPC that originally provided the requested data and the provider shall be requested to authorize the Commission to release the data.
- c) Such persons shall also agree to maintain the data requested in a manner consistent with the security standards established by the Commission for the ICCAT Secretariat.

31. CPCs that have provided non-public domain data to the Commission shall notify the Secretariat regarding their representatives with the authority to authorize the release of non-public domain data by the Commission. Decisions whether to authorize the release of such data shall be made in a timely manner.

#### **4.7 Force majeure**

32. The Executive Secretary may authorize the release of Non-Public Domain data to rescue agencies in cases of *force majeure* in which the safety of life at sea is at risk.

#### **5. Periodic Review**

33. The Commission or its subsidiary bodies will periodically review these Rules and Procedures, and subsidiary documents, and the rules and procedures referred to in paragraphs 23 and 24 above and amend these if necessary.

#### **6. Final Clause**

34. These Rules and Procedures do not prevent a CPC from authorizing the release of any data it has provided to the ICCAT.

**Table 1.** Types of information and confidentiality classification. Certain types of information such as Task I and Task II already have mandatory reporting and are publicly available through the ICCAT web site and the ICCAT *Statistical Bulletin*.

<i>Information Type</i>	<i>Risk Classification</i>
Operational level catch and effort data (e.g. set-by-set CPUE)	High
Annual catch estimates stratified by gear/flag and species for the ICCAT statistical areas (Task I)	mandatory reporting already in place
Aggregated catch and effort data stratified by gear/year/month, 5x5 (LL) or 1x1 (surface), and flag (Task II catch/effort)	mandatory reporting already in place
Records of vessel unloading and logbooks	Medium
Transshipment consignments by species	Medium
Biological data ( <u>after the period set in article 17bis c</u> )	mandatory reporting already in place
Conventional tagging data	No risk
Detailed electronic tagging data	Medium
ICCAT Record of Fishing Vessels (vessels authorized to fish; vessels authorized to transport; support vessels; carrier vessels)	mandatory reporting already in place
Vessel and gear attributes from other open sources	No risk
Oceanographic and meteorological data	No risk
Movements of fishing vessels recorded at a fine resolution/VMS vessel position, direction and speed	High
Boarding and Inspection Reports	High
Certified observer personnel	Medium
Certified inspection personnel	High
Catch Documentation Scheme	Medium
Port State Inspection Reports	Medium
Violations and infringements, detailed	High
Annual number of active vessels, by gear type and flag	mandatory reporting already in place
Economic data	[unassigned]
[Social data]	[unassigned]
Fisheries intelligence-sharing information	High
Weekly catch reports	High
Caging declarations	Medium

**Table 2.** Annotations on information types mentioned in **Table 1.**

<i>Information Type</i>	<i>Annotations</i>
Operational level Catch Effort data	Collected on fishing vessel logbooks and by observers.
Compliance-related observer data	Excludes operational catch and effort data, biological data and vessel and gear attributes.
Biological data	Biological data include size data, data on gender and maturity, genetic data, data on hard parts such as otoliths, stomach contents, and isotopic N15/C14 data collected by observers, port samplers and other sources. “Biological data” in this context does not include information identifying the fishing vessel, for example, which would otherwise alter its security classification.
Conventional tagging data	Conventional tagging data include species, release and recapture positions, lengths and dates. “Tagging data” in this context does not include information identifying the fishing vessel that recaptured the tagged tuna, for example, which would otherwise alter its security classification.
Electronic tagging data	Detailed electronic tagging data include detailed records from pop-up or archival tags such as date, time, depth, temperature, light intensity, etc.
ICCAT Record of Vessels	Covers vessels authorized to fish in the ICCAT Convention area also covers records of transport and other types of vessels
Vessel and gear attributes from other sources	Includes data collected by observers and port inspectors. Covers all vessels (i.e. includes vessels restricted to national jurisdiction–domestic fleets). Includes electronic equipment.
Oceanographic and meteorological data	“Oceanographic and meteorological data” in this context does not include information identifying the fishing vessel that collected the information, for example, which would otherwise alter its security classification.
Certified observer personnel	If identified by individual, then risk classification would be assigned to HIGH.
Certified inspection personnel	If identified by individual, then risk classification would be assigned to HIGH.
Violations and infringements, detailed	May cover individual violations and infringements pending investigation and/or prosecution. Summarized information included in Biannual ICCAT Report from CPCs. Includes compliance information collected by observers.
Economic data	Insufficient information currently available to determine Risk Classification.

**Public Domain Data**

The following types of data are considered to be in the public domain:

1. Annual catch estimates (Task I) stratified by gear, flag and species for the ICCAT statistical area;
2. The annual numbers of vessels active in the ICCAT Convention area stratified by gear type and flag;
3. Catch and effort/data (Task II) aggregated by gear type, flag, year/month and, for longline, 5° latitude and 5° longitude, and, for surface gear types, 1° latitude and 1° longitude – and made up of observations from a minimum of three vessels;
4. Biological data (after the period set in article 17bis c);
5. Conventional tagging data;
6. The ICCAT Records of Fishing Vessels;
7. Information on vessel and gear attributes;
8. Any vessel record established for the purpose of the Commission's VMS;
9. Oceanographic and meteorological data;
10. [Social data].

**Examples of Non-Public Domain Data**

The following are examples of types of data considered to be Non-Public Domain:

1. Operational level catch-effort data (detailed set-by-set information)
2. Records of vessel unloading
3. Transshipment consignments by species
4. Data describing (at a fine resolution) the movement of vessels including near- real time Commission VMS data (vessel position, direction and speed)
5. Boarding and Inspection Reports
6. Certified inspection personnel
7. Raw data from any Catch Documentation Scheme or Trade Documentation Scheme
8. Port State Inspection Reports
9. Violations and infringements, detailed
10. Economic data
11. Fisheries intelligence-sharing information
12. Detailed electronic tagging data
13. Data that reveal the individual activities of any vessel, company or person, including caging declarations and weekly catch reports.

### Framework for Access to Non-Public Domain Data

1. In accordance with the policies for data protection, security and confidentiality established by the Commission's Information Security Policy (ISP), a Contracting Party or non-Contracting Cooperating Entity or Fishing Entity (CPC) shall have access to non-public domain data types covering describing the activities of any vessels:
  - a) covering vessels flying their flag in the ICCAT Convention area or;
  - b) covering any vessels fishing in waters under their national jurisdiction or;
  - c) covering vessels applying to fish in their national waters, unloading in their ports or transshipping fish within waters under their national jurisdiction;
  - d) for the purpose of scientific and other research, if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision.
2. For the purposes of compliance and enforcement activities on the high seas, non-public domain data will be made available subject to separate rules and procedures for the access and dissemination of such data, that the Commission will adopt for these purposes. VMS data will be made available for scientific purposes, subject to these same separate rules and procedures.
3. In regard to paragraph 1:
  - a) CPCs shall provide a written request for access to such data to the Executive Secretary, specifying the purpose of the Convention by reference to the relevant article(s). In so doing, CPCs shall use the Commission Data Request Form (**Attachment 1 to Appendix 3 to ANNEX 6**).
  - b) The CPC shall undertake to only use such data for the purpose described in the written request. The CPC shall also complete and sign the Commission Confidentiality Agreement (**Attachment 2 to Appendix 3 to ANNEX 6**).
  - c) The Executive Secretary shall not authorize the release of more data than is necessary to achieve the purpose described in the written request.
4. The Executive Secretary shall not authorize access to non-public domain data by any CPC that has not fulfilled its obligations to provide data to the Commission for two consecutive years until all such matters are rectified. The Executive Secretary also shall not authorize access to a CPC whose authorized representative failed to observe the Rules and Procedures for the Protection, Access to and Dissemination of Data Compiled by the Commission until the CPC informs the Executive Secretary that appropriate actions have been taken.
5. The Executive Secretary may attach conditions appropriate for the access to such data (such as that the data be deleted upon achievement of the purpose for which it was released or by a pre-determined date, that a register of persons accessing the data be maintained and furnished to the Commission upon request, etc.)
6. Requests may be made for a standing authorization, such that CPCs may have multiple accesses to the requested data for the same purpose as of the original written request.
7. Dissatisfaction with the Executive Secretary's decisions in regard to access to non-public domain data by CPCs shall be resolved by the Commission Chairman.

**Data Request Form**

**To the Executive Secretary of the International Commission for the Conservation of Atlantic Tunas (ICCAT)**

I wish to submit the following request to receive and analyse data collected by ICCAT. I have read the above Data Policy, noting in particular, the matters relating to data confidentiality and usage specified in Annex 6 of the ICCAT REPORT for biennial period, 2010-2011, Part I (2010) – Vol. 1, “Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled By ICCAT”, and providing an appropriate acknowledgement in the case of any publications arising from the use of these data, and agree to all the conditions listed.

<p><b><u>Name of the person(s) or institution(s) requesting the data and contact details</u></b></p>
<p><b><u>Purpose/Project outline</u></b>  <i>If non-public domain data are being requested, the use of the data shall be authorized only for the purpose described below.</i></p>
<p><b><u>Data requested</u></b>  <i>If applicable, the specification of data being requested should refer to the type of data and any parameters relevant to the type of data, which may include, inter alia, the gear types, time periods, geographic areas and fishing nations covered, and the level of stratification of each parameter.</i></p>
<p><b><u>Name(s), job title(s) and affiliation(s) of the person(s) requesting access to the data; the use of the non-public domain data shall be authorized only for the person(s) listed.</u></b>  <i>Note, the Secretariat expects to be informed of any changes to the data users list.</i></p>
<p><b><u>Intentions with respect to publication of the results of the proposed work</u></b></p>

Signature and date: \_\_\_\_\_

Name:

Position:

Organisation:

Approved / Not Approved

Signature and date:

### Confidentiality Agreement

Confidentiality Agreement for the Dissemination of Non-Public Domain Data by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

Applicants name(s) and full contact details and signatures  
 Full name Institution, address and  
 Contact details  
 Signature and Date

I/we agree to the following:

- To abide by any conditions attached to use of the data by the Executive Secretary;
- That the data shall be used only for the purpose for which the data are being requested, be accessed only by the individuals listed in Item 3 of the Data Request Form, and be destroyed upon completion of the usage for which the data are being requested;
- To make no unauthorized copies of the data requested. If a copy of all, or part, of the data requested is made by the applicant, all copies, or part thereof, will be registered with the Executive Secretary and will be destroyed upon completion of purpose for which the data was requested;
- To abide by the Commission's data security standards as specified in the Commission's Information Security Policy and the Rules and Procedures for Protection, Access to, and Dissemination of, Data Compiled by the Commission;
- That prior to the publication of any report of an analysis for which the requested data will be used, the report shall be provided to, and cleared by, the Executive Secretary of the ICCAT, who shall ensure that no non-public domain data will be published;
- To provide copies of all published reports of the results of the work undertaken using the data released shall be provided to the ICCAT Secretariat and to the relevant subsidiary body of ICCAT;
- Applicant(s) will not disclose, divulge, or transfer, either directly or indirectly, the confidential information to any third party without the written consent of the Executive Secretary;
- Applicant(s) shall promptly notify the Executive Secretary, in writing, of any unauthorized, negligent or inadvertent disclosure of confidential information of the ICCAT.
- Applicant(s) assume all liability, if any, in respect of a breach of this Confidentiality Agreement, once the data requested is released to the applicant(s).
- Pursuant to paragraph 28 of the Rules and Procedures for the Protection, Access to, and Dissemination of, Data Compiled by the Commission, CPC(s) shall not be granted access to non-public domain data until the appropriate actions have been taken to account for any disclosure in violation of the Agreement by the applicant or, *inter alia*, its affiliates, employees, attorneys, accountants, consultants, contractors, or other advisers or agents; and.
- That this Agreement may be terminated by giving written notice to the other party.

**Data that May be Disseminated to Other  
Regional Fisheries Management Organizations (RFMOs)**

***Operational level data***

1. Operational-level tuna fisheries data may be disseminated to other regional fisheries management organizations (RFMOs), subject to the terms of the agreement specified in paragraph 29 of these Rules and Procedures. Such data includes catch and effort (including by-catch of mammals, turtles, sharks and billfish), observer, unloading, transshipment and port inspection data.

***Aggregated data***

2. Aggregated catch and effort data may be disseminated to other RFMOs. Such data includes:
  - Data for long line gear aggregated by flag State by 5° latitude and by 5° longitude by month
  - Data for surface gear (including purse seine) aggregated by flag State by 1° latitude and by 1° degree longitude by month
  - Aggregated observer data (made up of observations from a minimum of three vessels).

***Other data***

3. Monitoring, control, surveillance, inspection and enforcement data may be disseminated to other RFMOs. Such data includes:
  - The names and other markings of 'Vessels of Interest' to each organization;
  - Transshipment verification reports for vessels transshipping in the Convention area of one RFMO but which have fished within the Convention area of the other.

**Road map for the development of Management Strategy Evaluation (MSE)  
and Harvest Control Rules (HCR)**

*Document adopted during the 2019 Commission meeting and revised during the SCRS meetings (changes are underlined)*

This schedule is intended to guide the development of harvest strategies for priority stocks identified in Rec. 15-07 (North Atlantic albacore, North Atlantic swordfish, eastern and western Atlantic bluefin tuna, and tropical tunas). It builds on the initial road map that was appended to the 2016 Annual Meeting report. It provides an aspirational timeline that is subject to revision and should be considered in conjunction with the stock assessment schedule that is revised annually by the SCRS.\* Due to the amount of cross-disciplinary dialogue that may be needed, intersessional Panel meetings and/or meetings of the Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers (SWGSM) may be necessary. The aspirational nature of this timeline assumes adoption of a final management procedure for northern albacore in 2020 and interim management procedures for bluefin tuna and northern swordfish in 2022 and tropical tunas as soon as 2023, however the exact timeline for delivery is contingent on funding, prioritization, and other work of the Commission and SCRS.

\* For 2015 through 2019, road map reflects progress to-date in some detail. For 2020 onward, more general steps for the SCRS and Commission are anticipated pending outcomes of the 2019 Annual Meeting.

	<i>Northern Albacore</i>	<i>Bluefin Tuna</i>	<i>Northern Swordfish</i>	<i>Tropical Tunas</i>
<b>2015</b>	- Commission established management objectives in Rec. 15-04			
<b>2016</b>	- SCRS conducted stock assessment - SCRS evaluated a range of candidate HCRs through MSE - PA2 identified performance indicators			- Commission identified performance indicators (Rec. 16-01)
<b>2017</b>	- SCRS evaluated the performance of candidate HCRs through MSE, using the performance indicators developed by PA2 - SWGSM narrowed the candidate HCRs and referred to Commission - Commission selected and adopted an HCR with associated TAC at the Annual Meeting (Rec. 17-04)	- SCRS conducted stock assessment - Core modelling group completed development of modelling framework	- SCRS conducted stock assessment	- SCRS reviewed performance indicators for YFT, SKJ, and BET - SWGSM recommended a multispecies approach for development of MSE framework

<p><b>2018</b></p>	<ul style="list-style-type: none"> <li>- SCRS contracted independent expert to complete peer review of MSE code</li> <li>- Call for Tenders issued for peer review</li> <li>- SCRS tested the performance of the adopted HCR, as well as variations of the HCR, as requested in Rec. 17-04</li> <li>- SCRS developed criteria for the identification of exceptional circumstances</li> </ul>	<ul style="list-style-type: none"> <li>- SCRS conducted joint MSE meeting on BFT/SWO</li> <li>- SCRS reviewed but could not adopt reference set of OMs</li> <li>- SCRS began testing candidate management procedures (MPs)</li> <li>- SWGSM considered qualitative management objectives</li> <li>- BFT WG reviewed progress and developed detailed road map</li> <li>- Commission adopted conceptual management objectives (Res. 18-03)</li> </ul>	<ul style="list-style-type: none"> <li>- SCRS conducted joint meeting on BFT/SWO MSE</li> <li>- SCRS contracted MSE technical expert to develop OM framework, define initial set of OMs, and conduct initial conditioning of OMs</li> <li>- SWGSM considered qualitative management objectives</li> </ul>	<ul style="list-style-type: none"> <li>- SCRS contracted with technical experts: start development of MSE framework (phase I)</li> <li>- SCRS conducted bigeye tuna stock assessment</li> </ul>
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	<i>Northern Albacore</i>	<i>Bluefin Tuna</i>	<i>Northern Swordfish</i>	<i>Tropical Tunas</i>
<b>2019</b>	<ul style="list-style-type: none"> <li>- SCRS addressed recommendations of the peer reviewer</li> <li>- SCRS updated performance of the interim HCR and variants</li> <li>- SCRS produced consolidated report on MSE</li> </ul> <p>1. COMM: PA2 to consider possible approaches that could be useful in developing guidance on a range of appropriate management responses if exceptional circumstances occur, including those implemented by other RFMOs</p>	<ul style="list-style-type: none"> <li>- SCRS held three BFT MSE Technical Group meetings with significant progress but advised at least one additional year of work needed</li> <li>- SCRS continued to evaluate candidate MPs</li> <li>- At intersessional meeting, PA2 reviewed and developed initial operational management objectives and identified performance indicators</li> <li>- SCRS to hold December webinar to review OM progress</li> </ul> <p>1. COMM: PA2 to review MSE progress and advise the Commission on next steps, including need for an update of the stock assessment to provide TAC advice for at least 2021</p>	<ul style="list-style-type: none"> <li>- SWO Species Group meeting</li> <li>- SCRS contracted with technical expert to develop initial MSE framework</li> <li>- Commission to consider, and if possible, adopt conceptual management objectives at the Annual Meeting</li> </ul>	<ul style="list-style-type: none"> <li>- SCRS conducted yellowfin tuna stock assessment</li> </ul>
<b>2020</b>	1. COMM (PA2) to develop guidance intersessionally on a range of appropriate management responses should exceptional circumstances be found to occur ( <u>5-6, March, PA2 intersessional</u> )	1. SCRS to conduct stock assessment update and develop TAC advice for 2021 and 2022	1. SCRS to continue development of MSE framework, including the finalization of operating model conditioning and the uncertainty grid	1. SCRS to conduct skipjack data preparatory meeting
	2. COMM (PA2) to review interim HCR and recommend MP to the Commission for possible adoption at the Annual Meeting ( <u>5-6, March, PA2 intersessional</u> )		2. SCRS to develop example candidate MPs	2. SCRS to continue MSE development.
	3. SCRS to conduct NALB stock assessment (in June)	2. SCRS to initiate independent peer review of MSE code		

	<i>Northern Albacore</i>	<i>Bluefin Tuna</i>	<i>Northern Swordfish</i>	<i>Tropical Tunas</i>
<b>2020</b>	4. SCRS to evaluate existence of exceptional circumstances	3. SCRS to propose criteria for determining exceptional circumstances		3. COMM (PA1) to review and provide feedback on MSE progress either intersessionally or during the Annual Meeting <i>(Alternatively could take place in 2021)</i>
	5. COMM to: a. review and endorse guidance developed intersessionally on management responses in the case of exceptional circumstances b. review the interim HCR and adopt a long-term MP, including the TAC, at the Annual Meeting	4. COMM (PA2) – Intersessional Meeting (March)		4. COMM (PA1) to recommend initial operational management objectives and to review and revise the performance indicators agreed by the Commission in 2016, either intersessionally or during the Annual Meeting <i>(Alternatively, could take place in 2021)</i>
		4. COMM to review candidate MPs at the Annual Meeting		
		5. COMM to set TACs for at least 2021, based on stock assessment update, at the Annual Meeting		
<b>2021</b>	<u>1. SCRS to have a data preparatory meeting to prepare inputs for a SS model</u>		1. SCRS to continue development and testing of candidate MPs	1. SCRS to continue development and testing of candidate MPs
			2. SCRS to propose criteria for determining exceptional circumstances	2. SCRS to conduct skipjack stock assessment (timing to be determined)
			3. SCRS to initiate independent peer review of MSE code	3. SCRS to conduct bigeye data preparatory meeting (timing to be determined)

	<i>Northern Albacore</i>	<i>Bluefin Tuna</i>	<i>Northern Swordfish</i>	<i>Tropical Tunas</i>
<b>2021</b>			4. COMM (SWGSM/PA4) to recommend initial operational management objectives and identify performance indicators either intersessionally or during the Annual Meeting	4. SCRS to conduct bigeye stock assessment (timing to be determined)
		1. COMM (SWGSM/PA2) intersessionally to: <ul style="list-style-type: none"> <li>- review MSE progress, review preliminary candidate MP results, and provide feedback to SCRS;</li> <li>- [recommend final operational management objectives and identify performance indicators]; and</li> <li>- develop guidance on a range of appropriate management responses should exceptional circumstances be found to occur</li> </ul>	5. COMM (SWGSM/PA4) to review MSE progress, example candidate MP results, and provide feedback to SCRS, either intersessionally or during the Annual Meeting	
		2. SCRS to initiate independent peer review of MSE process		
		3. SCRS to complete MSE, incorporating feedback from Commission through PA2/SWGSM		
		4. SCRS to provide final advice to the Commission on criteria for determining exceptional circumstances	6. SCRS to conduct stock assessment	

	<i>Northern Albacore</i>	<i>Bluefin Tuna</i>	<i>Northern Swordfish</i>	<i>Tropical Tunas</i>
<b>2021</b>		5. COMM (SWGSM/PA2) and SCRS to refine MP(s) and to review and finalize, as needed, guidance on a range of appropriate management responses should exceptional circumstances be found to occur	7. COMM (SWGSM/PA4) to review results of performance of initial candidate MPs either intersessionally or during the Annual Meeting	5. COMM (SWGSM/PA1) to review MSE progress, preliminary candidate MP results, and provide feedback to SCRS either intersessionally or during the Annual Meeting
		6. COMM to: a. review and endorse guidance developed intersessionally on management responses in the case of exceptional circumstances, and b. adopt an interim MP at the Annual Meeting, including a 3-year TAC		6. COMM (PA1) to finalize operational management objectives and performance indicators at the Annual Meeting
<b>2022</b>	<u>1. SCRS to develop a SS model for ALB</u>		<u>1. SCRS to initiate independent peer review of MSE process</u>	<u>1. SCRS to continue MSE development, including developing and evaluating candidate MPs</u>
				<u>2. SCRS to propose criteria for determining exceptional circumstances</u>
				<u>3. SCRS to initiate independent peer review of MSE code</u>
			<u>2. SCRS to provide final advice to the Commission on criteria for determining exceptional circumstances</u>	<u>4. COMM (SWGSM/PA1) to develop guidance on a range of appropriate management responses should exceptional circumstances be found to occur</u>

	<i>Northern Albacore</i>	<i>Bluefin Tuna</i>	<i>Northern Swordfish</i>	<i>Tropical Tunas</i>
<b>2022</b>			<p><u>3. COMM (SWGSM/PA4) and SCRS to:</u></p> <ul style="list-style-type: none"> <li>- <u>refine MP(s) and to review and finalize, as needed, guidance on a range of appropriate management responses should exceptional circumstances be found to occur;</u></li> <li>- <u>recommend final operational management objectives and identify performance indicators (early in 2022).</u></li> </ul>	<u>5. COMM to review candidate MPs at the Annual Meeting</u>
			<u>4. SCRS to complete MSE, incorporating feedback from Commission through PA4/SWGSM</u>	[...]
			<p><u>5. COMM to:</u></p> <ul style="list-style-type: none"> <li>a) <u>review and endorse guidance developed intersessionally on management responses in the case of exceptional circumstances, and</u></li> <li>b) <u>adopts an interim MP at the Annual Meeting, including the TAC</u></li> </ul>	[...]

<p><b><u>2023 and beyond*</u></b></p>	<p><u>1. Once an MP is adopted, SCRS to conduct assessments to ensure that the conditions considered in MP testing are still applicable to the stock. The first benchmark assessment is scheduled for 2023, where a SS reference case as well as a grid of reference and robustness OMs is to be adopted after reconsidering the main axes of uncertainty.</u></p>	<p><u>1. Once an MP is adopted, SCRS to conduct assessments to ensure that the conditions considered in MP testing are still applicable to the stock</u></p>	<p><u>1. Once an MP is adopted, SCRS to conduct assessments to ensure that the conditions considered in MP testing are still applicable to the stock</u></p> <p>[...]</p>	<p><u>1. SCRS to complete MSE, incorporating feedback from Commission through SWGSM/PA1</u></p>
	<p><i>Northern Albacore</i></p>	<p><i>Bluefin Tuna</i></p>	<p><i>Northern Swordfish</i></p>	<p><i>Tropical Tunas</i></p>
<p><b><u>2023 and beyond*</u></b></p>	<p><u>2. On the predetermined timescale for MP setting, SCRS to evaluate existence of exceptional circumstances</u></p>	<p><u>2. On the predetermined timescale for MP setting, SCRS to evaluate existence of exceptional circumstances</u></p>	<p><u>2. On the predetermined timescale for MP setting, SCRS to evaluate existence of exceptional circumstances</u></p>	<p><u>2. SCRS to provide final advice to the Commission on criteria for determining exceptional circumstances</u></p>
				<p><u>3. SCRS to initiate independent peer review of MSE process</u></p>
	<p><u>3. COMM to continue use of the MP to set TAC at the Annual Meeting, on the predetermined timescale for MP setting</u></p>	<p><u>3. COMM to continue use of the MP to set TAC based on the MP at the Annual Meeting, on the predetermined timescale for MP setting</u></p>	<p><u>3. COMM to set TAC based on the MP at the Annual Meeting, on the predetermined timescale for MP setting</u></p>	<p><u>4. COMM (SWGSM/PA1) and SCRS to refine MP(s) and to review and finalize, as needed, guidance on a range of appropriate management responses should exceptional circumstances be found to occur</u></p>
				<p><u>5. COMM to:</u>  <u>a) review and endorse guidance developed intersessionally on management responses in the case of exceptional circumstances, and</u>  <u>b) adopt interim MP(s) at the Annual Meeting, including TACs, where applicable</u></p>

<b><u>2024 and beyond*</u></b>	See 2023 row SCRS to improve Observation Error Model by incorporating statistical properties of CPUE residuals	See 2023 row	See 2023 row	<u>1. Once an MP is adopted, SCRS to conduct assessments to ensure that the conditions considered in MP testing are still applicable to the stock</u>
	SCRS to test the available (i.e. production model) and alternative MPs (e.g. based on Jabba, or empirical)			<u>2. On the predetermined timescale for MP setting, SCRS to evaluate existence of exceptional circumstances</u>
	<i>Northern Albacore</i>	<i>Bluefin Tuna</i>	<i>Northern Swordfish</i>	<i>Tropical Tunas</i>
<b><u>2024 and beyond*</u></b>	[...]	[...]	[...]	<u>3. COMM to continue use of the MP to set management measures at the Annual Meeting, on the predetermined timescale for MP setting</u>
				[...]
				[...]
				[...]

\*Assumes that the workplan is accomplished as described.

**LIST OF ACRONYMS:**

**BET** = Bigeye tuna  
**BFT** = Bluefin tuna  
**BFT WG** = SCRS' Bluefin Tuna Working Group  
**HCR** = Harvest Control Rule  
**MP** = Management Procedure

**MSE** = Management Strategy Evaluation  
**OM** = Operating Model  
**SCRS** = Standing Committee on Research and Statistics  
**SWGSM** = Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers  
**TAC** = Total Allowable Catch  
**TRO** = Tropical tunas

**Proposal for amendment of the rules and procedures for the protection, access to, and dissemination of data compiled by ICCAT**

This is an addendum to Annex 6 of the ICCAT Report for biennial period, 2010-2011, Part I (2010) – Vol. 1, “Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled by ICCAT”. This amendment aims to clarify the rules and procedures that apply to data collected by entities contracted under ICCAT research and data collection programmes. As ICCAT and the SCRS continue to promote Scientific Research of ICCAT species through the participation of CPCs, national scientist and Academic and Research Centres, it is important that rules and procedures be defined to ensure that data collected under these research programs are properly evaluated and effectively used for scientific advice.

## ANNEX 6

**RULES AND PROCEDURES FOR THE PROTECTION, ACCESS TO,  
AND DISSEMINATION OF DATA COMPILED BY ICCAT**

**1. Basic principles relating to the dissemination of data by the ICCAT**

1. Data and information held by the ICCAT Commission or Secretariat, and by service providers or contractors acting on their behalf, shall only be released in accordance with these Rules and Procedures; which reflect the policies of confidentiality and security determined by the Commission.
2. Data may be disseminated if the CPC (Contracting Party or Cooperating non-Contracting Party, Entity or Fishing Entity) providing the data to the ICCAT authorizes its release.
3. Persons duly authorized by the Executive Secretary within the ICCAT Secretariat and service providers, who have read and signed the Commission’s confidentiality protocol, shall have access to the data necessary to perform their ICCAT duties.
4. Officers of the Commission and its subsidiary bodies shall have access to the data necessary to perform their ICCAT duties.
5. CPCs shall have access to data to serve the purposes of the Convention, including data:
  - a) covering vessels flying their flag in the ICCAT Convention area.
  - b) covering any vessels fishing in waters under their jurisdiction.
  - c) covering vessels applying to fish in their national waters, unloading in their ports or transshipping fish within waters under their jurisdiction.
  - d) for the purpose of compliance and enforcement activities on the high seas, consistent with the Convention and the conservation and management measures and other relevant decisions adopted by the Commission, subject to the rules and procedures for access and dissemination of such data that the Commission will adopt under paragraph 23.
  - f) for the purpose of scientific and other research, if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision.
6. To the greatest extent practical, the ICCAT Commission, Secretariat and their service providers, should disseminate data in a timely manner.

**2. Risk classification and definition of confidentiality**

7. Data covered by these Rules and Procedures will be classified in accordance with the risk classification methodology included in **Table 1**, which reflects *inter alia* the damage that would be done to the operations or creditability of the Commission as a consequence of the unauthorized disclosure or modification of such information.

8. Data covered by these Rules and Procedures were determined to be either public domain or non-public domain data in accordance with the definition of confidentiality established in **Table 1**.

*8 (bis) Clarification for data arising from ICCAT Research and Data Collection Programmes*

Associated conventional tagging data: examples: Tag shedding and Tag seeding data are classified as no risk and thus fall under the public domain data category. Associated conventional tagging data includes species, seeding and recovery dates and positions, gear type, flag, and fish information where available. Associated conventional tagging data in this context does not include information identifying the fishing vessel that reported the tag, for example, which would otherwise alter its security classification.

Biological data resulting from ICCAT Research and Data Collection Programmes are classified as medium risk and thus fall under the non-public domain data category. This should include biological samples and initial results from the analyses of such samples; for ageing, genetic, maturity and reproductive studies, stock identification samples such as microconstituents, parasites, stomach content, muscle or any other biological tissue used for scientific analyses.

Fisheries independent indices including aerial surveys, larval sampling, acoustic sonar data, video recording, and sampling from scientific based observer programs are classified as medium risk and thus fall under the non-public domain data category.

All other data types follow the definitions and classification rules outlined in **Table 1 and 2**.

### 3. Dissemination of public domain data

9. Data in the public domain shall not reveal the individual activities of any vessel, company or person and shall not contain private information. Catch and effort data in the public domain shall be aggregated by flag, gear, month and 1° x 1° grid (for surface fisheries) or 5°x5° grid (for longline fisheries).
10. Annual catch estimates and aggregated catch and effort data that can be used to identify the activities of any vessel, company or person are not in the public domain.
11. Except for data as described in Paragraphs 9 and 10, the types of data listed in **Appendix 1 to ANNEX 6** have been designated to be public domain data.
12. Public Domain data shall be available to any persons for (a) downloading from the Commission's website and/or (b) release by the Commission on request.
13. The website should contain a statement describing the conditions associated with the viewing or downloading of public domain data (for example, that the source of the data must be acknowledged), and should require the person requesting the data to "Accept" these conditions before viewing or downloading can begin.

13 (bis) Public domain data collected by entities contracted by ICCAT research and data collection programmes (e.g. conventional tagging) shall be quality controlled and uploaded to the ICCAT website by the Secretariat, on an annual basis. Immediate access to the most up to date quality-controlled data will be granted to respective SCRS working groups and participants of workshops organized by the research programme in question (e.g. capacity building workshops). Any other users wishing to access such data must follow the procedure outlined in section 17bis (c) below.

### 4. Dissemination of non-public domain data

#### 4.1 Definition of non-public domain data

14. Subject to the decisions of the Commission, all types of data not described in paragraph 11 shall be referred to as non-public domain data.

15. A list of examples of non-public domain data can be found in **Appendix 2 to ANNEX 6**.

#### **4.2 General rules for dissemination of, and access to, non-public domain data**

16. Access to and dissemination of non-public domain data shall be authorized in accordance with these Rules and Procedures and the policies of confidentiality and security established in the Commission's Information Security Policy (ISP).

17. The ICCAT Secretariat shall log and report to the Commission all access and dissemination of non-public domain data, including the name and affiliation of the person, the type of data accessed or disseminated, the purpose for which the data were requested, the date when the data were requested, the date when the data were released and authorizations that may have been required.

#### **17 (bis) In the case data gathered within ICCAT Research and Data Collection Programmes:**

a) Data will be accessible, once checked by ICCAT staff for quality control, to related SCRS subsidiary body (e.g. Species group) and the research teams directly involved in data generation, authorizing their use for scientific purposes as stipulated by the terms of the contract related to the collection of these data.

b) Metadata relating to such data should be periodically updated on the ICCAT website.

c) Data requests may be submitted by any person(s) or institutions(s) using the form found in this Addendum. Each request will be considered by an evaluation committee (composed of the Chair and Vice Chair of the SCRS, Rapporteur of the respective Species Group, and programme Coordinator if still available) to guarantee adherence to the ICCAT Publication Policy and alignment with the respective research programme priorities. The Evaluation Committee will consult with the data provider(s) to decide whether to authorize the data request. If the data provider(s) confirm that there is no conflict of interest, the data will be released after signing the Confidentiality Agreement (**Attachment 2 to Appendix 3 of ANNEX 6**). Should the data provider(s) seek preferential use of the data, this request will be considered and granted up to a period of two years, or for the period of time specifically agreed in the contract. The Secretariat will be responsible for coordinating and facilitating this process. The Evaluation Committee will strive to return a decision within 30 days of the request. The Secretariat will provide to the SCRS Plenary meeting a list of data requests and decisions in the annual report of activities.

#### **4.3 Access to non-public domain data by the Staff of the Secretariat, the ICCAT service providers, and Officers of the Commission and its subsidiary bodies**

18. Persons duly authorized by the Executive Secretary, within the ICCAT Secretariat and service providers, including scientific experts within the SCRS, shall have access to the data necessary to perform their ICCAT duties. Officers of the Commission and its subsidiary bodies shall have access to the data necessary to perform their ICCAT duties. All such persons shall sign a Confidentiality Agreement with the Executive Secretary and maintain the data security standards of the Commission in respect of data to which they have access. The Executive Secretary shall maintain a register of all such persons (including the purpose for which they require access to the data) and make the register available to a CPC on written request.

#### **4.4 Access to non-public domain data by CPCs**

19. CPCs shall have access to non-public domain data to serve the purposes of the Convention, including data:

- a) Covering vessels flying their flag in the ICCAT Convention area
- b) Covering any vessels fishing in waters under their jurisdiction
- c) Covering vessels applying to fish in their national waters, unloading in their ports or transshipping fish within waters under their jurisdiction
- e) For the purpose of scientific and other research, if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision.

20. CPCs shall notify the Secretariat of a small number of representatives (preferably only 2) authorized to receive non-public domain data. Such notification will include name, affiliation, and contact information (e.g. telephone, facsimile, email address). The ICCAT Secretariat will maintain a list of such authorized representatives. CPCs and the Secretariat shall ensure the list of CPC representatives is kept up to date and made available.
21. The authorized representative(s) of the CPCs are responsible for ensuring the confidentiality and security of the non-public domain data according to its risk classification and in a manner consistent with security standards established by the Commission for the ICCAT Secretariat.
22. The non-public domain data described in paragraph 19 will be made available by the Secretariat to authorized representatives of the CPCs for release by the Commission on request and, where appropriate, downloading from the Commission's website in accordance with the Commission's ISP.
23. For the purpose of compliance and enforcement activities on the high seas, non-public domain data will be made available subject to separate rules and procedures for the access and dissemination of such data, that the Commission will adopt for these purposes.
24. VMS data will be made available for scientific purposes, subject to the separate rules and procedures referred to in paragraph 23 above.
25. Access to non-public domain data by CPCs shall be administered by the Executive Secretary on the basis of these Rules and Procedures and the framework at **Appendix 3 to ANNEX 6**.
26. The Executive Secretary will implement the Framework and authorize access to and dissemination of non-public domain data.
27. Unless otherwise decided by the Member or CPC responsible for its external affairs, participating Territories shall have the same access rights to data as CPCs.
28. A CPC that has not fulfilled its obligations to provide data to the Commission for two consecutive years shall not be granted access to Non-Public Domain data until all such matters are rectified. A CPC whose representative, authorized in accordance with paragraphs 20 and 21 above, failed to observe the rules stipulated in these Rules and Procedures shall not be granted access to Non-Public Domain data until the appropriate actions have been taken.

#### ***4.5 Exchange of data with other regional fisheries management organizations***

29. If the Commission enters into agreements for the exchange of data with other regional fisheries management organizations (RFMOs) or other organizations, such agreements must include requirements that the other RFMO provides equivalent data on a reciprocal basis and maintains the data provided to them in a manner consistent with the security standards established by the Commission. The data that may be exchanged is specified in **Appendix 4 to ANNEX 6**. At each annual session the Executive Secretary will provide copies of data exchange agreements that exist with other RFMOs and a summary of the data exchanges that occurred during the previous 12 months under such agreements.

#### ***4.6 Disseminations of non-public domain data in other circumstances***

30. Non-Public Domain data will be made available by the Secretariat to any persons if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision. Unless otherwise requested by the provider of the data:

Including universities, researchers, NGOs, media, consultants, industry, federations, etc.

- a) Persons that request non-public domain data shall complete and sign the Data Request Form and sign the Confidentiality Agreement and provide them to the Commission in advance of obtaining access to said data.
- b) The Data Request Form and Confidentiality Agreement shall then be forwarded to the CPC that originally provided the requested data and the provider shall be requested to authorize the Commission to release the data.
- c) Such persons shall also agree to maintain the data requested in a manner consistent with the security standards established by the Commission for the ICCAT Secretariat.

31. CPCs that have provided non-public domain data to the Commission shall notify the Secretariat regarding their representatives with the authority to authorize the release of non-public domain data by the Commission. Decisions whether to authorize the release of such data shall be made in a timely manner.

#### **4.7 Force majeure**

32. The Executive Secretary may authorize the release of Non-Public Domain data to rescue agencies in cases of *force majeure* in which the safety of life at sea is at risk.

#### **5. Periodic Review**

33. The Commission or its subsidiary bodies will periodically review these Rules and Procedures, and subsidiary documents, and the rules and procedures referred to in paragraphs 23 and 24 above, and amend these if necessary.

#### **6. Final Clause**

34. These Rules and Procedures do not prevent a CPC from authorizing the release of any data it has provided to the ICCAT.

**Table 1.** Types of information and confidentiality classification. Certain types of information such as Task I and Task II already have mandatory reporting and are publicly available through the ICCAT web site and the ICCAT *Statistical Bulletin*.

<i>Information Type</i>	<i>Risk Classification</i>
Operational level catch and effort data (e.g. set-by-set CPUE)	High
Annual catch estimates stratified by gear/flag and species for the ICCAT statistical areas (Task I)	mandatory reporting already in place
Aggregated catch and effort data stratified by gear/year/month, 5x5 (LL) or 1x1 (surface), and flag (Task II catch/effort)	mandatory reporting already in place
Records of vessel unloading and logbooks	Medium
Transshipment consignments by species	Medium
Biological data ( <u>after the period set in article 17bis c</u> )	mandatory reporting already in place
Conventional tagging data	No risk
Detailed electronic tagging data	Medium
ICCAT Record of Fishing Vessels (vessels authorized to fish; vessels authorized to transport; support vessels; carrier vessels)	mandatory reporting already in place
Vessel and gear attributes from other open sources	No risk
Oceanographic and meteorological data	No risk
Movements of fishing vessels recorded at a fine resolution/VMS vessel position, direction and speed	High
Boarding and Inspection Reports	High
Certified observer personnel	Medium
Certified inspection personnel	High
Catch Documentation Scheme	Medium
Port State Inspection Reports	Medium
Violations and infringements, detailed	High
Annual number of active vessels, by gear type and flag	mandatory reporting already in place
Economic data	[unassigned]
[Social data]	[unassigned]
Fisheries intelligence-sharing information	High
Weekly catch reports	High
Caging declarations	Medium

**Table 2.** Annotations on information types mentioned in **Table 1.**

<i>Information Type</i>	<i>Annotations</i>
Operational level Catch Effort data	Collected on fishing vessel logbooks and by observers.
Compliance-related observer data	Excludes operational catch and effort data, biological data and vessel and gear attributes.
Biological data	Biological data include size data, data on gender and maturity, genetic data, data on hard parts such as otoliths, stomach contents, and isotopic N15/C14 data collected by observers, port samplers and other sources. “Biological data” in this context does not include information identifying the fishing vessel, for example, which would otherwise alter its security classification.
Conventional tagging data	Conventional tagging data include species, release and recapture positions, lengths and dates. “Tagging data” in this context does not include information identifying the fishing vessel that recaptured the tagged tuna, for example, which would otherwise alter its security classification.
Electronic tagging data	Detailed electronic tagging data include detailed records from pop-up or archival tags such as date, time, depth, temperature, light intensity, etc.
ICCAT Record of Vessels	Covers vessels authorized to fish in the ICCAT Convention area also covers records of transport and other types of vessels
Vessel and gear attributes from other sources	Includes data collected by observers and port inspectors. Covers all vessels (i.e. includes vessels restricted to national jurisdiction–domestic fleets). Includes electronic equipment.
Oceanographic and meteorological data	“Oceanographic and meteorological data” in this context does not include information identifying the fishing vessel that collected the information, for example, which would otherwise alter its security classification.
Certified observer personnel	If identified by individual then risk classification would be assigned to HIGH.
Certified inspection personnel	If identified by individual then risk classification would be assigned to HIGH.
Violations and infringements, detailed	May cover individual violations and infringements pending investigation and/or prosecution. Summarized information included in Biannual ICCAT Report from CPCs. Includes compliance information collected by observers.
Economic data	Insufficient information currently available to determine Risk Classification.

**Public Domain Data**

The following types of data are considered to be in the public domain:

1. Annual catch estimates (Task I) stratified by gear, flag and species for the ICCAT statistical area;
2. The annual numbers of vessels active in the ICCAT Convention area stratified by gear type and flag;
3. Catch and effort/data (Task II) aggregated by gear type, flag, year/month and, for longline, 5° latitude and 5° longitude, and, for surface gear types, 1° latitude and 1° longitude – and made up of observations from a minimum of three vessels;
4. Biological data (after the period set in article 17bis c);
5. Conventional tagging data;
6. The ICCAT Records of Fishing Vessels;
7. Information on vessel and gear attributes;
8. Any vessel record established for the purpose of the Commission's VMS;
9. Oceanographic and meteorological data;
10. [Social data].

**Examples of Non-Public Domain Data**

The following are examples of types of data considered to be Non-Public Domain:

1. Operational level catch-effort data (detailed set-by-set information)
2. Records of vessel unloading
3. Transshipment consignments by species
4. Data describing (at a fine resolution) the movement of vessels including near- real time Commission VMS data (vessel position, direction and speed)
5. Boarding and Inspection Reports
6. Certified inspection personnel
7. Raw data from any Catch Documentation Scheme or Trade Documentation Scheme
8. Port State Inspection Reports
9. Violations and infringements, detailed
10. Economic data
11. Fisheries intelligence-sharing information
12. Detailed electronic tagging data
13. Data that reveal the individual activities of any vessel, company or person, including caging declarations and weekly catch reports.

### Framework for Access to Non-Public Domain Data

1. In accordance with the policies for data protection, security and confidentiality established by the Commission's Information Security Policy (ISP), a Contracting Party or non-Contracting Cooperating Entity or Fishing Entity (CPC) shall have access to non-public domain data types covering describing the activities of any vessels:
  - a) covering vessels flying their flag in the ICCAT Convention area or;
  - b) covering any vessels fishing in waters under their national jurisdiction or;
  - c) covering vessels applying to fish in their national waters, unloading in their ports or transshipping fish within waters under their national jurisdiction;
  - d) for the purpose of scientific and other research, if the CPC that originally provided that data authorizes the Commission to release them. In cases where a CPC elects to provide an ongoing authorization for the release of such data, the CPC may at any time cancel this authorization by notifying the Secretariat that it has revised its earlier decision.
2. For the purposes of compliance and enforcement activities on the high seas, non-public domain data will be made available subject to separate rules and procedures for the access and dissemination of such data, that the Commission will adopt for these purposes. VMS data will be made available for scientific purposes, subject to these same separate rules and procedures.
3. In regard to paragraph 1:
  - a) CPCs shall provide a written request for access to such data to the Executive Secretary, specifying the purpose of the Convention by reference to the relevant article(s). In so doing, CPCs shall use the Commission Data Request Form (**Attachment 1 to Appendix 3 to ANNEX 6**).
  - b) The CPC shall undertake to only use such data for the purpose described in the written request. The CPC shall also complete and sign the Commission Confidentiality Agreement (**Attachment 2 to Appendix 3 to ANNEX 6**).
  - c) The Executive Secretary shall not authorize the release of more data than is necessary to achieve the purpose described in the written request.
4. The Executive Secretary shall not authorize access to non-public domain data by any CPC that has not fulfilled its obligations to provide data to the Commission for two consecutive years until all such matters are rectified. The Executive Secretary also shall not authorize access to a CPC whose authorized representative failed to observe the Rules and Procedures for the Protection, Access to and Dissemination of Data Compiled by the Commission until the CPC informs the Executive Secretary that appropriate actions have been taken.
5. The Executive Secretary may attach conditions appropriate for the access to such data (such as that the data be deleted upon achievement of the purpose for which it was released or by a pre-determined date, that a register of persons accessing the data be maintained and furnished to the Commission upon request, etc.)
6. Requests may be made for a standing authorization, such that CPCs may have multiple accesses to the requested data for the same purpose as of the original written request.
7. Dissatisfaction with the Executive Secretary's decisions in regard to access to non-public domain data by CPCs shall be resolved by the Commission Chairman.

**Data Request Form**

**To the Executive Secretary of the International Commission for the Conservation of Atlantic Tunas (ICCAT)**

I wish to submit the following request to receive and analyse data collected by ICCAT. I have read the above Data Policy, noting in particular, the matters relating to data confidentiality and usage specified in Annex 6 of the ICCAT REPORT for biennial period, 2010-2011, Part I (2010) – Vol. 1, “Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled By ICCAT”, and providing an appropriate acknowledgement in the case of any publications arising from the use of these data, and agree to all the conditions listed.

<p><b><u>Name of the person(s) or institution(s) requesting the data and contact details</u></b></p>
<p><b><u>Purpose/Project outline</u></b>  <i>If non-public domain data are being requested, the use of the data shall be authorized only for the purpose described below.</i></p>
<p><b><u>Data requested</u></b>  <i>If applicable, the specification of data being requested should refer to the type of data and any parameters relevant to the type of data, which may include, inter alia, the gear types, time periods, geographic areas and fishing nations covered, and the level of stratification of each parameter.</i></p>
<p><b><u>Name(s), job title(s) and affiliation(s) of the person(s) requesting access to the data; the use of the non-public domain data shall be authorized only for the person(s) listed.</u></b>  <i>Note, the Secretariat expects to be informed of any changes to the data users list.</i></p>
<p><b><u>Intentions with respect to publication of the results of the proposed work</u></b></p>

Signature and date: \_\_\_\_\_

Name:

Position:

Organisation:

Approved / Not Approved

Signature and date:

### Confidentiality Agreement

Confidentiality Agreement for the Dissemination of Non-Public Domain Data by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

Applicants name(s) and full contact details and signatures  
 Full name Institution, address and  
 Contact details  
 Signature and Date

I/we agree to the following:

- To abide by any conditions attached to use of the data by the Executive Secretary;
- That the data shall be used only for the purpose for which the data are being requested, be accessed only by the individuals listed in Item 3 of the Data Request Form, and be destroyed upon completion of the usage for which the data are being requested;
- To make no unauthorized copies of the data requested. If a copy of all, or part, of the data requested is made by the applicant, all copies, or part thereof, will be registered with the Executive Secretary and will be destroyed upon completion of purpose for which the data was requested;
- To abide by the Commission's data security standards as specified in the Commission's Information Security Policy and the Rules and Procedures for Protection, Access to, and Dissemination of, Data Compiled by the Commission;
- That prior to the publication of any report of an analysis for which the requested data will be used, the report shall be provided to, and cleared by, the Executive Secretary of the ICCAT, who shall ensure that no non-public domain data will be published;
- To provide copies of all published reports of the results of the work undertaken using the data released shall be provided to the ICCAT Secretariat and to the relevant subsidiary body of ICCAT;
- Applicant(s) will not disclose, divulge, or transfer, either directly or indirectly, the confidential information to any third party without the written consent of the Executive Secretary;
- Applicant(s) shall promptly notify the Executive Secretary, in writing, of any unauthorized, negligent or inadvertent disclosure of confidential information of the ICCAT.
- Applicant(s) assume all liability, if any, in respect of a breach of this Confidentiality Agreement, once the data requested is released to the applicant(s).
- Pursuant to paragraph 28 of the Rules and Procedures for the Protection, Access to, and Dissemination of, Data Compiled by the Commission, CPC(s) shall not be granted access to non-public domain data until the appropriate actions have been taken to account for any disclosure in violation of the Agreement by the applicant or, *inter alia*, its affiliates, employees, attorneys, accountants, consultants, contractors, or other advisers or agents; and.
- That this Agreement may be terminated by giving written notice to the other party.

**Data that May be Disseminated to Other  
Regional Fisheries Management Organizations (RFMOs)**

***Operational level data***

1. Operational-level tuna fisheries data may be disseminated to other regional fisheries management organizations (RFMOs), subject to the terms of the agreement specified in paragraph 29 of these Rules and Procedures. Such data includes catch and effort (including by-catch of mammals, turtles, sharks and billfish), observer, unloading, transshipment and port inspection data.

***Aggregated data***

2. Aggregated catch and effort data may be disseminated to other RFMOs. Such data includes:
  - Data for long line gear aggregated by flag State by 5° latitude and by 5° longitude by month
  - Data for surface gear (including purse seine) aggregated by flag State by 1° latitude and by 1° degree longitude by month
  - Aggregated observer data (made up of observations from a minimum of three vessels).

***Other data***

3. Monitoring, control, surveillance, inspection and enforcement data may be disseminated to other RFMOs. Such data includes:
  - The names and other markings of 'Vessels of Interest' to each organization;
  - Transshipment verification reports for vessels transshipping in the Convention area of one RFMO but which have fished within the Convention area of the other.

**Appendix 12** Task 1 catches for all major ICCAT species (excluding those contained in items 5.1 to 5.4 of this report), as of 3 September 2020.

**Appendice 12** Capturas de Tarea 1 para todas las principales especies de ICCAT (no se incluyen las que figuran en los puntos 5.1 a 5.4 de este informe), a 3 de septiembre de 2020

**Apéndice 12.** Prises de la Tâche 1 pour toutes les principales espèces relevant de l'ICCAT (à l'exclusion de celles figurant aux points 5.1 à 5.4 du présent rapport), en date du 3 septembre 2020

<b>Table / Table/ Tabla</b>	<b>Species</b>	<b>Spc. group</b>
YFT-Table 1. Estimated catches (t) of yellowfin ( <i>Thunnus albacares</i> ) by area, gear and flag.	YFT	Tropical tunas
BET-Table 1. Estimated catches (t) of bigeye tuna ( <i>Thunnus obesus</i> ) by area, gear and flag.	BET	Tropical tunas
SKJ-Table 1. Estimated catches (t) of skipjack tuna ( <i>Katsuwonus pelamis</i> ) by area, gear and flag.	SKJ	Tropical tunas
SWO-ATL-Table 1. Estimated catches (t) of Atlantic swordfish ( <i>Xiphias gladius</i> ) by gear and flag.	SWO	SWO & billfish
WHM/RSP -Table 1. Estimated catches (t) of Atlantic white marlin ( <i>Kajikia albida</i> ) and Roundscale spearfish ( <i>Tetrapturus georgii</i> ) by area, gear and flag.	WHM	SWO & billfish
BUM-Table 1. Estimated catches (t) of Atlantic blue marlin ( <i>Makaira nigricans</i> ) by area, gear and flag.	BUM	SWO & billfish
SAI-Table 1. Estimated catches (t) of Atlantic sailfish ( <i>Istiophorus albicans</i> ) by area, gear and flag.	SAI	SWO & billfish
SPF-Table 1. Estimated catches (t) of longbill spearfish ( <i>Tetrapturus pfluegeri</i> ) by area, gear and flag.	SPF	SWO & billfish
SMT-Table 1. Reported landings (t) of small tuna species, by area and flag.	SMT sp.	Small tuna species
BSH-Table 1. Estimated catches (t) of blue shark ( <i>Prionace glauca</i> ) by area, gear and flag.	BSH	Major sharks
SMA-Table 1. Estimated catches (t) of Shortfin mako ( <i>Isurus oxyrinchus</i> ) by area, gear and flag.	SMA	Major sharks

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YFT-Table 1. Estimated catches (t) of yellow fin (Thunnus albacares) by area, gear and flag.

YFT-Tableau 1. Prises estimées (t) d'albacore (Thunnus albacares) par zone, engin et pavillon.

YFT-Tabla 1. Capturas estimadas (t) de rabíl (Thunnus albacares) por area, arte y bandera.

			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		
TOTAL			193584	167523	163770	163447	173739	154677	149187	137318	144513	136154	132315	153439	134770	122580	119558	105067	105885	100431	111868	117908	118212	113904	115614	108132	113414	128298	148874	135865	135106	132158		
ATE			160853	130626	126058	124702	125524	119404	116132	104978	113594	104947	96992	113123	105105	97598	88303	75569	77613	76264	93745	99131	97189	94678	91652	82848	88947	102182	114057	100041	105040	107244		
ATW			32731	36897	37712	38745	48215	35274	33056	32341	30919	31207	35623	40317	29665	24982	31255	29498	28272	24167	18123	18777	21023	19225	23963	25285	24468	26116	34817	35824	30066	24915		
Landings	ATE	Bait boat	19717	17793	15261	18467	15646	13570	11401	12639	14261	16558	9965	14018	11488	10099	14773	9770	12836	12914	9553	8851	9370	12382	9178	6803	9450	9354	10065	8065	7499	7078		
		Longline	10253	9740	7171	9079	14876	13935	14493	10740	13872	13063	11588	7576	5864	9183	11537	7206	7234	13437	8562	7443	5161	6298	5337	5657	4742	4343	4860	4583	5025	6167		
		Other surf.	1739	2622	1353	1399	1667	1658	1688	1770	1571	1465	2301	1951	1624	2309	2661	2110	2644	1951	1498	1740	1688	1101	1891	2979	1550	1596	2470	2329	1603	3159		
	ATW	Purse seine	128020	97549	99810	92310	90276	87732	87737	78334	82401	72079	70787	89191	85808	74702	57798	55429	54152	47126	73123	79674	79102	71875	73373	66076	71803	84898	94971	83847	89299	90817		
		Bait boat	4718	5359	6276	6383	7094	5297	4560	4275	5511	5364	6753	5572	6009	3764	4868	3867	2695	2304	886	1331	1436	2311	1299	1602	513	743	1216	866	715	862		
		Longline	19749	14967	18442	13675	12626	11560	12605	11896	12426	14254	16163	15696	11926	10166	18165	18171	15463	16098	13773	14650	14882	11963	14933	11864	8939	8803	11456	10407	9876	10091		
Landings(FP)			1124	2921	2463	3447	3059	2509	813	1495	1488	1781	2051	387	321	1305	1534	1054	747	836	1008	1423	1869	3021	1872	1332	1401	1855	1691	1155	1567			
Discards	ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		ATW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	ATE	CP	292	510	441	211	137	216	78	70	115	170	35	34	34	34	34	0	0	23	98	0	0	0	0	0	0	0	0	2	1	150		
		Belize	0	0	0	0	0	1	0	3	963	0	326	406	0	0	0	0	0	0	0	0	405	1794	3172	5861	5207	7036	7132	3497	5811	8121	9152	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cape Verde			2136	1932	1527	1612	1943	1908	1518	1783	1421	1663	1851	1684	1953	1868	3236	6019	5648	4568	7905	4638	5856	6002	4603	7513	4507	7823	6990	2756	5498	3699		
China PR			0	0	0	139	156	200	124	84	71	1535	1652	586	262	1033	1030	1112	1056	1000	365	214	169	220	170	130	20	78	286	346	188	163		
Curaçao			0	0	0	0	0	0	3183	6082	6110	4039	5646	4945	4619	6667	4747	24	1939	1368	7351	6293	5302	4413	6792	3727	5152	6140	7905	6535	7543	7751		
Côte d'Ivoire			0	0	0	0	0	0	0	2	0	0	673	213	99	302	565	175	482	216	626	573	470	385	1481	2077	324	251	315	952	116	2649		
EU.Denmark			0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EU.España			68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	31105	31469	24884	21414	11795	11606	13584	24409	32793	25560	21026	18854	11878	14225	21094	19266	12308	10669	14457		
EU.Estonia			0	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EU.France			45572	34788	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211	32753	32429	23949	22672	18940	11330	16115	18923	20280	22037	18506	20291	21087	19443	26198	25831	24581	17745		
EU.Ireland			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EU.Italy			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EU.Latvia			0	255	54	16	0	55	151	223	97	25	36	72	334	334	334	334	334	0	0	0	200	143	15	0	0	0	23	0	0	0		
EU.Lithuania			0	332	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EU.Malta			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
EU.Poland			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EU.Portugal			179	328	195	128	126	231	288	176	267	177	194	4	6	4	5	16	274	865	300	990	537	452	355	335	69	76	112	67	133	125		
EU.United Kingdom			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	21	22	1	0	0	0	0	0	0	0	
El Salvador			0	0	0	0	0	0	0	0	0	0	0	0	933	0	0	0	0	0	0	0	0	0	0	0	0	2750	8252	6227	5553	3959		
Gabon			0	0	0	12	88	218	225	225	295	225	162	270	245	44	6	2	44	0	1	0	0	0	0	0	0	0	0	1	3	0	0	
Gambia			2	16	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ghana			11988	9254	9331	13283	9984	9268	8182	15087	13850	21450	12673	23845	18546	15839	15444	13019	14037	15570	16521	15858	20252	18501	16470	13921	18939	19659	20218	20398	24346	24864		
Guatemala			0	0	0	0	0	0	0	0	0	0	0	0	0	0	2207	1588	2906	5265	3461	3736	2603	3124	2803	2949	4023	3754	5200	2703	3647	2499	2944	
Guinea Ecuatorial			0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	892	892	199	0	2	11	9	6	0	8	10		
Guinée Rep.			0	0	0	0	0	208	1956	820	0	0	0	0	0	0	0	0	0	0	0	0	298	292	1559	1484	823	0	0	0	0	0	0	
Honduras			0	0	2	0	0	4	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Japan			5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2286	1550	1534	1999	5066	3088	4206	8496	5266	3563	3041	3348	3637	3843	3358	2857	2914	2708	2946	3430		
Korea Rep.			324	259	174	169	436	453	297	101	23	94	142	3	8	209	984	95	4	303	983	381	324	20	26	97	77	36	356	408	449	507		
Liberia			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	71	89	100	88	76	88	1	6	0	
Libya			0	0	0	0	0	0	0	0	0	0	0	208	73	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Maroc			5306	1799	2653	2396	3017	2290	3430	1947	2276	2307	2441	3000	2111	1675	814	1940	222	102	110	110	44	272	55	137	107	72	115	113	108	228		
Mauritania			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Namibia			0	0	0	0	35	14	72	69	3	147	59	165	89	139	85	135	59	28	11	1	9	90	24	6	15	42	53	53	424	82		
Nigeria			0	0																														

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	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				
	Cambodia	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Cayman Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Congo	22	17	18	17	14	13	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Cuba	798	658	653	541	238	212	257	269	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Faroe Islands	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Georgia	0	25	22	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	NEI (ETRO)	0	1636	2359	388	477	1847	0	148	0	0	1510	1345	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	NEI (Flag related)	1115	2310	1315	1157	2524	2975	3588	3368	5464	5182	3072	2019	43	466	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Seychelles	0	0	0	0	0	0	0	0	0	6	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Ukraine	0	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
ATW	CP	Barbados	89	108	179	161	156	255	160	149	150	155	142	115	178	211	292	197	154	156	79	129	131	195	188	218	262	324	270	248	121			
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	143	1164	1160	940	264	42	41	38	33	0	2163	359	623	955			
		Brazil	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503	6985	7223	3790	5468	2749	3313	3677	3615	4639	7277	11645	13643	16682	18362	16381	12907		
		Canada	7	29	25	71	52	174	155	100	57	22	105	125	70	73	304	240	293	276	168	53	166	50	93	74	34	59	19	193	15	108		
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		China PR	0	0	0	0	0	0	0	0	628	655	22	470	435	17	275	74	29	124	284	248	258	126	94	81	73	91	182	232	172	158		
		Curaçao	170	150	160	170	155	140	130	130	130	130	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127	107	126	72	22		
		EU.España	2	1462	1314	989	7	4	36	34	46	30	171	0	0	0	0	1	84	81	69	27	33	32	138	155	105	360	357	239	299			
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	456	712	412	358	647	632	403	346	488	257				
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151	60	88	179	260	115	127	92	4	2	0	15	70	505	131			
		El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	381	91	21	18			
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Grenada	530	620	595	858	385	410	523	302	484	430	403	759	593	749	460	492	502	633	756	630	673	0	0	0	0	0	0	0	0	0		
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	71	40	13				
		Japan	1734	1698	1591	469	589	457	1004	806	1081	1304	1775	1141	571	755	1194	1159	437	541	986	1431	1539	1106	1024	734	465	612	462	415	147	689		
		Korea Rep.	484	1	45	11	0	0	84	156	0	0	0	0	0	0	580	279	270	10	52	56	470	472	115	39	11	12	3	6				
		Mexico	112	433	742	855	1093	1126	771	826	788	1283	1390	1084	1133	1313	1208	1050	938	890	956	1211	916	1174	1414	1004	1045	968	1279	1241	1028	760		
		Panama	2651	2249	2297	0	0	0	0	0	0	5	0	20	28	0	0	2804	227	153	119	2134	1126	1630	1995	902	1580	1863	1620	2104	2379			
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	40	48	22	65	16	43	37	35	48	687	1989	1365	1165	568	4251	3430	2680	2989	2547	2274	854	963	551	352	505	153	434	701	373	105		
		Trinidad and Tobago	304	543	4	4	120	79	183	223	213	163	112	122	125	186	224	295	459	615	520	629	788	799	931	1128	1141	1179	1057	890	1214	982		
		U.S.A.	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5710	7695	6516	5568	7091	5529	2473	2788	2679	3315	4777	4177	3184	2798	4104	4444	2720	2656		
		UK.Bermuda	15	17	42	58	44	44	67	55	53	59	31	37	48	47	82	61	31	30	15	41	37	100	66	36	12	10	9	25	32	50		
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	10	5	0	0	0	0		
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	0	0		
		Uruguay	18	62	74	20	59	53	171	53	88	45	45	91	91	95	204	644	218	35	66	76	122	24	6	7	0	0	0	0	0	0		
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	681	689	661	555	873	816	720	330	207	124	17	0	0	0	0	0	0		
		Venezuela	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	11663	18687	11421	7411	5792	5097	6514	3911	3272	3198	4783	4419	4837	5050	3772	3127	4204	5059	2743	2029		
NCC		Chinese Taipei	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1540	1679	1269	400	240	315	211	287	305	252	236	139	293	181	213	395	272		
		Colombia	237	92	95	2404	3418	7172	238	46	46	46	46	46	46	46	46	46	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	183	181	3				
		Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1943	1829	0	0	0	0	0	0	0	
NCO		Argentina	23	34	1	0	0	0	0	0	0	0	0	0	0	327	327	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	
		Cuba	53	18	11	1	14	54	40	40	15	15	0	0	65	65	65	65	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Dominica	18	12	23	30	31	9	0	0	0	80	78	120	169	119	81	119	65	103	124	102	110	132	119	120	256	194	179	209	194			
		Dominican Republic	0	0	0	0	0	0	0	0	89	220	226	226	226	226	226	226	226	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Jamaica	0	0	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NEI (Flag related)	2985	2008	2521	1514	1880	1227	2374	2732	2875	1578	2197	765	14	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	29	13				
		Seychelles	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		St. Lucia	58	49	58	92	130	144	110	110	276	123	134	145	94	139	147	172	103	82	106	97	223	114	98	136	93	175	191	232	199			
Landings(FP)	ATE	CP	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	50	71	27	109	35	0	0	0	0	0	0	0	
		Cape Verde	0	0	0	0	0																											

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BET-Table 1. Estimated catches (t) of bigeye tuna (*Thunnus obesus*) by area, gear and flag.  
 BET-Tableau 1. Prises estimées (t) de thon obèse (*Thunnus obesus*) par zone, engin et pavillon.  
 BET-Tabla 1. Capturas estimadas (t) de patudo (*Thunnus obesus*) por area, arte y bandera.

		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	
<b>TOTAL</b>	<b>A+M</b>	85264	97197	100117	113861	134933	128148	120803	110280	107994	121541	103510	91051	75658	87487	89981	67956	59192	69998	63172	76426	76048	76749	71317	66976	75019	79524	79109	78584	72944	74091	
Landings	Bait boat	18283	17743	16258	16472	20358	25697	18352	21289	19190	22200	12149	14391	8455	11235	20259	13124	10631	10333	6335	11565	7853	12849	10510	9214	8726	8020	6787	8436	7977	7342	
	Longline	56537	61655	62484	62891	78908	74872	74930	68312	71857	77227	72011	56123	47351	55356	49400	37961	34182	46231	41063	43533	42516	37899	34930	32245	36769	40362	36321	35156	32038	34199	
	Other surf.	284	332	513	622	967	551	353	534	428	672	451	766	221	447	286	716	527	431	192	241	476	957	961	2764	4950	5957	6395	7144	4568	5523	
	Purse seine	9413	15527	19227	31586	32668	25361	26628	19152	15531	20258	17537	19516	19418	19582	19016	15129	13310	12311	14810	20007	24209	23767	24080	22122	23965	24159	28418	26838	27284	27001	
Landings(FP)	Purse seine	747	1941	1636	2290	2032	1667	540	993	989	1184	1363	257	214	867	1019	1026	542	692	772	1081	994	1277	823	632	609	989	1187	972	1049		
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	2	0	0	26	15	
	Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	2	10	
Landings	CP	Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	253	
	Barbados	0	0	0	0	0	0	0	24	17	18	18	6	11	16	19	27	18	14	14	7	12	7	15	11	26	30	19	16	29	14	
	Belize	0	0	0	0	10	0	5	195	0	134	96	0	0	0	0	4	60	70	234	249	1218	1242	1336	1502	1877	1764	1961	2135	2307		
	Brazil	591	350	790	1256	601	1935	1707	1237	776	2024	2768	2659	2582	2455	1496	1081	1479	1593	958	1189	1173	1841	2120	3623	6456	7750	7660	7258	5096	6249	
	Canada	10	26	67	124	111	148	144	166	120	263	327	241	279	182	143	187	196	144	130	111	103	137	166	197	218	257	171	214	237	193	
	Cape Verde	52	151	305	319	385	271	299	228	140	9	2	0	1	1	1077	1406	1247	444	545	554	1037	713	1333	2271	2764	1680	1107	1418	880		
	China PR	0	0	0	428	476	520	427	1503	7347	6564	7210	5840	7890	6555	6200	7200	7399	5686	4973	5489	3720	3231	2371	2232	4942	5852	5514	4823	5718		
	Curaçao	0	0	0	0	0	1893	2890	2919	4016	3098	3757	2221	3203	3526	27	416	252	1721	2348	2688	3441	2890	1964	2315	2573	3598	2844	3530	2787		
	Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	790	576	47	507	635	441	12	544	1239	384	1998	
	EU.España	10355	14705	14656	16782	22096	17849	15393	12513	7110	13739	11250	10133	10572	11120	8365	7618	7454	6675	7494	11966	11272	13100	10914	10082	10736	10058	11469	11544	8400	9117	
	EU.France	5023	5576	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293	3940	2926	2816	2984	1629	1130	2313	3329	3507	3756	3222	3549	2548	4566	4039	4055	5118	
	EU.Ireland	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
	EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.Portugal	6233	5718	5796	5616	3099	9662	5810	5437	6334	3314	1498	1605	2590	1655	3204	4146	5071	5505	3422	5605	3682	6920	6128	5345	3869	3135	2187	3146	4405	3146	
	EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	32	0	0	0	0	0	0	0	0	0	0	
	El Salvador	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	992	1450	1826	2634	2464	
	FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	90	21	0	28	6	0	2	3	0	2	0	0	0	0	0	0	0	0	0	
	Gabon	0	0	0	1	87	10	0	0	184	150	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ghana	5031	4090	2866	3577	4738	5517	4751	10174	10647	11704	5632	9864	6480	9061	17888	8860	2307	2559	3372	4515	6253	3541	4468	2963	4175	5918	5194	3838	3636	2865	
	Grenada	0	65	25	20	10	0	0	1	0	0	0	0	0	0	0	0	10	31	0	0	0	0	0	0	0	0	0	0	0	0	
	Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	736	831	998	949	836	998	913	1011	282	262	163	993	340	1103	1602	1488	1623	
	Guinea Ecuatorial	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	50	0	58	0	3	10	17	4	11	7	8	
	Guinea Rep.	0	0	0	0	0	334	2394	885	0	0	0	0	0	0	0	0	0	0	0	0	328	322	1516	1429	902	0	0	0	0	0	
	Honduras	0	0	44	0	0	61	28	59	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Iceland	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Japan	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24605	18087	15306	19572	18509	14026	15735	17993	16684	16395	15205	12306	15390	13397	13603	12390	10365	10994	9854	9477	
	Korea Rep.	2690	802	866	377	386	423	1250	796	163	124	43	1	87	143	629	770	2067	2136	2599	2134	2646	2762	1908	1151	1039	675	562	432	623	540	
	Liberia	16	13	42	65	53	57	57	57	57	57	57	57	57	57	0	0	0	0	0	0	0	0	0	0	0	0	27	98	1	3	
	Libya	0	0	508	1085	500	400	400	400	400	400	400	31	593	593	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Maroc	68	206	81	774	977	553	654	255	336	1444	1160	1181	1154	1399	1145	786	929	700	802	795	276	300	300	308	300	309	350	410	500	850	
	Mauritania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
	Mexico	0	0	0	1	4	0	2	6	8	6	2	2	7	4	5	4	3	3	1	1	3	1	1	2	1	2	3	3	3	3	
	Namibia	0	0	0	0	715	29	7	46	16	423	589	640	274	215	177	307	283	41	146	108	181	289	376	135	240	465	359	141	109	79	
	Nigeria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	
	Norway	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	6150	7446	9991	10138	13234	9927	4777	2098	1252	580	952	562	211	0	1521	2310	2415	2922	2263	2405	3047	3462	1694	2774	2315	1289	2337	1664	2067	2995	
	Philippines	0	0	0	0	0	0	0	1154	2113	975	377	837	855	1854	1743	1816	2368	1874	1880	1399	1267	532	1323	1964	0	0	0	0	0	0	
	Russian Federation	0	0	5	0	0	13	38	4	8	91	0	0	0	0	1	1	26	73	43	0	0	0	0	0	0	0	0	0	0	0	
	S. Tomé e Príncipe	6	3	4	4	3	6	4	5	6	5	4	4	4	11	6	4	0	92	94	97	100	103	107	110	633	421	393	2	6		
	Senegal	0	10	5	8	123	357	190	272	789	1372	915	1159	497	322	490	770	1318	1293	734	1144	969	479	436	606	369	1031	1500	2978	2870	2272	

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		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
	Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	0	60	20	22	74	203	288	245	209	0	0	0	0	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151	106	135	97	85	38	70	41	80	27	0	0	0	0	
	NCO Mixed flags (EU tropical)	153	663	379	494	457	582	169	301	193	143	281	28	8	198	378	294	189	348	337	375	324	257	0	0	0	989	1187	972	1049	
Discards	CP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	38	2	10
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	15
	Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK,Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SKJ-Table 1. Estimated catches (t) of skipjack tuna (*Katsuwonus pelamis*) by area, gear and flag.

SKJ-Tableau 1. Prises estimées (t) de listao (*Katsuwonus pelamis*) par zone, engin et pavillon.

SKJ-Tabla 1. Capturas estimadas (t) de listado (*Katsuwonus pelamis*) por area, arte y bandera.

			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	
TOTAL			145047	223469	171204	209820	191386	174793	157191	148928	161471	180840	155521	163633	122642	155504	182020	172499	138376	143635	145104	163603	189782	219484	251498	259224	232405	241903	257289	268507	306639	264395	
ATE			118937	190065	141050	176600	161437	152933	129629	117217	132384	153484	126328	132182	101042	130755	154558	143982	111924	118192	123082	137828	163875	187073	218663	224143	205208	221192	235206	244938	284674	245124	
ATW			26110	33404	30155	33221	29949	21860	27562	31712	29087	27356	29193	31451	21600	24749	27461	28517	26453	25443	22022	25774	25907	32411	32835	35081	27196	20711	22083	23569	21965	19272	
Landings	ATE	Bait boat	37113	41326	35676	31734	37821	33955	35947	37288	46804	44915	33759	56702	31195	34466	54917	48601	44788	43451	31908	35119	38632	38456	44843	30746	25709	23848	29002	25786	3194	24384	
		Longline	0	5	3	2	10	3	7	47	85	42	48	53	59	83	67	83	204	428	199	59	46	35	58	79	54	21	540	498	113	350	
		Other surf.	982	1842	1408	948	311	308	323	131	930	288	2335	662	534	385	1008	2351	5181	3323	3749	5121	5073	5491	6740	7199	2158	2521	2496	4689	5077	5404	
		Purse seine	75014	131746	91194	126043	107434	105657	89135	72002	76849	99003	79552	72760	67589	89053	90610	87659	58570	65764	81431	89059	119119	133696	160113	179826	170369	183211	190383	202675	234587	214777	
		ATW	22350	24096	21112	19902	22855	17744	23741	27045	24727	23881	25641	25142	18737	21990	24028	26028	23766	23888	20702	23518	29468	32187	24814	17538	16810	14647	14926	15410	14677	15410	
		27	42	37	21	16	36	21	7	21	58	22	60	334	95	206	207	286	52	49	20	854	352	62	1194	464	206	804	291	322	412		
		492	739	496	504	1367	2021	450	313	513	481	467	951	413	367	404	316	355	283	370	202	306	731	498	792	837	709	1520	5694	4769	2277		
		3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116	2296	2769	1967	2045	1209	901	2035	1943	1859	1582	908	1081	2259	2950	2937	1948	1173		
		5828	15145	12769	17873	15860	13010	4217	7749	7716	9237	10634	2004	1666	6769	7956	5288	3181	5226	5796	8471	8205	9395	6909	6293	6918	10960	12785	11196	11647			
Discards	ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	631	0	94	56	208
	ATW	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	ATE	CP	0	0	0	0	0	0	0	0	171	43	89	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Algeria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Angola	69	66	41	13	7	3	15	52	2	32	14	14	14	14	10	0	0	0	0	50	636	44	91	514	0	1	1	1	0	3240	
		Belize	0	0	0	0	0	0	0	0	720	0	229	278	0	0	0	0	0	0	0	1373	2714	7429	15554	6218	10779	12599	7730	9958	20748	17063	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	806	1333	1257	1138	1176	1585	581	858	1245	1040	789	794	398	343	1097	7157	4754	5453	4682	4909	5155	7883	5535	16016	15254	17600	10925	7823	7852	5785	
		China PR	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Curaçao	0	0	0	0	0	0	7096	8444	8553	10045	11056	15450	7246	12084	10225	101	3042	1587	6436	9143	9179	11939	12779	17792	18086	19621	22180	20660	24539	17360	
		Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	1173	259	292	143	559	1259	1565	1817	2328	2840	2840	5968	10923	8063	2365	254	675	1534	22	3241
		EU.España	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25466	44837	38751	28178	22292	23723	35124	36722	41235	56908	67040	66911	51628	46085	52110	57458	52912	48378	
		EU.Estonia	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.France	16996	32928	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16637	19899	21879	14850	7034	4168	4439	7789	14749	13067	13139	16242	17406	20563	19435	16574	22862	20438	
		EU.Germany	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
		EU.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	102	99	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	0	0	8	6	0	0	0	0	0	0	0	7	0	0
		EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	4	29	34	17	0	0	0	0	0	0	0	0	0	0	0	47	57	91	131
		EU.Latvia	0	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.Lithuania	0	221	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	0	0	0	6	0	
		EU.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0
		EU.Portugal	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958	4315	8504	4735	11158	8995	6057	1084	12974	4143	2794	4049	1712	1347	708	1785	7480	2799	
		EU.Rumania	142	349	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6970	16949	14577	17045	16729
		Gabon	0	0	0	1	11	51	26	0	59	76	21	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ghana	24251	25052	18967	20225	21258	18607	24205	26380	43612	54088	36517	57540	40194	34435	47746	54209	31934	35419	38648	43922	45505	44169	54264	48131	50146	62114	54883	57907	69381	60179	
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	2120	4808	6389	4959	5546	6319	4036	2951	2829	3631	4907	5811	7078	7386	9800	8648	7626	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1224	1224	1010	0	1	3	1	0	0	1	1	
		Guinée Rep.	0	0	0	0	0	975	6432	2408	0	0	0	0	0	0	0	0	0	0	0	1500	1473	7942	7363	5484	0	0	0	0	0	0	
		Japan	2566	4792	2378	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	4	5	2	4	1	1	3	5
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Maroc	6874	1795	880	3652	3672	6886	2859	5532	4741	4176	4091	1737	1303	3403	3843	4666	4032	1592													

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	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	
Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	543	410	161	185	0	0	14	
St. Vincent and Grenadines	29	27	20	66	56	53	37	42	57	37	68	97	357	92	251	251	355	90	83	54	46	50	0	36	39	47	0	78	36	35	
Trinidad and Tobago	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
U.S.A.	304	858	560	367	99	82	85	84	106	152	44	70	88	79	103	30	61	66	67	119	95	107	99	326	183	94	179	199	78	44	
UK,Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Venezuela	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	2890	6870	2554	3247	3270	1093	2008	921	757	2250	2119	1473	1742	1002	1179	2019	2317	2222	1276	927	
NCC Chinese Taipei	0	32	26	9	7	2	10	1	2	1	0	1	16	14	27	28	29	2	8	0	2	1	11	1	2	21	17	34	32	27	
Colombia	0	0	0	2074	789	1583	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	552	0	0	0	0	0	0	
NCO Argentina	106	272	123	50	1	0	1	0	2	0	1	0	0	0	30	0	0	0	0	3	12	0	0	0	0	0	0	0	0	0	
Cuba	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0	624	545	514	536	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dominica	60	38	41	24	43	33	33	33	33	85	86	45	55	51	30	20	28	32	45	25	0	13	0	4	41	16	27	28	0	0	
Dominican Republic	110	156	135	143	257	146	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jamaica	0	0	0	0	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	
Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Sta. Lucia	37	51	39	53	86	72	38	100	263	153	216	151	106	132	137	159	120	89	168	0	153	143	109	171	139	87	138	142	122	0	
Landings( ATE CP																															
Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	395	368	179	636	301	0	0	0	0	0	
Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	419	131	162	276	603	726	411	230	428	1362	0	0	0	0	0	
Curaçao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88	171	116	105	917	415	441	545	520	351	0	0	0	0	0	
Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	562	544	202	0	0	0	0	0	
EU.España	1888	4876	4455	5959	4719	2899	453	1990	2562	3802	3700	0	0	1738	1907	713	437	366	1158	1994	1394	1842	983	998	1623	0	0	0	0	0	
EU.France	2749	5094	5355	8055	7573	5568	2447	3414	3647	4316	4740	1786	1601	3484	3096	918	346	206	287	1120	743	1480	1646	463	440	0	0	0	0	0	
Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260	69	66	162	59	136	51	102	72	93	0	0	0	0	0	
Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	387	0	330	118	359	614	1778	2379	1670	2146	0	0	0	0	0	
Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	796	548	977	693	680	354	609	284	962	400	0	0	0	0	0	
NCO Mixed flags (EU tropical)	1192	5176	2959	3858	3568	4543	1316	2345	1508	1119	2194	218	65	1547	2953	1708	1478	3003	2998	2624	3427	2372	0	0	0	10960	12785	11196	11647	0	
Discards ATE CP																															
Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	631	0	94	56	208	
Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ATW CP Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SWO-ATL-Table 1. Estimated catches (t) of Atlantic swordfish (*Xiphias gladius*) by gear and flag.  
 SWO-ATL-Tableau 1. Prises estimées (t) d'espadon de l'Atlantique (*Xiphias gladius*) par engin et pavillon.  
 SWO ATL-Tabla 1. Capturas estimadas de pez espadal del Atlántico (*Xiphias gladius*) por arte y bandera.

	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			
TOTAL	32977	28876	29207	32868	34460	39036	35511	31567	26356	27123	27180	25139	23758	24077	25149	25541	25722	27931	23461	24808	24256	23891	24555	21260	20648	21018	21037	20728	19298	20250			
ATN	15672	14934	15394	16738	15501	17105	15222	13025	12329	11622	11453	10011	9654	11442	12068	12377	11478	12302	11050	12081	11558	12523	13868	12069	10678	10673	10376	10171	8895	10146			
ATS	17305	13893	13813	16130	18958	21931	18289	18542	14027	15502	15728	15128	14104	12634	13082	13163	14245	15629	12411	12727	12698	11368	10686	9191	9970	10345	10661	10557	10403	10104			
Landings	ATN	Longline	14215	14276	14356	15804	14365	15864	13822	12204	11062	10716	9921	8677	8799	10333	11407	11528	10846	11475	10341	11439	10964	11610	12955	11344	10059	10121	9802	9354	8379	9335	
	ATS	Other surf	1457	443	655	526	428	715	812	370	782	376	393	432	240	486	341	516	409	546	465	485	441	511	512	526	463	386	469	667	364	504	
	ATN	Longline	16705	13496	13422	15739	17839	21584	17859	18299	13748	14823	15448	14302	13576	11714	12558	12915	14033	15318	12022	12359	12189	11017	10255	8958	9736	10047	10515	10306	10349	10034	
	ATS	Other surf	600	397	391	391	1119	347	429	222	269	672	278	826	527	920	523	248	212	221	384	368	361	277	291	235	189	254	144	140	27	20	
Discards	ATN	Longline	0	215	383	408	708	526	562	439	476	525	1137	896	607	618	313	323	215	273	235	151	148	392	393	199	156	167	105	149	152	308	
	ATS	Other surf	0	0	0	0	0	26	12	12	4	1	6	8	5	7	10	8	9	9	7	5	0	0	0	0	0	0	0	0	0	0	
	ATN	Longline	0	0	0	0	0	0	1	21	10	6	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATS	Other surf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	ATN	CP	0	0	0	0	0	33	16	16	12	13	19	10	21	25	44	39	27	39	20	13	23	21	16	21	29	20	21	18	10		
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	112	106	184	141	142	76	1	3	59	145	117		
		Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285	1203	1558	1404	1348	1334	1300	1346	1551	1489	1505	1604	1579	1548	1188	782	995	
		China PR	0	0	0	75	86	104	132	40	337	304	22	102	90	316	56	108	72	85	92	92	73	75	59	96	60	141	135	81	86	92	
		Curaçao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	30	0	0	0	0	0	0	27	21	0	
		EU,Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU,España	6386	6633	6672	6598	6185	7176	5547	5140	4084	3996	4595	3968	3957	4586	5376	5521	5448	5564	4366	4949	4147	4889	5622	4084	4484	3750	4013	3916	3588	3186	3112
		EU,France	75	75	75	95	46	84	97	164	110	104	122	0	74	169	102	178	92	46	14	15	35	16	94	44	28	66	90	79	80	82	
		EU,Ireland	0	0	0	7	0	15	15	132	81	35	17	5	12	1	3	2	2	2	1	1	2	5	2	3	15	15	10	13	3		
		EU,Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
		EU,Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU,Portugal	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032	1320	900	949	778	747	898	1054	1203	882	1438	1241	1420	1460	1871	1691	2392	
		EU,Romania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU,United Kingdom	0	0	0	2	3	1	5	11	0	2	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
		El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		FR,St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Grenada	1	2	3	13	0	1	4	15	15	42	84	0	54	88	73	58	30	26	43	0	0	0	0	0	0	0	0	0	0	0	
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	575	705	656	889	935	778	1062	523	639	300	545	430	379	456	325	362		
		Korea Rep.	51	3	3	19	16	16	14	19	15	0	0	0	0	0	51	65	175	157	3	0	0	0	64	35	0	9	19	9	11		
		Liberia	3	0	7	14	26	28	28	28	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	95	5	7	
		Maroc	91	110	69	39	36	79	462	267	292	119	114	523	223	329	335	339	341	237	430	724	968	782	770	1062	1062	850	900	900	950	950	
		Mexico	0	0	0	6	14	10	22	14	28	24	37	27	34	32	44	41	31	35	34	32	35	38	40	33	32	31	36	64	44	30	
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	1	4	44	5	0	8	0	22	28	0	17	36	9	14	0	0	0	0	0		
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Senegal	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	28	11	44	43	49	78	52	51	44	57		
		Sierra Leone	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	3	0	3	23	0	4	3	1	0	1	0	22	22	7	7	7															

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	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	
Cambodia	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cuba	448	209	246	192	452	778	60	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Mixed flags (FR+ES)	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NEI (flag related)	439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Togo	3	5	5	8	14	14	64	0	0	0	0	0	0	0	9	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards																															
ATN CP																															
Canada	0	0	0	0	0	0	0	5	52	35	50	26	33	79	45	106	38	61	39	9	15	8	111	59	12	8	11	21	5	2	
EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Japan	0	0	0	0	0	0	0	0	0	0	598	567	319	263	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	170	46	19	0	2	0	0	0	0	
Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
U.S.A.	0	215	383	408	708	526	588	446	433	494	490	308	263	282	275	227	185	220	205	148	138	223	217	120	137	137	90	111	140	291	
U.K. Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	7	18	4	18	-7	7	
ATS CP																															
Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	6	0	0	0	0	0	0	0	0	0	0	0	0
EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	70	23	0	0	0	0	0	0	0	0
South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U.S.A.	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	117	0	45	43	2	111	26	49	

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WHM/RSP - Table 1. Estimated catches (t) of Atlantic white marlin (*Kajikia albigata*) and Roundscale spearfish (*Tetrapturus georgii*) by area, gear and flag.  
 WHM/RSP - Tableau 1. Prises estimées (t) de makaira blanc de l'Atlantique (*Kajikia albigata*) et Makaira épée (*Tetrapturus georgii*) par zone, engin et pavillon.  
 WHM/RSP - Tabla 1. Capturas estimadas (t) de aguja blanca del Atlántico (*Kajikia albigata*) y Marlin peto (*Tetrapturus georgii*) por area, arte, y bandera.

		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		
TOTAL	A+M	1739	1743	1537	1681	2202	1880	1679	1513	1945	1786	1535	1078	1012	845	841	768	612	748	714	755	506	530	465	647	452	491	465	439	258	232		
Landings	Longline	1545	1575	1389	1528	2065	1720	1535	1367	1717	1638	1403	970	834	756	757	689	532	629	607	632	419	414	372	464	373	444	419	400	187	176		
	Other surf.	88	59	59	56	64	36	56	62	189	85	89	86	139	71	55	60	65	81	84	95	68	85	62	56	61	34	33	41	26	10		
	Sport (HL+RR)	25	19	22	30	30	22	24	14	6	6	2	4	6	1	1	2	1	2	2	2	6	4	6	116	7	3	4	5	10	4		
Discards	Longline	81	90	88	67	43	101	65	70	32	57	41	17	29	17	27	17	12	36	21	24	12	27	24	11	11	10	9	12	34	62		
	Other surf.	0	0	0	0	0	0	0	0	1	0	1	4	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0		
Landings	CP	Barbados	39	17	24	29	26	43	15	41	33	25	24	15	15	18	16	33	22	24	26	6	3	5	6	6	10	14	17	22	11		
		Belize	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Brazil	205	377	211	301	91	105	75	105	217	158	106	172	407	266	80	244	90	52	55	53	35	75	71	352	102	121	67	47	62	76	
		Canada	0	0	0	0	4	4	8	8	5	5	3	2	1	2	5	3	2	1	2	1	2	1	2	3	5	3	1	2	1	1	
		China PR	0	0	0	0	9	11	9	11	15	30	2	20	23	8	6	9	6	10	5	9	8	3	4	2	0	0	0	3	2	3	
		Curacao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	
		Côte d'Ivoire	0	0	0	0	0	0	1	2	1	5	1	2	2	3	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	0	
		EU.España	12	26	23	26	26	36	151	93	101	119	186	61	6	22	64	58	51	46	35	16	113	4	35	42	99	125	96	118	9	9	
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0		
		EU.Portugal	0	0	0	0	0	0	0	1	1	0	0	1	5	19	30	22	2	35	40	11	18	25	10	9	7	11	13	0	0		
		El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Gabon	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	31	17	14	22	1	2	1	3	7	6	8	21	2	1	1	1	4	4	3	1	1	1	1	1	1	1	1	0	0		
		Grenada	0	0	0	0	0	0	0	0	0	0	1	15	8	14	33	10	12	11	17	14	0	0	0	0	0	0	0	0	0	0	
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Honduras	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	126	122	248	82	92	57	112	58	56	40	83	56	16	33	36	34	39	21	34	43	41	31	42	24	6	8	9	10	6	11	
		Korea Rep.	81	57	10	8	43	23	59	23	35	39	0	0	11	40	7	0	113	96	78	43	43	0	0	0	0	0	0	0	0	0	
		Liberia	0	0	0	0	0	1	1	3	8	4	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	1	7	11	3	1	3	6	11	13	16	15	28	25	16	14	14	19	20	28	36	30	20	26	20	12	16	9	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	1	12	0	0	0	0	0	0	0	0	1	1	2	2	1	2	2	2	2	0	0	0	0	
		S. Tomé e Príncipe	19	26	24	17	21	30	45	40	36	37	37	37	37	21	33	29	35	36	37	38	39	40	41	42	17	15	13	1	3		
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	1	0	0	0	0	0	0	1	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	5	
		Trinidad and Tobago	6	3	6	1	11	18	8	32	10	13	4	2	5	12	6	6	5	12	10	11	15	14	39	33	38	32	20	0	0	0	
		U.S.A.	17	13	11	19	13	7	12	8	5	5	1	3	6	1	1	1	1	0	2	2	2	2	1	4	2	3	1	2	3	3	
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	1	1	3	2	3	0	1	24	22	16	21	20	1	9	2	5	9	3	6	5	5	0	0	0	0	0	0	0	0	0	0
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	159	163	276	362	236	286	270	310	228	178	182	215	168	136	156	190	131	62	128	116	160	121	77	99	119	187	192	84	53		
		NCC Chinese Taipei	895	803	598	616	1350	907	566	441	506	465	437	152	178	104	172	56	44	54	38	28	20	28	15	7	7	10	10	5	6	2	
		Costa Rica	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NCO Argentina	9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cambodia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cuba	20	10	10	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mixed flags (FR+ES)	37	11	10	12	11	9	7	7	9	8	12	13	12	13	13	11	10	9	10	12	12	37	0	0	0	0	0	0	0	0	
		NEI (BIL)	0	0	0	0	0	0	0	0	0	0	34	77	4	30	134	42	37	170	204	199	0	11	0	0	0	0	0	0	0	0	
		NEI (ETRO)	0	0	0	114	214	237	285	359	526	498	322	180	11	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	0	1	1	
		Togo	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	CP	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19	1	0	0	0	0	0	0	0	0	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	0	0	0	0	0	0																									

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BUM-Table 1. Estimated catches (t) of Atlantic blue marlin (Makaira nigricans) by area, gear and flag.  
 BUM-Tableau 1. Prises estimées (t) de makaira bleu de l'Atlantique (Makaira nigricans) par zone, engin et pavillon.  
 BUM-Tabla 1. Capturas estimadas (t) de aguja azul del Atlántico (Makaira nigricans) por area, arte, y bandera.

		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		
TOTAL	A+M	4612	4220	3104	3175	4258	4230	5421	5737	5713	5408	5485	4474	3910	4419	3209	3570	3176	4364	3780	3345	3052	2901	2856	2162	2689	1930	2022	2134	1411	1181		
Landings	Longline	3618	3463	2319	2167	2966	2934	3786	4218	4165	3645	3658	2499	1743	2001	1666	1906	1739	2289	2162	1859	1773	1294	1198	1005	1534	1158	1229	1373	935	965		
	Other surf.	698	453	433	588	870	871	1121	951	1035	1242	1306	1403	1463	1651	886	1128	828	1396	731	777	741	858	917	746	900	550	511	613	380	120		
	Sport (HL+RR)	136	161	205	293	311	272	318	430	461	438	462	548	655	747	623	520	571	637	849	649	519	694	668	352	198	111	217	48	31	26		
Discards	Longline	159	142	146	127	111	153	197	139	51	83	60	22	37	19	34	24	38	42	37	40	19	56	70	55	54	106	52	73	44	62		
	Other surf.	0	0	0	0	0	0	0	0	1	0	0	2	11	0	1	1	0	0	1	20	1	0	2	4	3	5	13	27	21	9		
Landings	CP	Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Barbados	18	12	18	21	19	31	25	30	25	19	19	18	11	11	0	0	25	0	0	0	9	13	14	11	12	34	11	24	21	13	
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	3	3	7	47	19	8	5	13	1	6			
		Brazil	52	61	125	147	81	180	331	193	486	509	467	780	387	577	195	612	298	262	182	150	130	63	48	114	105	89	79	64	37	20	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	62	73	62	78	120	201	23	92	88	89	58	96	99	65	13	77	100	99	61	45	40	44	50	40	42	46	
		Curacao	50	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		Côte d'Ivoire	67	76	56	104	151	134	0	157	66	189	288	208	111	171	115	21	8	132	66	72	54	17	48	48	87	15	72	44	32	163	
		EU, España	6	14	47	44	55	40	158	122	195	125	140	94	28	12	51	24	91	38	55	160	257	131	190	147	209	287	225	321	0	0	
		EU, France	85	98	115	179	191	197	252	299	333	370	397	428	443	443	450	470	470	461	585	498	344	461	395	212	276	149	157	187	161	174	
		EU, Portugal	1	4	2	15	11	10	7	3	61	20	22	18	8	32	27	48	105	135	158	106	140	54	55	25	23	46	50	57	74	18	
		El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		FR, St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Gabon	0	0	0	1	2	0	304	5	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ghana	324	126	123	236	441	471	422	491	447	624	639	795	999	415	470	759	405	683	191	140	116	332	234	163	236	88	44	162	60	44	
		Grenada	30	36	30	33	52	50	26	47	60	100	87	104	69	72	45	42	33	49	54	32	69	53	32	63	63	0	0	0	0	0	
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	23	0	
		Japan	1217	900	1017	926	1523	1409	1679	1349	1185	790	883	335	267	442	540	442	490	920	1028	822	731	402	430	189	280	293	296	430	287	362	0
		Korea Rep.	324	537	24	13	56	56	144	56	2	3	1	1	0	0	1	6	33	64	91	36	85	57	34	24	10	3	26	25	25	13	0
		Liberia	0	0	0	0	0	87	148	148	701	420	712	235	158	115	188	304	162	274	76	56	46	133	94	178	293	35	127	10	1	2	0
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	4	7	82	0	0	
		Mexico	0	0	0	3	13	13	13	13	27	35	68	37	50	70	90	86	64	91	81	93	89	68	106	86	67	72	66	60	68	51	0
		Namibia	0	0	0	0	0	0	0	0	0	0	0	3	0	5	9	57	0	50	2	23	10	0	8	36	8	32	57	84	53	0	
		Panama	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0	
		Philippines	0	0	0	0	0	0	0	7	71	38	0	0	0	0	0	0	0	8	0	3	4	1	2	2	2	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		S. Tomé e Príncipe	17	18	21	25	28	33	36	35	33	30	32	32	32	32	9	21	26	66	68	70	72	74	76	78	81	11	10	13	5	7	
		Senegal	1	4	8	0	9	0	2	5	0	0	0	11	24	32	11	1	5	91	114	61	41	64	164	45	72	10	82	39	25	21	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	2	0	1	0	0	0	1	1	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	1	2	2	2	1	0	1	0	0	0	20	0	0	0	0	1	3	2	1	0	0	2	0	0	2	2	1	0	
		Trinidad and Tobago	11	6	1	2	16	28	14	50	16	20	51	17	16	9	11	7	14	16	34	26	22	25	46	48	48	35	19	0	0	0	
		U.S.A.	29	33	51	80	88	43	43	46	50	37	24	16	17	19	26	16	17	9	13	6	4	6	14	9	1	9	19	13	20	19	0
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK, Bermuda	17	18	19	11	15	15	3	5	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	1	2	1	2	1
		UK, British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK, St Helena	0	0	0	0	0	2	2	1	2	4	4	3	4	1	1	2	2	3	4	2	2	2	12	2	1	1	0	0	0	0	
		UK, Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Uruguay	0	1	0	0	3	1	1	26	23	0	0	0	1	5	3	2	8	5	0	6	1	0	0	0	0	0	0	0	0	0	0
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	7	8	6	3	2	0	
		Venezuela	75	56	67	86	122	117	148	142	226	240	125	84																			

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SAI-Table 1. Estimated catches (t) of Atlantic sailfish (Istiophorus albicans) by area, gear and flag.  
 SAI-Tableau 1. Prises estimées (t) de volleur de l'Atlantique (Istiophorus albicans) par zone, engin et pavillon.  
 SAI-Tabla 1. Capturas estimadas (t) de pez vela del Atlántico (Istiophorus albicans) por area, arte, y bandera.

	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				
TOTAL	3550	2701	3239	3228	2292	2445	3023	2604	2978	2922	3976	4603	4411	4137	4339	4059	3854	4137	3962	3753	3082	2888	2866	2324	2022	2144	2635	2728	2305	3266				
ATE	2315	1474	1776	1814	1171	1231	1880	1347	1363	1342	1980	2805	2351	2659	2612	2220	1916	2577	2229	2129	1853	1553	1591	1339	1163	1246	1421	1648	936	2008				
ATW	1235	1226	1463	1414	1121	1214	1143	1257	1615	1580	1996	1797	2060	1498	1727	1839	1939	1561	1733	1624	1229	1335	1275	985	859	898	1214	1080	1369	1258				
Landings	ATE	Longline	109	229	300	332	234	261	729	216	275	273	198	568	756	497	335	319	580	590	628	622	514	546	543	457	423	436	337	372	496	955		
	Other surf.	1249	816	783	1034	871	836	970	644	859	883	1231	1470	1496	1860	2057	1758	1289	1798	1493	932	900	870	749	985	754	730	749	1082	1175	436	1046		
	Sport (HL+RR)	957	429	692	448	67	135	182	488	228	186	551	767	98	282	219	143	46	189	108	575	439	136	58	128	10	56	0	94	1				
	ATW	Longline	655	698	919	958	651	581	453	641	1033	1102	1711	1660	1636	1161	1271	1704	1737	1299	1406	1153	1131	1213	1081	880	730	884	1184	1052	1349	1242		
	Other surf.	251	93	175	160	225	256	300	297	244	163	666	311	331	449	131	194	246	310	457	92	102	154	86	107	1	8	10	9					
	Sport (HL+RR)	267	371	333	233	217	348	230	350	267	163	76	60	106	0	0	2	6	7	4	2	10	7	12	5	15	11	4	5					
Discards	ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	ATW	Longline	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7	3	5	8	9	10	4	10	20	12	11	7	7	7	7	6		
	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Landings	ATE	CP	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		China PR	0	0	0	0	3	3	3	5	9	4	5	11	4	4	8	16	8	1	4	5	2	4	1	1	2	2	4	2		11		
		Curacao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Côte d'Ivoire	58	38	69	40	54	66	91	65	35	80	45	47	65	121	73	93	78	52	448	74	24	108	192	80	99	55	38	405	35	959		
		EU.España	0	13	3	42	8	13	42	48	15	20	8	195	245	197	169	202	214	227	239	318	206	197	257	229	302	333	225	236	277	324		
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Portugal	0	0	1	2	1	2	1	2	27	53	13	4	10	13	19	31	137	43	49	131	170	121	72	109	33	41	30	27	123	65		
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Gabon	0	0	0	3	3	110	218	2	0	0	0	0	0	4	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	395	463	297	693	450	353	303	196	351	305	275	568	592	566	521	542	282	420	342	358	417	299	201	220	191	99	238	267	82	78		
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Honduras	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	31	6	15	27	45	52	47	19	58	16	26	6	20	22	70	50	62	144	199	94	115	143	157	71	59	36	52	45	47	63		
		Korea Rep.	12	22	2	2	5	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Liberia	0	0	0	0	33	85	43	136	122	154	56	133	127	106	122	118	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Moroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		S. Tomé e Príncipe	97	84	78	81	88	92	96	139	141	141	136	136	136	515	346	292	384	114	119	121	124	127	131	134	312	212	219	2	7			
		Senegal	1040	466	860	462	162	167	240	560	260	238	786	953	240	673	567	463	256	737	446	630	484	174	247	165	37	60	586	301	313	397		
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NCC	Chinese Taipei	3	4	80	157	38	58	24	56	44	66	45	50	62	49	15	25	36	109	121	80	21	52	54	42	17	21	23	26	21	16		
	NCO	Benin	21	20	21	20	20	19	6	4	5	5	12	2	2	5	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cuba	61	184	200	77	83	72	533	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Mixed flags (FR+ES)	595	174	150	182	160	128	97	110	138	131	353	400	365	413	336	264	274	205	251	308	265	275	275	275	275	275	0	0	0	0	0	
		NEI (BILL)	0	0	0	0	0	0	0	0	0	28	269	408	213	55	1	105	43	20	11	0	44	0	0	0	0	0	0	0	0	0	0	
		NEI (ETRO)	0																															



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SMT-Table 1. Reported landings (t) of small tuna species, by area and flag.  
 SMT-Tableau 1. Débarquements déclarés (t) des thonides mineurs, par zone et pavillon.  
 SMT-Tabla-1. Descarques declaradas (t) de pequeños túnidos por area y bandera.

		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					
BLF	TOTAL	3888	4202	4353	3535	2719	4051	4488	3258	3395	3203	2483	4034	4756	1303	1926	1031	1937	1927	1669	1442	1837	2083	2849	2134	1152	1306	1920	1334	1539	1252					
	Landings	A+M	All gears																																	
	Discards	A+M	All gears																																	
	Landings	A+M	CP	Angola																																
				Brazil	355	130	49	22	38	153	649	418	55	55	38	149	1669	1	118	91	242	253	266	10	9	46	124	110	299	325	228	192	592	410		
				Curaçao	70	60	60	65	60	50	44	45	45	45	45	45	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
				EU.España	0	0	307	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
				EU.Francia	865	1210	1170	1140	1330	1370	1040	1040	1040	1040	1040	1040	1040	0	0	0	0	0	0	0	0	32	19	26	0	14	12	14	6	19		
				Grenada	293	195	146	253	189	123	164	126	233	94	164	223	255	335	268	306	371	291	290	291	291	291	291	0	0	0	0	0	0	0		
				Mexico	0	0	0	0	0	0	0	0	0	0	12	0	0	10	9	10	12	6	7	6	9	5	4	4	4	5	4	4	3	0		
				St. Vincent and Grenadines	38	11	7	53	19	20	18	22	17	15	23	24	24	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0		
				Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
				U.S.A.	81	112	127	508	492	582	447	547	707	617	326	474	334	414	675	225	831	422	649	619	911	967	1919	1326	585	761	1265	946	1074	790		
				UK.Bermuda	13	8	6	5	7	4	5	4	6	6	5	4	5	9	4	5	8	7	6	7	9	8	11	15	20	17	17	16	10	0		
				UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0		
				UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				Venezuela	1150	1598	2148	1224	21	624	758	498	1034	1192	696	1902	1211	319	732	225	237	777	231	293	331	473	237	191	88	81	197	33	42	4		
				NCO Cuba	487	318	196	54	223	156	287	287	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				Dominica	19	10	14	15	19	30	0	0	0	79	83	54	78	42	20	38	47	29	37	45	41	37	39	37	39	24	34	0	0	0		
				Dominican Republic	520	536	110	133	239	892	892	231	158	18	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				Jamaica	0	0	0	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				Sta. Lucia	17	14	13	16	82	47	35	40	100	41	45	108	96	169	96	126	182	151	179	165	203	229	192	147	104	80	156	119	0	0		
				Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BLT	TOTAL	11994	8777	5714	3420	5300	4301	5909	3070	2309	2646	3912	5796	6041	3794	6223	4231	4090	5459	6825	5557	7952	9484	6234	7653	3916	5571	4003	3348	4055	3177	0	0			
	Landings	A+M	All gears																																	
	Discards	A+M	All gears																																	
	Landings	A+M	CP	Algerie	0	174	270	348	306	230	237	179	299	173	225	230	481	0	391	547	586	477	1134	806	970	1119	1236	577	1025	1984	1592	231	799	905		
				Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	406	0	133	131	34	72	0	0	
				Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
				EU.Croatia	0	24	21	52	22	28	26	26	26	26	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				EU.España	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493	495	1009	845	1101	3083	3389	726	3812	3227	1620	2654	749	1241	1081	2175	778	1026	0	
				EU.Francia	0	8	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
				EU.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				EU.Greece	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120	246	226	180	274	157	620	506	169	129	118	155	108	311	207	181	294	513	0	
				EU.Italy	494	432	305	379	531	531	229	229	229	462	462	462	2452	1463	1819	866	0	0	342	732	574	653	613	892	0	0	0	0	0	966	25	
				EU.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				EU.Malta	21	20	10	9	1	2	6	1	3	1	1	1	2	8	4	11	14	12	7	11	23	2	85	14	14	11	9	12	12	27	0	
				EU.Portugal	0	0	0	0	0	0	0	28	263	494	208	166	231	299	580	867	602	311	436	654	387	55	38	0	0	0	0	0	0	0	64	0
				Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				Maroc	2452	1289	1644	170	1726	621	1673	562	1140	682	763	256	621	246	326	50	199	35	83	336	525	237	194	237	171	811	200	0	442	0		
				Mauritania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Russian Federation	0	2171	814	70	100	0	0	0	0	0	408	1028	460	122	102	139	22	0	23	48	67	119	366	703	352	345	336	62	125	62	75	
				Syria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Tunisia	985	985	35	20	13	14	13	32	93	45	15	2300	932	989	1760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Turkey	0	35	0	324	77	0	0	0	0	0	316	316	316	316	0	284	1020	1031	993	836	1873	1081	2552	907	863	562	476	407	474	367	462	
				U.S.S.R.	3634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				NCO Serbia & Montenegro	0	13	1	0	0	2	6	6	6	6	7	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Yugoslavia Fed.	23	0	0	0																												





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			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		
		Benin	66	61	49	53	60	58	58	196	83	69	69	69	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cuba	88	63	33	13	15	27	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Germany Democratic Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (ETRO)	0	0	0	0	20	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	2	2	2	1	10	1	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0	1	0	0	
MED	CP	Algeria	0	522	585	495	459	552	554	448	384	562	494	407	148	0	158	116	187	96	142	119	131	98	6	157	341	204	268	444	298	242		
		EU.Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Croatia	0	2	3	2	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	28	25	44	37	43	31	1	0
		EU.Cyprus	23	25	21	11	23	10	19	19	19	16	19	19	19	0	0	0	0	0	6	5	4	0	0	0	0	0	0	0	0	0	0	0
		EU.España	0	0	0	0	0	15	18	9	15	0	8	82	32	0	41	262	116	202	212	86	299	488	441	235	300	456	384	486	289	640	640	
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Greece	0	0	0	0	0	0	0	0	0	0	195	125	132	0	112	69	72	183	148	165	301	276	363	289	271	501	299	489	635	635		
		EU.Italy	0	0	0	0	0	0	0	0	0	0	16	24	38	34	0	0	486	243	365	304	669	557	442	0	992	930	1032	1513	1513	1513		
		EU.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	2	5	7	5	21	6	4	1	6	6	6	6	7		
		Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	849	712	0	0	0	0	
		Libya	0	0	0	0	0	0	0	45	52	0	5	4	4	0	0	0	0	0	0	0	0	0	0	0	0	102	1100	48	80	80		
		Maroc	16	0	0	0	0	1	0	1	14	8	0	0	3	1	0	9	0	331	19	24	1	0	0	0	0	0	0	3	0	0	0	
		Syria	127	110	156	161	156	155	270	350	417	390	370	370	330	0	0	0	193	133	163	148	155	304	229	0	0	0	0	0	0	0		
		Tunisie	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	960	657	633	0	0	0	0	0	810	800	803	798	5165	6323	12434	4032	6152	6152		
		Turkey	0	0	0	0	0	500	0	0	0	0	750	750	750	0	568	507	1230	785	1074	1309	1046	1437	1645	1386	682	326	184	480	617	450		
NCO		Israel	129	108	126	119	119	215	119	119	119	119	119	119	119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (MED)	200	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Palestine	0	0	0	0	0	0	90	59	61	60	60	60	129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Serbia & Montenegro	0	5	0	28	21	35	22	18	20	18	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Yugoslavia Fed.	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings(FP)	ATL	CP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Belgium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	223	51	238	14	133	0	0	0	0	0	0	0	0	
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	76	265	214	189	262	266	179	438	178	0	0	0	0	0	0	0	
		Curacao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	42	50	160	185	167	209	284	284	0	0	0	0	0	0	
		Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	162	56	12	0	0	0	0	0	
		EU.España	0	335	188	707	1127	454	284	353	295	194	751	1197	209	656	508	206	213	1253	944	1181	1320	2067	1105	732	1182	2095	2065	0	0	0	0	
		EU.France	0	211	413	844	1169	272	391	540	777	541	821	1192	396	710	1058	367	205	262	122	241	901	1061	675	693	565	673	1169	0	0	0		
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	35	178	92	118	17	121	43	126	145	64	0	0	0	0	0	0	0	0	
		Guinea Rep.	0	0	0	0	0	0	0	15	0	0	0	0	0	15	0	21	2	0	358	260	666	1186	202	15	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	35	191	577	368	228	106	250	259	72	20	0	0	0	0	0	0	0	0	
		NCO Mixed flags (EU tropical)	1152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5722	7187	6536	0	
Discards	ATL	CP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAW	TOTAL		6629	3746	2423	1723	1278	1053	2910	1475	1496	971	1321	881	1393	646	325	480	571	847	616	684	2364	1328	1128	3016	1460	1242	3206	1286	7066	1784		
Landings	A+M	All gears	6629	3746	2423	1723	1278	1053	2910	1475	1496	971	1321	881	1393	646	325	480	571	847	616	684	2364	1328	1128	3016	1460	1242	3206	1286	7066	1778		
Discards	A+M	All gears	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Landings	A+M	CP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	1650	249	221	1247	0	3	1	2	1	0	
		Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	66	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Estonia	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Latvia	208	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Lithuania	0	52	4	0	0	0	0	0	0	0	0	0	0	298	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Netherlands	0																															

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	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		
U.S.A.	82	134	203	827	391	764	608	750	614	858	640	633	846	789	712	558	89	1123	495	522	653	584	999	460	1027	1153	2060	1204	530	989		
UK.Bermuda	74	67	80	58	50	93	99	105	108	104	61	56	91	87	88	83	86	124	117	101	81	100	88	75	76	86	95	92	68	82		
UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	4	1	1	0	0	0	0		
UK.Sta Helena	18	12	17	35	26	25	23	19	10	15	15	22	25	18	17	11	20	13	18	29	19	31	12	16	16	10	15	16	9	5		
UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Venezuela	159	302	333	514	542	540	487	488	360	467	4	17	13	9	7	16	13	33	9	25	28	23	38	32	27	30	64	51	45	46		
NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Guayana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NCO Antigua and Barbuda	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aruba	70	60	50	50	125	40	50	50	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dominica	38	43	59	59	59	58	58	58	58	50	46	11	37	10	6	8	15	14	16	10	13	13	0	0	0	20	10	10	0	0	0	
Dominican Republic	6	9	13	7	0	0	0	325	112	31	35	35	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	7	0	0	0	0	0	0	0	0	0	0	0	6	9	14	13	
Sta. Lucia	77	79	150	141	98	80	221	223	223	310	243	213	217	169	238	169	187	0	171	195	199	0	0	148	155	87	147	110	0	0		
Landings(FP) A+M CP Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	40	0	0	0	0	0	0	0	0	0	
Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92	9	55	60	22	29	25	4	0	0	0	0	0	0	0	0	
Curacao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	7	31	57	23	78	9	0	0	0	0	0	0	0	0	
Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	
EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92	63	44	224	262	136	240	56	0	0	0	0	0	0	0	0	
EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	10	3	16	26	26	17	0	0	0	0	0	0	0	0	0	
Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	11	21	28	7	0	8	0	0	0	0	0	0	0	0	0	
Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	8	15	7	0	0	0	0	0	0	0	0	0	0	0	
Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	44	104	102	65	13	66	15	0	0	0	0	0	0	0	0	
NCO Mixed flags (EU tropical)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	30	44	97	26	39	0	0	0	0	0	0	0	0	0	0	
EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	14	15	6	
Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A+M NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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BSH-Table 1. Estimated catches (t) of blue shark (Prionace glauca) by area, gear and flag.  
 BSH-Tableau 1. Prises estimées (t) de peau bleue (Prionace glauca) par zone, engin et pavillon.  
 BSH-Tabla 1. Capturas estimadas de tiburón azul (Prionace glauca) por area, arte y bandera.

	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		
TOTAL	3039	4313	3669	9602	11301	11585	11651	39580	35624	37023	40664	35220	32765	37983	36306	43072	43889	50464	53903	58843	65254	73200	63246	57859	62961	62791	70214	68142	68436	62121		
ATN	3038	4306	3561	9591	8592	8468	7396	29285	26764	26172	28174	21128	20066	23006	21741	22359	23218	26027	30725	35199	37239	38092	36783	37087	36579	39627	44608	39664	33995	27279		
ATS	0	8	107	10	2704	3108	4252	10145	8797	10829	12444	14044	12682	14966	14440	20642	20493	23487	23407	23459	27799	35069	26421	20672	26148	22498	25417	28373	34583	34784		
MED	1	3	1	0	6	8	2	150	63	22	45	47	17	11	125	72	178	50	81	185	216	40	42	100	235	665	729	105	58	58		
Landings	ATN	Longline	2077	3037	2884	7460	7646	7548	6131	28678	26153	25382	27305	20699	19290	22881	21297	22167	23068	26811	30516	35032	36954	37783	36553	36878	36245	38777	42859	38493	32765	26050
ATN	Other surf.	220	497	492	994	373	300	560	428	419	682	732	324	708	70	380	126	104	63	80	63	117	102	110	100	205	726	1121	1033	1086	1024	
ATS	Longline	0	8	107	10	2704	3108	4246	10135	8790	10801	12444	14043	12678	14960	14341	20638	20434	23417	22708	23453	27785	24532	25878	20387	24203	21736	24643	27662	33546	33975	
ATS	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MED	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MED	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	ATN	Longline	741	772	184	1136	572	621	180	170	104	137	105	68	55	63	66	45	53	129	102	167	205	119	109	128	124	88	138	143	205	
ATN	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ATS	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ATS	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MED	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	ATN	CP	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ATN	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ATN	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Canada	680	774	1277	1702	1260	1494	528	831	612	547	624	581	836	346	965	1134	977	843	0	0	0	0	0	0	0	0	0	0	0	0	
ATN	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	China PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	China PR	0	0	185	0	0	0	0	0	0	0	0	0	185	104	148	0	0	185	367	109	88	53	109	98	327	0	1	27	2	6	
ATN	EU, Denmark	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	EU, España	0	0	0	0	0	0	0	0	24497	22504	21811	24112	17362	15666	15975	17314	15006	15464	17038	20788	24465	26094	27988	28666	28562	29041	30078	29019	27316	21685	16314
ATN	EU, France	130	187	276	322	350	266	278	213	163	399	395	207	221	57	106	120	99	167	119	84	122	115	31	216	132	259	352	124	94	80	
ATN	EU, Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	EU, Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	EU, Portugal	1387	2257	1583	5726	4669	4722	4843	2630	2440	2227	2081	2110	2265	5643	2025	4027	4338	5283	6167	6252	8261	6509	3768	3694	3060	3859	7819	5664	5195	4507	
ATN	EU, United Kingdom	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	FR, St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Mauritania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	U.S.A.	88	308	215	682	31	24	284	214	256	217	291	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	UK, Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATN	Venezuela	9	7	24	23	18	16	6	27	7	47	43	47	29	40	10	28	12	19	8	73	75	117	98	52	113	129	116	105	111		

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	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		
Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	
Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	76	18	
Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U.S.A.	0	0	0	0	0	0	7	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	132	132	112	122	139	201	97	146	
MED CP EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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	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
NCC Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	2	2	3	3	2	2
MED CP EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0