REPORT OF THE 2018 ICCAT SMALL TUNA SPECIES GROUP INTERSESSIONAL MEETING
(Madrid, Spain 2-6 April 2018)

1. Opening, adoption of Agenda and meeting arrangements

The meeting was held at the ICCAT Secretariat in Madrid, 2-6 April 2018. Flávia Lucena (Brazil), the Species Group ("the Group") rapporteur and meeting Chair, opened the meeting and welcomed participants. Dr. Miguel Neves dos Santos (Assistant Executive Secretary) addressed the Group on behalf of the ICCAT Executive Secretary, welcomed the participants and thanked Dr. Lucena for having assuming the new responsibilities as Group rapporteur. The Chair proceeded to review the Agenda, which was adopted without changes (**Appendix 1**).

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

Sections	*Rapporteur*
Items 1, 9	M. Neves dos Santos
Item 2	C. Palma, M. Ortiz, A. Krim
Item 3	J. Ortiz de Urbina, S. Baibat
Item 4	M. Pons, T. Frédou
Item 5	P. Lino, M. Ortiz, T. Frédou
Item 6	F. Lucena, M. Neves dos Santos
Item 7	F. Lucena
Item 8	F. Lucena, M. Neves dos Santos

2. Review of fishery statistics

2.1 Task I (catches) data

The final Task I nominal catch (T1NC) estimations adopted by the Group, for the major small tuna species by year are presented in **Table 1** (cumulative catches by species in **Figure 1**). These estimations (updates to the first version presented) were obtained after adopting various revisions presented by several CPCs, and, the continuous work done by this Group on species discrimination (SMT discontinued, and, KGX having now only residual catches), unclassified gear reduction, and elimination (replaced by official statistics) of carry-overs.

EU-France and EU-Spain (details in document SCRS/2018/023) presented a revision (1991 to 2016) of the tropical PS by-catch (FRI and LTA) fisheries associated to the "faux poissons" catches going to the local market (tagged as Catch type "LF"). These are different catch series, by default not included in the respective FRI and LTA PS catch series reported officially. Still pending is the revision of the equivalent catch series from the European "associated" PS fleet component (EU vessels under the flag of Cabo Verde, Curaçao, El Salvador, Guatemala, etc.).

Brazil presented to the Group an entire T1NC update (all species and gears from 2010 to 2016). The Group adopted this revision, as preliminary, until the respective SCRS document (in preparation) is presented.

Mauritania presented to the Group (SCRS/P/2018/08) the data recovery (2006 to 2016) on small tuna species catches (project financed by the SMTYP). It covered the artisanal, semi-industrial, industrial fleets (pelagic Trawl fishery catching small tunas as by-catch). After some corrections (unit errors, also corrected in the final SMTYP report) to the industrial fleet catches, the Group adopted the new information provided. S. Tomé e Principe presented an update (SCRS/P/2018/014) of the small tuna T1NC series (2009 to 2017) which included various improvements on gear discrimination and the completion of the catches on the most recent years. The Group also adopted this update.

Liberia presented (SCRS/P/2018/009) preliminary catch estimates (2011 to 2017) of the artisanal fisheries (a combination of GILL and small LL) operating in Liberia EEZ waters fishing for tuna and tuna-like species.

The Group adopted this new LTA series (the old FAO related BLF catch series of the period 1988 to 1992 was accordingly reclassified as LTA).

Gabon presented a new catch series (2006 to 2015) for *Scomberomorus tritor* (MAW). In Gabon small tunas are species incidentally caught in all fisheries (foreign purse seiners, industrial trawlers, and, a small artisanal fleet of 12 meter canoes). These neritic tuna species (mostly for local consumption) are poorly known and often classified in the category of fish called "various tunas". Aiming to improve information on the landings by species, the Directorate General of Fisheries and Aquaculture (DGPA) has launched a programme to recover historical data of small tunas caught by coastal industrial fishing and artisanal fisheries. To date, only data from MAW caught by TRAW fleet was transmitted to the ICCAT Secretariat (2006-2015).

Russia presented preliminary estimates of catches for small tuna species (SCRS/2018/033) 2017-2018 caught as by-catch from their mackerel and horse mackerel fisheries. Catch estimates of small tunas are 1,019 t and 1,011 t, respectively. These estimates were based on a linear regression of the total small tuna catches (2000-2016) and their ratio with the Russian catches over the same time, it was noted the low correlation between the catch-series, which limited their applicability due to the lack of accuracy. The Group recommended exploring other methods for estimating the by-catch of small tunas including the species composition and area distribution of catches.

In addition to all the new and revised T1NC series adopted (which reduced slightly the ratio of carry-overs) the Group continued its progress in the improvement of the species discrimination (a large portion of the mixed KGX "Scomberomorus spp" species, was eliminated/reclassified for various CPCs).

On the contrary, very little progress was made on fishing gear discrimination (current status in **Table 3**) and carry-over ratio reduction (as presented in **Table 2**). The Secretariat reiterated the need to continue the work of eliminating (detailed values in **Table 4**) these two major weaknesses of the T1NC statistics in relation to small tuna. The incompleteness of T1NC is also affected by the *carry overs* (preliminary SCRS estimations, based on carrying forward the means obtained from catches from previous years) which provide temporary catch estimates aiming to replace inexistent official data. **Figure 2a** and **2b** show the combined (all small tuna species) carry overs in Task I and the carry over ratios (%) by species respectively. In recent years (2009 to 2015) the ratio of T1NC *carry overs* (**Table 3**) in the catches of small tuna represent on average about 14% of the total Task I data. By species, this ratio is even higher (e.g. KGM with 65%, SSM with 33%, BLF with 24%, and BRS with 28%), the situation was similar from 1992 to 2002. There is also a lack of provision of a specific "fishing gear" code (i.e. UNCL and SURF in T1NC data source) for a large portion of T1NC between 1950 and 2016. Before 1980 (small tuna catches were provided without gear from the FAO Yearbook and from joint ICCAT/GFCM meetings). In that period, T1NC catches with "unclassified" gears varies between 50% and 90% (**Figure 3**) before 1980. In the eighties and nineties, the ratio of "unknown" gear in T1NC catches dropped to about 50%. Only in recent years (2003 onwards, except 2016 which is still preliminary) these ratio reached levels of less than 21%. This missing element in the T1NC catch series indicates a poor knowledge of the fleet structure (*métier* components) of a large portion of the ICCAT CPCs, and, could impose large limitations in future assessments.

The Group acknowledged all the efforts and work of scientist in response to improving fisheries statistics for the small tuna species. Despite the important progress made in recent years (i.e. by historical data recovery projects, special programmes, work of National scientists, etc.), the majority of the species still have highly incomplete catch series (levels varying depending on the species) in the official ICCAT statistics. Continuing efforts are underway to recover some of these missing historical data, under the SMTYP project or at the national level.

Of the total 13 species included in the Small Tuna Species Group, the seven most important ones represent about 92% of Task I nominal catches between 1950 and 2016. These are (by descending order of importance in weight): BON (*Sarda sarda*) with about 34% of the total catches, LTA (*Euthynnus alletteratus*) with 14%, FRI (*Auxis thazard*) with 12%, KGM (*Scomberomorus cavalla*) and SSM (*Scomberomorus maculatus*) both with 11%, and, BRS (*Scomberomorus brasiliensis*) and BLT (*Auxis rochei*) with 5% each. The remaining species (BLF: *Thunnus atlanticus*; MAW: *Scomberomorus tritor*; WAH: *Acanthocybium solandri*; DOL: *Coryphaena hippurus;* BOP: *Orcynopsis unicolor*; CER: *Scomberomorus regalis*) represent only 8% of the total catch. The species group KGX (*Scomberomorus* spp.) represents now less than 0.2% of total catches in the entire T1NC series.

The Group noted that some reports of catches (less than 5 t for the entire 1950-2016 period) of slender tuna species (*Allothunnus fallai*), are restricted to the south oceans (mainly Indian Ocean) according to their biology (Wolfe *et al.* 1975). Thus the Group recommends to be excluded from the list of Atlantic major small tuna species.

It was noted that catches (both historical and recent periods) of small tuna species (KGM, SSM, LTA, WAH, DOL) are missing from the Gulf of Mexico, North America Atlantic coast and the Caribbean. These missing catches (together with the respective size frequencies) should be provided to ICCAT. A similar situation exists for the eastern Mediterranean and North Africa Mediterranean coast (BON, BLT, and, LTA). The ICCAT Secretariat should continue its efforts to recover these missing data by directly contacting the related CPCs statistical correspondents.

2.2 Task II (catch-effort and size samples) data

Task II catch and effort (T2CE) and Task II size information (T2SZ) availability were presented to the Group in the form of the standard SCRS catalogues on statistics (**Appendix 5**) of the major ICCAT small tuna species by stock/area, major fishery (flag/gear combinations ranked by order of importance) and year (1986 to 2016). Only the most important fisheries (representing about 95% of Task I total catch) are shown. For each data series, Task I (DSet= "t1", in tonnes) 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"= CAS exists) that represents the Task II data availability in the ICCAT- database. The Group noted that many gaps persist in these datasets and this is problematic for stock assessment purposes.

During the meeting Morocco provided preliminary size data from their longline fisheries of BON (*Sarda sarda*) for 2016 and 2017. The Group recalled that, much observer data regarding size information exist and these data are being compiled by National scientists. **Table 5** summarises all the T2SZ samples available in the ICCAT-DB in relation to small tuna species (number of fish and class ranges by species, frequency type, flag and class interval).

2.3 Other information (tagging)

The Coordinator of the Atlantic Ocean Tropical tuna tagging programme (ICCAT AOTTP) presented a summary of the tagging activities that involved small tunas. The ICCAT AOTTP is committed to tagging 120,000 tropical tuna, the focus species are bigeye, skipjack, and yellowfin, however there is also the objective of tagging 5,000 little tunny, and 5,000 wahoo. So far 1,313 little tunny and 42 wahoo have been tagged and released at sea in 2 years since the project began. Of these, 220 tagged little tunny have been recovered (17%) with a mean time at liberty of 83 days and a maximum of 379 days. Mean distance between release and recapture is 185 nautical miles with a maximum of 629. Only one wahoo of the 42 released has been recaptured at the St Peter and St Paul Islands off Brazil. This fish was at liberty for 210 days but a distance of only 8 nautical miles was recorded between release and recapture. Little tunny have been tagged on both sides of the tropical Atlantic; however no cross-Atlantic movement has yet been reported, indicating rather coastal associated movements. Preliminary data was also presented on growth based on size increment and time at liberty.

The Coordinator noted that more little tunny and wahoo need to be tagged under the ICCAT AOTTP indicating that soon it will step up its efforts, particularly for wahoo. The Group inquired if other species of small tunas will be tagged by the AOTTP, to this it was noted that the SCRS can make specific request to the AOTTP for additional species to be considered. It was noted also, that the Secretariat can provide to CPCs and scientific institutions conventional tags for their scientific tagging programs. The Group noted that both genetics and tagging information are important tools for trying to identify stock structure and population or subpopulation(s) distribution for small tuna species, encouraging scientist and CPCs to continue or implement research in these areas.

2.4 Fishery indicators

Two scientific documents were presented on standardized indices of abundance for small tuna species. SCRS/2018/030 presented a standardized series of abundance for wahoo (WAH) from the US recreational fisheries in the Gulf of Mexico and Atlantic east US coast 1986-2015. A target species approach was explored to identify wahoo directed trips, and standardized indices were developed using a delta-lognormal

modeling approach using the following variables: hour of interview, month of interview, area of fishing, state in which the interview occurred, if a bag limit was imposed at the time of the interview or not, and year. The author was asked if the bag limit in the U.S. South Atlantic, from 2003 forward, biased catch estimates. The author explained that any wahoo released alive or dead, due to the bag limit or not, were included in the catch estimate and, therefore, there should be no bias.

SCRS/2018/026 presented standardized indices of spawning biomass of little tunny, Auxis spp., king mackerel, Spanish mackerel and common dolphin based on ichthyoplankton surveys in the US Gulf of Mexico. These are fishery independent indices from the Scientific Larval Survey carry out by NOAA fisheries 1986 through 2016 in the Gulf of Mexico. Indices for LTA, *Auxis* sp., KGM, and SSM were developed using catch rates of larvae sampled with both Neuston and bongo gear, while those for DOL were developed using catch rates of larvae sampled with only Neuston gear. Also, survey data from spring, summer and fall surveys were used for development of LTA, *Auxis* spp., and DOL, while only summer and fall survey data were used for KGM and SSM. A delta-lognormal modeling approach was utilized, including the following covariates: time of day, season, area sampled, year and gear. The indices were updated since the last meeting. Only data collected later than 2016 were used, due to a lack of standardization in identifications. Also, as per request of the Group during the last meeting, the indices of KGM and SSM were developed using all available data from the fall and summer survey seasons from all years of the time series.

The author was asked if geostatistics were used in station selection, and the author explained that the surveys have always been conducted on a 30-nautical-mile grid. However, the author agreed that sampling based on geostatistics could result in an increase in index precision, but only on a species-specific basis. The author was also asked if the mortality rates used in catch standardization have been verified. The author answered in the negative, and it was agreed that this should be recommended as future research.

3. Review of available and new information on biology and other life-history information of small tunas such as stock structure

In total, seven papers and three presentations were submitted to the Group.

SCRS/2018/031 presented a CPUE analysis of Atlantic bonito caught in the southern part of the Moroccan Atlantic coast for the period 2003-2016. The demographic structure and the reproductive period of this species in the same area were also provided. Based on the evolution of the gonado-somatic index and the development of the stages of sexual maturity, the study concluded that the Atlantic bonito breeds in this area from May to July.

The Group recommended that this CPUE series be standardized in the future and to include the size data used in the study in the ICCAT database.

SCRS/2018/027 presented a feeding study for bullet tuna in Tunisian waters. A total of 13 prey taxa belonging to 11 families were identified; Teleosts being the most frequent Group. Both stomach repletion and diet composition varied significantly between sexes. Diet diversity differed among seasons, with fish having the most diverse diet in winter and the least in autumn.

SCRS/2018/024 presented some biological aspects of bullet tuna in Algeria, including feeding and reproduction period. The species feeds mainly on small pelagic fish larvae. Based on the gonado-somatic index, the breeding period of this species was determined between May and July, with a peak in July.

SCRS/2018/034 presented several parameters of the reproductive biology of bullet tuna in the Gulf of Guinea, including sex-ratio, gonadosomatic index, length at first maturity and both total and relative fecundity. There were no significant differences in length at first maturity between sexes. Total fecundity proved to be highly correlated with both the length and body weight of the fish.
SCRS/2018/P/010 presented daily growth parameters for little tunny and Atlantic bonito in the coast of Senegal based on otolith analyses. The values of the daily growth parameters were L_∞ = 42.72 cm, K = 0.269717 and t_0 = -61.4221 for little tunny and L_∞= 84.72 cm, K = 0.14547 and t_0 = 20.72705 for the bonito. K and t_0 are in days. The authors pointed out that it was a study in progress that should be improved by using a stratified sampling protocol to cover the species size range.

The Group recommended that the growth parameters be estimated on a yearly basis.

SCRS/2018/028 provided information on some biological aspects of Atlantic bonito from the western Mediterranean Spanish coast and the Atlantic Ocean (south of Iberian Peninsula). It reported length-weight relationships, sex-ratio, spawning season based on histological analysis and monthly variation of the gonadosomatic index, and lengths at first maturity by using macroscopic and microscopic criteria.

SCRS/2018/029 presented information on some biological aspects of little tunny from the western Mediterranean Spanish coast and the Atlantic Ocean (south of Iberian Peninsula). It reported length-weight relationships, sex-ratio, spawning season based on histological analysis and monthly variation of the gonadosomatic index, and lengths at first maturity by using macroscopic and microscopic criteria.

SCRS/2018/P/006 presented a Working Living Document (WLD) for bullet tuna, Atlantic bonito and little tunny maturity staging. The WLD included a large amount of detailed photos (macro and micrographs) of the different gonad stages. The main objective was to develop a living bank of images in order to facilitate the interpretation of small tuna reproductive status.

SCRS/2018/P/012 presented the results of genetic analysis for bullet tuna (*Auxis rochei*) along the north and south coast of the west Mediterranean and a location in the east Atlantic close to the Strait of Gibraltar using the combination of mitochondrial DNA and microsatellite genetic markers. The analysis identified several individuals as frigate tuna (*A. thazard*), suggesting a mixed fishery of two species in the area of the Strait of Gibraltar with possible implications in stock assessment. Population genetics results showed a clear heterogeneity between samples of the Iberian Peninsula and North African locations. As regards the Mediterranean Peninsula coast, markers failed to show genetic heterogeneity.

The Group noted that these results could have a clear impact in the conservation and management strategies of this species, and if confirmed, in other small tuna species.

4. Update of Data Poor Methods and development of management advice

Last year, the Group suggested that different data-limited approaches should be evaluated in order to provide scientific information on the status of SMT. Simulation testing was recommended to evaluate the usefulness of different approaches and to evaluate the robustness of those methods for the application to SMT.

Document SCRS/2018/025 synthesized the spatialized catch and length data available as well as life history parameters for SMT in order to contribute to data poor stock assessment methods compiled at the last 2017 Small tunas species group intersessional meeting (Anon. 2017b) (SCRS/2018/025, Figures 1 and 3). After review of the main data poor methods (SCRS/2018/025, Table 2) the (a) Catch-based (Constant catch linked to average catches); (b) Indicator-based (length target) (incrementally adjusts the TAC to reach a target mean length in catches) and (c) Ltarget based on Life history parameters (see Smith *et al*., 2017) were considered the most adequate for the 3 main captured species BON, LTA, FRI, as well as WAH which is considered as high risk (WAH) (Lucena Frédou *et al*., 2017). All these species are included within the Small Tunas Work Plan for 2018-2019. Data quality should be investigated for these species as well as the viability of providing index of abundance in order to investigate the applicability of other methods which require this information (Indicator-based – Recent index and index target; and abundance-based methods) (SCRS/2018/025, Table 2).

The Group considered this synthesis to be useful as a first step to define main areas and species to assess. A great amount of data (20%) were discarded because they were aggregated in larger quadrant than 5x5 (10x10 and 20x20). The Secretariat informed the Group that work is being done to break down this information into 5x5 quadrant. In addition, some of the information was excluded from the diagnostic as the catch provided was in number instead of weight. The Secretariat indicated that this data should be estimated back into weight. Another concern was the quality control of the data as some inconsistencies were observed on the maps.

Presentation SCRS/P/2018/007 showed preliminary results on the implementation of data-limited approaches for small tunas using simulation testing. Different catch-based and length-based assessment methods and scenarios were compared in order to give some recommendations for future analysis. The use of catch-based methods is constrained to the reliability, length, and contrast in the catch time series as well as the capacity to estimate priors on depletion. The use of length-based methods depends on how representative is the length data distribution by stock, since the size data available in T2SZ comes from different fleets with different gear selectivity. Also, the Group discussed which life history parameters

should be considered for each region because all these methods are very sensitive to these input parameters. The Group suggested not to use the mean or median of the life history parameters but chose the best set of information available. The Group will work with this issue (see item 5).

The selection of data limited methods is dependent on data availability and quality, and the Group noted that it is still necessary to assess data quality before applying any assessment method and discussed which data should be used to implement some data-poor approaches. Catch data has been improved but it is still incomplete for some species, regions and fleets. Some of the catch-based methods presented cannot be applied if this information is not complete and accurate. Nevertheless, comparison between length-based and catch models should be considered when data improved. Data quality is also an issue for length-based methods since they are quite sensitive to the representativeness of the population structure. An overall of 40% of length data did not have gear information. Length information available in T2SZ has been updated since the last meeting up to 2016 for some species. Length-based methods such as LBSPR (Hordyk *et al*., 2015) could be applied to estimate stock status for stocks presented in **Table 6**.

The Group discussed the quality of the size-data information available and the constrains of applying length-based methods when the data come from gears that show a dome-shape selectivity. A common problem with many gillnet fisheries is that they present dome-shaped selectivity, where large fish are not caught by the fishing gear. The LBSPR model assumes asymptotic selectivity, and it is expected that the method will underestimate the spawning potential ratio (SPR) in these cases (Hordyk *et al*., 2015). To deal with this issue, the Group recommended using length-data from all gears combined in order to get a better representation of the length distribution of the population, assigning equal weight to each fishing gear. It is important for all CPCs to report size data from all gears in order to get a representation of the length distribution of the entire population. Other length data, ideally from fishery independent surveys, could complement this information and improve the assessments.

5. Review development of a meta-database for small tunas and appropriate approaches for future assessment of small tuna stocks

The diversity of species covered by the Small Tunas Species Group and the regional/coastal nature of the stocks and fisheries covered require that information is organized by species and region. For that purpose it was previously considered essential that a meta-database be constructed.

Presentation SCRS/P/2018/013 proposed to use the open database provided by Juan-Jordá in the 2016 Small tunas species group intersessional meeting (Anon 2017a) (Juan-Jordá *et al*., 2016) with a thorough review of the Scombridae life history parameters as a starting point for a meta-database. The original database was filtered to contain only the Atlantic and the small tunas species defined in ICCAT. The references database that supported the life history parameters database, also provided by Juan-Jordá in open format, was considered an excellent starting point for a shared SMT publication database. A proposal for shared protocols and methodologies as well as establishing reference sets agreed within the Group by species was presented. It was suggested that a Searchable ICCAT references database should be implemented within ICCAT site by adding internal search for papers.

The Group considered this proposal for updating and sharing parameters and useful references. A form with required fields was circulated and nearly 30 publications were added during the meeting. The updated database, available for all participants and stored in the ICCAT Owncloud, allowed for data mining and spatial visualization of current status and data gaps in the life history parameters of SMT species which was used to assess future research needs (**Table 7**).

The Group considered the areas defined by ICCAT previously (ICCAT Statistical Areas Map 4) were adequate for SMT and studies should be carried based on such spatial unities. The five areas are: Mediterranean Sea (MD), Northeast Atlantic (AT-NE), Southeast Atlantic (AT-SE), Southwest Atlantic (AT-SE), Northwest Atlantic (AT-NW). The Group determined the principal life history parameters that should be compiled for data poor methods, these are: Linf, k, t0, L50, A50, Lmax, a (L-W), b (L-W), batch fecundity.

Data was extracted by region for the 6 species selected for further research by the Group: A*canthocybium solandri* (WAH), *Auxis rochei* (BLT), *A. thazard* (FRI), *Euthynnus alletteratus* (LTA), *Sarda sarda* (BON) and

Scomberomorus cavalla (KGM). The Group selected the most reliable parameters by region for each species. A table with selected values and supporting references was constructed. This table will be used for running the Data Poor Models selected in Section 4 and to plan research to fill the gaps (**Table 8**).

6. Review status of SMTYP program to improve collaboration among scientists and obtain the information required for assessment

The Secretariat provided detailed explanation on the decisions taken by the Commission in November 2017 regarding the Small Tunas Year Program (SMTYP) and the science budget for 2018 and 2019.

The science budget proposed for 2018 includes new ICCAT funds provided by the Commission (€50,000), and the leftover funds that had been previously committed to SMTYP. The funds allocated for 2018, however, were not sufficient to cover all the research requests proposed by the SCRS in September 2017. As a result the ICCAT Secretariat took the initiative to approach a willing CPC for additional funding. This funding was obtained recently from the EU, for strengthening the scientific basis for decision-making in ICCAT. These additional funds have been provided for a specific list of activities that was developed on the basis of the SCRS Sub-Committees and Working Groups work plans for 2018.

In order to access these funds in 2018, Working/Species Groups will have to define specific research activities that require funding. The Secretariat will then liaise with the SCRS Chair and the Species Groups rapporteurs to define terms of reference (TORs) required for developing call for tenders that will subsequently be advertised by ICCAT. TORs should contain specific milestones and deliverables to be achieved as part of all funded activity. Contracts issued through call for tenders have the advantage that initial partial payments can be provided shortly after the contract is signed.

Additionally, the Group was informed of other available funding (i.e. ICCAT Data fund; Capacity building) that could be used for enhancing the collection of data on small tunas. Since in the past SMTYP contained activities aimed at improving the basic fishery data (e.g. catch, effort, sizes) that cannot be funded from the new ICCAT research budget, scientists from developing country CPCs were encouraged to create regional consortia to propose such data improvement projects to the Secretariat.

The Group stressed the importance of continuing such support activities to improve the quality of data on small tunas collected from artisanal fisheries and the difficulty to achieve such goals without a multi-annual program, as these activities have to be carried out over a period exceeding the bi-annual timeframe of the ICCAT science budget. It was also stressed that such support could be aimed at expanding data collection, improving the design of collection activities and recovering data sets, but that the funds could not be considered as a permanent source of support for data collection because that is a responsibility of the CPCs.

In order to properly conduct stock assessment it is important to have key life parameters, and characterize and define stock boundaries for small tunas. Conducting such work for all species at present would require a considerable period of time as well as monetary resources, much greater than those currently available. The Group nevertheless agreed that research effort under the current SMTYP should continue for selected species, aiming at extending knowledge of key biological processes and parameters, as well as stock boundaries.

The Group reiterated that SMTYP should be a collaborative process, increasingly involving more scientists from all nations with major small tuna fisheries. Any additional CPCs that are interested in participating and can provide relevant samples/data and/or expertise in the projects are welcome.

For those species assigned as of high priority for each of the four major Atlantic areas (NE, NW, SE and SW), as well as the Mediterranean Sea, and for which knowledge gaps have been clearly identified, specific activities/research lines were prioritized (including collection of historical data aiming revision of Task I and II data). It was emphasized that this mode of collaboration may not always focus on species that are of the highest priority to a given CPC. However, based on the available budget, the Group agreed it is a way of building trust between research teams and should always lead to increases in the research capacity of the Group. It is hoped that, as trust is built through this process, the Group can more effectively address other species/stocks. It was also agreed that leaders of each research activity/research line should be as inclusive

as possible in their selection of collaborators to make sure all that are interested in participating in the research are considered in the collaboration.

Ongoing activities in 2018 and 2019

The overall budget available during 2018 for the Small Tuna Species Group and related decisions taken by the Group are summarized below:

Activity	Amount (€)	Needs	Action to be taken
Reproductive biology study	10,000	To collect gonads samples for LTA, BON and WAH	Draft ToR for a Call for tenders aiming the collection of samples for reproduction, age and growth and genetics for LTA, BON and WAH and provide preliminary analysis results for at least one species.
Age and growth study	10,000	To collect two hard structures for LTA, BON and WAH	
Genetics study for stock differentiation	25,000	To collect tissue samples for LTA, BON and WAH and provide preliminary analysis results for at least one species.	
Sampling collection and shipping	5,000	Handling and shipping of samples.	
Total	**€50,000**		

Under the new research funding system, a call for tenders shall soon be circulated by the Secretariat aimed at small tuna studies. The Group therefore developed those Terms of Reference, which are provided in **Appendix 6** to this report.

Additional detailed information regarding the Group decisions on research activities to be carried out during the period 2018-2019 under the ICCAT SMTYP, for priority species, are detailed in **Table 9** and **10**.

7. Recommendations

Recommendation to the Commission

It was recommended that the Commission develops a process which can support funding of research programs for longer than biannual budget limits, as most tuna and other ICCAT research programs require multiannual and multiregional initiatives. The ICCAT Strategic Research Plan recognizes that such longer term commitment is essential for improving scientific advice.

The Group updated the metadata base provided in 2016 (Juan-Jordá *et al*., 2016). This metadata application has proven to be useful as input of biological and other information for assessment methods and other approaches. The Group recommends that a similar initiative should be applied to the metadata of life history parameters for other species within the mandate of ICCAT.

Recommendations with financial implications

The Group recommends continuing with the ICCAT SMTYP research program activities in 2018-2019 to further improve the biological information (growth, maturity and stock identification) for the species/areas prioritized (**Table 9 and 10**).

The Group recommends that a workshop on the application of data-limited methods be scheduled to increase the participation of National scientist in the evaluations of small tuna species. This workshop should take place in 2019.

The CPCs should make the necessary arrangements to ensure increased participation of their National scientists in Small Tunas Species Group meetings (both intersessional and Species Group meetings).

Other recommendations

In addition the Group recommended:

The application of data-limited assessment models, especially length-based and catch-based methods, however special attention should be given to the input data availability and of their quality. At the moment, for the next intersessional meeting, model applications should be evaluated for the following species: LTA, BON, FRI, WAH, KGM, and BLT. The first 5 species have been already considered priority by the Group. The BLT was suggested by the Group to be included as priority given its importance in the catches for countries of the North African region. And, to extend the PSA analysis to catches of small tunas with gillnets, which is one of the main fishing gear targeting these stocks, taking into consideration the 5 geographical areas adopted by ICCAT for small tuna reporting and endorsed by the Group.

That CPCs provide indices of abundance and size catch data preferable from fishery independent surveys and/or other National programs, which would substantially improve assessments.

As regards AOTTP:

In light of the very positive initial results of the tagging of small tunas accomplished by the ICCAT AOTTP, the Group recommends to the ICCAT AOTTP that, when possible, it should attempt to tag and release a wider size range of little tuna; this may allow increasing the number of days at liberty of the tagged fish and obtain more comprehensive information on growth. The Group also urges the ICCAT AOTTP to ensure that sufficient LTA and especially WAH are tagged and that the numbers of fish released reach the original objectives of the program. That in order to increase the probability of collecting information on recaptures of tagged fish that the AOTTP pays special attention to enhancement of recovery efforts: for little tuna, focus should be on artisanal gillnets and purse seine fisheries. For wahoo, recovery efforts should focus on longline and handline fisheries.

The Group recommends the use of scientific tagging projects for identification of distribution, stock structure and migrations patterns of small tuna species (BLT, BON, LTA), especially in the Mediterranean Sea and the African eastern Atlantic coast. The Group recognized that differences in rewards and financial support for different tagging programs create inconsistencies in the CPCs efforts for such research programs. It was recommended that the Ad hoc Working Group on coordination of Tagging information to review current status and provide some ideas to standardized such efforts for all tagging programs under the ICCAT.

The Group recommends to extend 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*) and dolphinfish (*Coryphaena hippurus*), and update all other species chapters which were last updated in 2006, except for *Thunnus atlanticus*, which was updated in 2013.

In addition, the Group recommends that 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, the replacement of the carry overs (**Table 3**), the split of "unclassified" gear catches to specific gear codes, and the completeness of Task I 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, FL 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 required 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.

8. Other matters

No other matters were discussed under this agenda item.

9. Adoption of the report and closure

The report was adopted by the Group and the meeting was adjourned.

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Table 1. Overall Task I nominal catches (t) of major small tuna species, by species, area and year.

	BON		LTA		FRI	KGM	SSM	BRS	BLT	BLF	MAW	WAH	DOL	BOP		CER	KGX	TOTAL
Year	ATL	MED	ATL	MED	ATL	A+M	A+M	A+M	A+M	A+M	A+M	A+M	A+M	ATL	MED	A+M	A+M	
1950	1458	483	3136	156	5527	961	3583	3000	751	300	0			100		100		19555
1951	1727	413	669	251	3801	1645	4726	3000	424	300	0			100		100		17156
1952	3334	327	2539	14	1900	1393	4858	3000	212	300	0			100		100		18077
1953	4486	6795	3335	44	9798	1506	4251	2900	794	300	0			400		100		34709
1954	2037	18436	4936	135	8734	1238	3585	3200	689	400	0		191	400		100		44081
1955	4270	56207	4250	60	6665	1617	3845	3900	1072	100	0		151	400		300		82838
1956	3166	58178	2059	94	2618	2090	5127	2900	1392	300	0		140	200		300		78564
1957	4799	44127	2236	22	5924	2022	5410	2700	32	100	0		101	100		300		67873
1958	4769	28626	3359	47	8640	2313	6811	3434	1729	500	0		237	2700		500		63664
1959	6331	11530	9660	11	6104	2472	6005	3742	90	600	0		260	1000		700		48505
1960	6366	34361	3000	13	7279	2993	7118	4479	1540	600	0		306	1000		800		69855
1961	4868	45812	2452	24	6453	3199	7672	4042	3609	400	0		341	2200		600		81671
1962	7285	7527	5089	31	4185	3346	8355	3842	3893	700	0		560	3000		600		48413
1963	5349	22837	3968	18	3568	3770	7835	3842	4310	788	0		588	3100		500		60472
1964	3342	13489	1653	48	4022	3387	6148	4496	2801	776	0		403	2300		600		43465
1965	4374	27004	4078	42	6888	3787	8717	3796	2604	712	0		381	216	1	600		63199
1966	7023	22113	3274	27	4477	3545	10016	4205	2765	662	0		411	339	1	600		59458
1967	7942	41206	3978	38	6972	4558	9783	3813	4628	896	0		514	684	48	600		85660
1968	5679	26268	3003	168	5500	6055	12012	1667	3139	683	1800	100	391	228	4	600		67297
1969	6065	55612	2599	951	13416	6788	11180	2926	2793	753	2700		197	1341	3	500		107824
1970	8002	20681	7676	960	8185	6589	12484	3368	3383	1952	200	378	276	806	3	500	400	75843
1971	15692	28230	4838	866	6209	6520	10713	3154	4107	1875	1300	381	294	683	7	800	300	85969
1972	8754	16225	2237	904	10180	7465	11956	4810	3478	1895	2100	381	229	310	6	800	200	71930
1973	6069	6254	1542	1061	6641	9917	13093	6946	3569	936	1600	280	440	102	3	780	300	59533
1974	13679	7693	4196	1304	9582	13789	12226	8750	4354	1062	4713	391	477	143	7	619	363	83348
1975	9571	6033	7657	1386	7886	9290	13058	5039	2644	815	1140	326	422	84		620	596	66567
1976	9490	6498	8373	2028	6457	8442	12307	2272	3290	1026	1901	379	493	212		565	353	64086
1977	11977	8697	5845	2499	16611	8960	12218	3188	3404	1251	2572	393	370	321	135	629	243	79314
1978	7854	9417	15138	2495	4776	6944	11528	3484	3567	1341	6716	452	235	817	153	698	249	75864
1979	6485	13485	11803	2870	8868	11593	10899	3722	3707	1205	4167	760	369	464	28	586	54	81065
1980	12568	18546	16440	2774	16960	15797	13945	5617	3952	1175	4921	610	249	698	0	604	73	114929
1981	10879	28167	14160	1446	12759	18692	11164	5841	3677	1973	2742	2920	177	1448	0	628	160	116833
1982	13456	28937	13723	2480	19755	18352	13633	6019	6043	1941	5311	2280	402	584		687	80	133683
1983	6998	35545	21018	1561	16662	14607	9574	6632	5820	1738	4689	2366	441	38		677	20	128387
1984	6918	15058	18410	1650	19746	13182	11362	8129	6337	1908	4482	2159	566	49		680	485	111122
1985	7149	17959	10625	2040	17753	9964	11590	3501	5240	1403	3941	920	464	124	9	574	22	93279
1986	6163	15428	11225	2166	15478	13990	14207	6549	5057	2822	3180	1151	361	86	1	500	149	98511
1987	7370	22317	18070	2424	21193	13792	14461	6212	3739	3462	1721	1235	286	538	26	392	261	117499
1988	20727	24028	23836	2405	20573	14331	12671	9510	6483	3093	3811	1635	264	1474	8	219	491	145560
1989	17671	11955	28257	2035	16411	12153	13845	10778	7110	2834	2808	1527	306	1109	7	234	105	129146
1990	6811	22097	12772	2617	16738	10420	12782	7698	11994	3888	6629	1498	260	436	37	225	131	117034
1991	8079	25255	9133	2315	19674	13241	15318	8856	8777	4202	3746	1721	291	507	101	375	131	121722
1992	6881	15111	20607	1755	11425	14691	16285	6051	5714	4353	2423	1835	188	465	176	390	266	108617
1993	4531	25997	11872	1258	16797	16331	16317	8049	3420	3535	1723	2671	174	378	252	450	301	114057
1994	6037	15682	13202	1197	13332	14777	14490	7161	5300	2719	1278	2143	334	615	176	490	368	99302
1995	6030	15189	10381	1894	11816	14930	13697	7006	4301	4051	1953	2408	334	588	115	429	367	95491
1996	7939	17195	9453	2116	13871	17782	16571	8435	5909	4488	2910	2515	307	2064	132	280	744	112710
1997	10340	14078	12804	1601	13968	19815	15403	8004	3070	3258	1415	3085	295	254	227	251		107868
1998	15523	29730	12804	2914	14332	16394	8877	7923	2309	3395	1496	2488	363	47	130	251		118976
1999	9143	28170	9405	2876	10589	17717	9837	5754	2646	3203	909	2957	349	651	217	1		104425
2000	5179	21972	11830	3489	8680	16205	8220	4785	3912	2483	1219	2020	234	1062	145	4	184	91624
2001	5400	22237	13955	2988	9330	15408	8383	4553	5796	4034	828	2296	303	858	154	6		96529
2002	8208	15717	14080	2643	5736	17258	9414	7750	6041	4756	1345	2202	347	786	137	1		96419
2003	3307	11117	16313	684	5905	15863	9793	5137	3794	1303	565	2049	564	713	23	2		77132
2004	4584	11248	14918	1439	8470	12830	8119	3410	6223	1926	285	2596	2632	573	8	1		79262
2005	4391	74376	10873	1042	6154	11766	10470	3712	4231	1031	443	2456	2772	215	2	1	1	133937
2006	9648	31751	8320	1605	8429	8185	6282	3587	4090	1937	571	1809	1295	32		1	93	87633
2007	6381	8637	16472	1687	9789	17936	6102	2253	5459	1927	847	2568	4753	875	172	0	16	85875
2008	6772	10042	11954	2259	7861	7344	5900	3305	6825	1669	616	2158	1042	426	107	0	0	68279
2009	13691	10019	14166	2100	12384	12533	6197	2681	5557	1442	684	2354	5381	442	6	0	2	89640
2010	16337	12584	20258	2170	14215	9742	5974	1590	7952	1548	2384	2086	4798	273	14	0	20	101945
2011	22219	14442	21005	3668	15471	10868	5931	1055	9484	1533	1333	2500	7187	335	42	2	13	117086
2012	8911	39321	15389	4186	18284	12766	5185	613	6234	1529	1128	3716	3647	657	24	0	6	121594
2013	6458	18365	15868	4633	17597	12132	5459	853	7653	1243	3016	5396	5005	641	21	0	14	104354
2014	4620	23352	9212	3605	17030	4432	3858	698	3916	913	1460	2979	5381	939	13	1	18	82425
2015	6665	8993	11729	6574	12218	3642	4079	389	8766	1172	1242	2157	5915	1161	1078	1	23	75806
2016	10936	43938	14076	9788	16483	3942	3829	1124	4003	1455	3185	15871	4229	743	62	0	23	133688

Table 2. Task I (t) of major small tuna species and year. Reported data (official) *versus* SCRS estimations (carry overs) with the respective carry over ratios (%).

	Reported (t)															Carry overs (t)													Carry over ratios (%)													
Year	BON	LTA	FRI	SSM	KGM	BRS	BLT	MAW	BLF	WAH	DOL	BOP	CER	KGX	Total	BON	LTA	FRI	SSM	KGM	BRS	BLT	MAW	BLF	WAH	DOL	BOP	CER	KGX	Total	BON	LTA	FRI	SSM	KGM	BRS	BLT	MAW	BLF	WAH	DOL	BOP	CER	KGX	total
1950	1941	3292	5527	3583	961	3000	751	0	300			100	100		19555															0	0	0	0	0	0	0	0	0				0	0		0
1951	1240	920	3801	3946	1425	3000	424	0	300			100	100		15256	900			780	220										1900	42	0	0	17	13	0	0	0				0	0		11
1952	3661	2553	1900	4858	1393	3000	212	0	300			100	100		18077															0	0	0	0	0	0	0	0	0				0	0		0
1953	11281	3379	9798	3080	1177	2900	794	0	300			400	100		33209				1171	329										1500	0	0	0	28	22	0	0	0				0	0		4
1954	20473	5071	8734	2414	909	3200	689	0	400		191	400	100		42581				1171	329										1500	0	0	0	33	27	0	0	0			0	0	0		3
1955	60477	4310	6665	3845	1617	3900	1072	0	100		151	400	300		82838															0	0	0	0	0	0	0	0	0			0	0	0		0
1956	61344	2153	2618	3566	1651	2900	1392	0	300		140	200	300		76564				1561	439										2000	0	0	0	30	21	0	0	0			0	0	0		3
1957	46426	2258	5924	5410	2022	2700	32	0	100		101	100	300		65373	2500														2500	5	0	0	0	0	0	0	0			0	0	0		4
1958	33395	3406	8640	6811	2313	3434	1729	0	500		237	2700	500		63664															0	0	0	0	0	0	0	0	0			0	0	0		0
1959	17861	9671	6104	6005	2472	3742	90	0	600		260	1000	700		48505															0	0	0	0	0	0	0	0	0			0	0	0		0
1960	40727	3013	7279	7118	2993	4479	1540	0	600		306	1000	800		69855															0	0	0	0	0	0	0	0	0			0	0	0		0
1961	50680	2476	6453	7672	2199	4042	3609	0	400		341	2200	600		80671					1000										1000	0	0	0	0	31	0	0	0			0	0	0		1
1962	14112	5120	4185	8355	2346	3842	3893	0	700		560	3000	600		46713	700				1000										1700	5	0	0	0	30	0	0	0			0	0	0		4
1963	28186	3986	3568	7835	3770	3842	4310	0	788		588	3100	500		60472															0	0	0	0	0	0	0	0	0			0	0	0		0
1964	16831	1701	4022	6148	3387	4496	2801	0	776		403	2300	600		43465															0	0	0	0	0	0	0	0	0			0	0	0		0
1965	31278	4120	6888	8717	3687	3796	2604	0	712		381	217	600		62999	100				100										200	0	0	0	0	3	0	0	0			0	0	0		0
1966	29036	3301	4477	10016	3545	4205	2765	0	662		411	340	600		59358	100														100	0	0	0	0	0	0	0	0			0	0	0		0
1967	49148	4016	6972	9783	4558	3813	4628	0	896		514	732	600		85660															0	0	0	0	0	0	0	0	0			0	0	0		0
1968	31747	3171	5500	12012	6055	1667	3139	1800	683	100	391	232	600		67097	200														200	1	0	0	0	0	0	0	0	0	0	0	0	0		0
1969	61477	3550	13416	11180	6788	2926	2793	2700	753		197	1344	500		107624	200														200	0	0	0	0	0	0	0	0	0	0	0	0	0		0
1970	28483	8636	8185	12484	6589	3368	3383	200	1952	378	276	809	500	400	75643	200														200	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	43722	5554	6209	10713	6520	3154	4107	1300	1775	103	294	690	800	300	85241	200	150							100	278					728	0	3	0	0	0	0	0	0	5	73	0	0	0	0	1
1972	24679	2991	10180	11956	7465	4810	3478	2100	1795	103	229	316	800	200	71102	300	150							100	278					828	1	5	0	0	0	0	0	0	5	73	0	0	0	0	1
1973	12123	2447	6641	13093	9917	6946	3569	1600	836	2	440	5	780	300	58699	200	156							100	278		100			834	2	6	0	0	0	0	0	0	11	99	0	95	0	0	1
1974	21372	5450	9582	12226	13789	8750	4354	4713	1062	113	477	50	619	363	82920		50								278		100			428	0	1	0	0	0	0	0	0	0	71	0	67	0	0	1
1975	15604	8993	7886	13058	9290	5039	2644	1140	815	48	422	84	620	596	66239		50								278					328	0	1	0	0	0	0	0	0	0	85	0	0	0	0	0
1976	15788	10344	6457	12307	8442	2272	3290	1901	926	101	493	212	565	353	63451	200	57							100	278					635	1	1	0	0	0	0	0	0	10	73	0	0	0	0	1
1977	20674	7994	16611	12218	8960	3188	3404	2572	1251	115	370	456	629	243	78686		350								278					628	0	4	0	0	0	0	0	0	0	71	0	0	0	0	1
1978	17271	17583	4776	11528	6944	3484	3567	6716	1341	452	235	880	698	249	75724		50										90			140	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0
1979	19970	14623	8868	10899	11593	3722	3707	4167	1150	430	369	402	586	54	80540		50							55	330		90			525	0	0	0	0	0	0	0	0	5	43	0	18	0	0	1
1980	31114	19214	16960	13945	15797	5617	3952	4921	1120	280	249	698	604	73	114544									55	330					385	0	0	0	0	0	0	0	0	5	54	0	0	0	0	0
1981	39046	15606	12756	11164	18692	5841	3677	2742	1918	2590	177	1448	628	160	116445			3						55	330					388	0	0	0	0	0	0	0	0	3	11	0	0	0	0	0
1982	42393	16203	19755	13633	18352	6019	6043	5311	1886	1950	402	584	687	80	133298									55	330					385	0	0	0	0	0	0	0	0	3	14	0	0	0	0	0
1983	42543	22369	16662	9574	14607	6632	5820	4689	1683	2036	441	38	677	20	127792		210							55	330					595	0	1	0	0	0	0	0	0	3	14	0	0	0	0	0
1984	21976	19860	19746	11362	13182	8129	6337	4482	1853	1829	566	49	680	485	110537		200							55	330					585	0	1	0	0	0	0	0	0	3	15	0	0	0	0	1
1985	25108	12375	17753	11590	9964	3501	5240	3941	1348	805	464	93	574	22	92779		290							55	115		40			500	0	2	0	0	0	0	0	0	4	12	0	30	0	0	1
1986	21232	13191	15478	14207	13990	6549	5057	3180	2762	1151	361	87	500	149	97892	359	200							60						619	2	1	0	0	0	0	0	0	2	0	0	0	0	0	1
1987	29687	20244	21193	14461	13792	6212	3739	1721	3402	1235	286	514	392	261	117139		250							60			50			360	0	1	0	0	0	0	0	0	2	0	0	9	0	0	0
1988	44755	25991	20573	12671	14331	9510	6483	3811	3023	1635	264	1432	219	491	145190		250							70			50			370	0	1	0	0	0	0	0	0	2	0	0	3	0	0	0
1989	29626	30042	16411	13845	12153	10778	7110	2808	2764	1167	306	1066	234	105	128416		250							70	360		50			730	0	1	0	0	0	0	0	0	2	24	0	4	0	0	1
1990	28908	15139	16738	12782	10420	7698	11994	6629	3818	1218	260	423	225	131	116384		250							70	280		50			650	0	2	0	0	0	0	0	0	2	19	0	11	0	0	1
1991	33006	11011	19674	14780	13241	8856	8777	3746	4202	1721	291	608	375	131	120419	328	437		538											1303	1	4	0	4	0	0	0	0	0	0	0	0	0	0	1
1992	21681	21925	11425	16285	14691	6051	5714	2423	4293	1835	188	641	390	266	107809	311	437							60						808	1	2	0	0	0	0	0	0	1	0	0	0	0	0	1
1993	30528	12930	16797	16317	16330	8049	3420	1723	3535	2562	174	630	450	301	113747		200				1				109					310	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0
1994	21419	14080	13332	14490	14777	7161	5300	1278	2719	2084	334	791	490	368	98624	300	319								59					678	1	2	0	0	0	0	0	0	0	3	0	0	0	0	1
1995	20919	12076	11816	13628	14930	7006	4301	1953	4051	2408	334	703	429	367	94922	300	200		69											569	1	2	0	1	0	0	0	0	0	0	0	0	0	0	1
1996	24834	11311	13871	16571	17782	8435	5909	2910	4488	2227	307	2196	280	744	111864	300	258								288					846	1	2	0	0	0	0	0	0	0	11	0	0	0	0	1
1997	18717	14067	11390	3740	13015	4395	3070	1415	1883	2268	295	481	1		74738	5700	338	2578	11663	6800	3609			1375	817			250		33130	23	2	18	76	34	45	0	0	42	26	0	0	100		31
1998	42213	15381	14332	8877	16394	7923	2309	1496	2270	1927	363	177	1		113662	3040	338							1125	561			250		5314	7	2	0	0	0	0	0	0	33	23	0	0	100		4
1999	37116	11042	10589	9837	14122	4238	2646	909	2063	2677	349	868	1		96458	197	1239			3595	1516			1140	280					7967	1	10	0	0	20	26	0	0	36	9	0	0	0		8
2000	21550	11288	8680	8220	13781	3019	3596	805	1398	1699	234	1207	4	184	75666	5601	4031			2424	1766	316	414	1085	321					15958	21	26	0	0	15	37	8	34	44	16	0	0	0	0	17
2001	23308	11729	9292	8225	12758	2787	5480	414	2949	1981	303	1012	6		80244	4329	5214	38	158	2650	1766	316	414	1085	315					16285	16	31	0	2	17	39	5	50	27	14	0	0	0		17
2002	22644	11951	5736	9256	14560	5984	5725	931	3647	1887	347	923	1		83590	1281	4772		158	2698	1766	316	414	1109	315					12829	5	29	0	2	16	23	5	31	23	14	0	0	0		13
2003	14424	16997	5905	9793	15863	5137	3794	565	1303	2049	564	736	2		77132															0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
2004	15832	16357	8470	8119	12830	3410	6223	285	1926	2596	2632	581	1		79262															0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
2005	78767	11915	6154	10470	11766	3712	4231	443	1031	2456	2772	217	1	1	133937															0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	41398	9925	8429	6282	8185	3587	4090	571	1937	1809	1295	32	1	93	87633															0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	15018	18159	9789	6102	17936	2253	5459	847	1927	2568	4753	1047	0	16	85875															0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
2008	16814	14213	7861	5900	7344	3305	6825	616	1669	2158	1042	533	0	0	68279															0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	22734	14700	12384	4251	4285	1639	4664	684	987	2354	5381	449	0	2	74515	976	1566		1946	8247	1042	892		456						15125	4	10	0	31	66	39	16	0	32	0	0	0	0	0	17
2010	26842	20222	13712	4128	4112	1590	6158	2384	1216	1962	4798	287	0	20	87432	2079	2206	503	1846	5630		1794		331	124					14512	7	10	4	31	58	0	23	0	21	6	0	0	0	0	14
2011	36031	24175	15471	4035	3855	938	8747	1333	1242	2402	7187	377	2	13	105808	630	498		1896	7013	116	737		291	99					11278	2	2	0	32	65	11	8	0	19	4	0	0	0	0	10
2012	47553	18488	17759	3321	3579	613	5538	1128	1174	3506	3563	681	0	6	106907	679	1087	525	1864	9187		696		355	210	84				14687	1	6	3	36	72	0	11	0	23	6	2	0	0	0	12
2013	23110	19067	15119	3582	4070	853	7569	3016	915	5396	5005	662	0	14	88379	1713	1433	2478	1877	8062		83		328						15976	7	7	14	34	66	0	1	0	26	0	0	0	0	0	15
2014	27972	12817	17030	3858	4432	698	3916	1460	913	2979	5381	952	1	18	82425															0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	15659	18303	12218	4079	3642	389	8766	1242	1172	2157	5915	2239	1	23	75806															0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	54874	23865	16483	3829	3942	1124	4003	3185	1455	15871	4229	805	0	23	133688															0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Task I nominal catches (t) of major small tuna species by year. Information with gear *versus* information without gear (UNCL) and respective ratio (%) of catches without gear.

	Catches (t) with gear															Catches (t) without gear (UNCL)														Ratios (%) of Task I without gear (UNCL)													
YearC	BON	LTA	SSM	FRI	KGM	BLT	WAH	DOL	BLF	MAW	BOP	BRS	KGX	CER	Total	BON	LTA	SSM	FRI	KGM	BLT	WAH	DOL	BLF	MAW	BOP	BRS	KGX	CER	Total	BON	LTA	SSM	FRI	KGM	BLT	WAH	DOL	BLF	MAW	BOP	BRS	KGX	CER	total
1950	341	292	3583	27	961	751				0					5955	1600	3000	0	5500			0		300	0	100	3000		100	13600	82	91	0	100	0	0			100		100	100		100	70
1951	240	420	4726	1	1645	424									7456	1900	500	0	3800			0		300	0	100	3000		100	9700	89	54	0	100	0	0			100		100	100		100	57
1952	161	353	4858		1393	212									6977	3500	2200	0	1900			0		300	0	100	3000		100	11100	96	86	0	100	0	0			100		100	100		100	61
1953	381	79	4251	198	1506	794									7209	10900	3300	0	9600			0		300	0	400	2900		100	27500	97	98	0	98	0	0			100		100	100		100	79
1954	773	166	3585	134	1238	689		191							6776	19700	4905	0	8600			0		400	0	400	3200		100	37305	96	97	0	98	0	0		0	100		100	100		100	85
1955	677	106	3845	165	1617	1072		151							7633	59800	4204	0	6500			0		100	0	400	3900		300	75204	99	98	0	98	0	0		0	100		100	100		100	91
1956	650	2003	5127	1482	2090	1392		140							12884	60694	150	0	1136			0		300	0	200	2900		300	65680	99	7	0	43	0	0		0	100		100	100		100	84
1957	1262	2204	5410	603	2022	32		101							11634	47664	54	0	5321			0		100	0	100	2700		300	56239	97	2	0	90	0	0		0	100		100	100		100	83
1958	981	3345	6811	1899	1946	1700		237							16919	32414	61	0	6741	366	29			500	0	2700	3434		500	46745	97	2	0	78	16	2		0	100		100	100		100	73
1959	636	9385	4835	1511	2014	72		260							18713	17225	286	1170	4593	458	18			600	0	1000	3742		700	29792	96	3	19	75	19	20		0	100		100	100		100	61
1960	774	3004	5581	1726	2672	923		306							14986	39953	9	1537	5553	321	617			600	0	1000	4479		800	54869	98	0	22	76	11	40		0	100		100	100		100	79
1961	491	2430	6272	2794	2741	35		341							15104	50189	46	1400	3659	458	3574			400	0	2200	4042		600	66568	99	2	18	57	14	99		0	100		100	100		100	82
1962	851	4866	7355	1868	2888	57		560							18445	13961	254	1000	2317	458	3836			700	0	3000	3842		600	29969	94	5	12	55	14	99		0	100		100	100		100	62
1963	1707	3752	7135	987	3312	611		588							18092	26479	234	700	2581	458	3699			788	0	3100	3842		500	42380	94	6	9	72	12	86		0	100		100	100		100	70
1964	1177	1413	4948	1281	2483	480		403							12185	15654	288	1200	2741	904	2321			776	0	2300	4496		600	31279	93	17	20	68	27	83		0	100		100	100		100	72
1965	1110	2900	7134	3659	3083	705		381			1				18973	30268	1220	1583	3229	704	1899			712	0	216	3796		600	44226	96	30	18	47	19	73		0	100		100	100		100	70
1966	2766	2852	8596	2535	2950	741		411							20851	26370	449	1420	1942	595	2024			662	0	340	4205		600	38607	91	14	14	43	17	73		0	100		100	100		100	65
1967	2058	3800	8476	2624	3771	760		514							22003	47090	216	1307	4348	787	3868			896	0	732	3813		600	63657	96	5	13	62	17	84		0	100		100	100		100	74
1968	1206	2699	11042	3664	3522	1040		391							23564	30741	472	970	1836	2533	2099	100		683	1800	232	1667		600	43733	96	15	8	33	42	67	100	0	100	100	100	100		100	65
1969	3780	2006	10151	4513	3914	630		197							25191	57897	1544	1029	8903	2874	2163			753	2700	1344	2926		500	82633	94	43	9	66	42	77		0	100	100	100	100		100	77
1970	5212	3738	5678	4687	907	250	0	276	0						20748	23471	4898	6806	3498	5682	3133	378		1952	200	809	3368	400	500	55095	82	57	55	43	86	93	100	0	100	100	100	100	100	100	73
1971	4521	2701	4000	1556	1303	390	3	294	0						14768	39401	3003	6713	4653	5217	3717	378		1875	1300	690	3154	300	800	71201	90	53	63	75	80	91	99	0	100	100	100	100	100	100	83
1972	4033	1111	5793	2526	1520	421	3	229	0						15636	20946	2030	6163	7654	5945	3057	378		1895	2100	316	4810	200	800	56294	84	65	52	75	80	88	99	0	100	100	100	100	100	100	78
1973	2109	967	7356	2891	2189	402	2	440	0						16356	10214	1636	5737	3750	7728	3167	278		936	1600	105	6946	300	780	43177	83	63	44	56	78	89	99	0	100	100	100	100	100	100	73
1974	3278	1282	5836	1555	1531	830	9	477	21						14819	18094	4218	6390	8027	12258	3524	382		1041	4713	150	8750	363	619	68529	85	77	52	84	89	81	98	0	98	100	100	100	100	100	82
1975	907	741	5395	456	1380	136	21	422	16						9474	14697	8302	7663	7430	7910	2508	305		799	1140	84	5039	596	620	57093	94	92	59	94	85	95	94	0	98	100	100	100	100	100	86
1976	1572	391	3880	314	1963	463	29	493	10						9115	14416	10010	8427	6143	6479	2827	350		1016	1901	212	2272	353	565	54971	90	96	68	95	77	86	92	0	99	100	100	100	100	100	86
1977	2929	1152	4814	408	2319	568	44	370	9						12614	17745	7192	7404	16203	6641	2836	349		1242	2572	456	3188	243	629	66700	86	86	61	98	74	83	89	0	99	100	100	100	100	100	84
1978	3260	6429	5738	1690	1914	366	33	235	7						19672	14011	11204	5790	3086	5030	3201	419		1334	6716	970	3484	249	698	56192	81	64	50	65	72	90	93	0	99	100	100	100	100	100	74
1979	2529	2007	6151	1499	8530	257	44	369	7	23	1				21417	17441	12666	4748	7369	3063	3450	716		1198	4144	491	3722	54	586	59648	87	86	44	83	26	93	94	0	99	99	100	100	100	100	74
1980	18525	3689	11915	6360	12623	64	82	249	6	35	1				53549	12589	15525	2030	10600	3174	3888	528		1169	4886	697	5617	73	604	61380	40	81	15	63	20	98	87	0	99	99	100	100	100	100	53
1981	27553	7538	9313	7596	15245	122	2337	177	864	691	2				71438	11493	8068	1851	5163	3447	3555	583		1109	2051	1446	5841	160	628	45395	29	52	17	40	18	97	20	0	56	75	100	100	100	100	39
1982	28177	10679	8275	7279	14084	485	1515	402	636	738	2				72273	14216	5524	5358	12476	4268	5558	765		1305	4573	582	6019	80	687	61411	34	34	39	63	23	92	34	0	67	86	100	100	100	100	46
1983	34322	10436	9395	7698	9897	2226	1654	441	582	757	1				77410	8221	12143	179	8964	4710	3594	712		1156	3932	37	6632	20	677	50977	19	54	2	54	32	62	30	0	67	84	97	100	100	100	40
1984	12369	11629	10179	10065	9626	2364	1435	566	600	1207	1				60042	9607	8431	1183	9681	3556	3973	724		1308	3275	48	8129	485	680	51080	44	42	10	49	27	63	34	0	69	73	98	100	100	100	46
1985	17169	9550	10054	6339	8284	2220	224	464	309	738	1				55353	7939	3115	1536	11414	1680	3020	696		1094	3203	132	3501	22	574	37926	32	25	13	64	17	58	76	0	78	81	99	100	100	100	41
1986	14757	10524	12804	6499	10167	1808	313	361	1630	1508	36				60406	6834	2867	1403	8979	3823	3249	838		1192	1672	51	6549	149	500	38105	32	21	10	58	27	64	73	0	42	53	59	100	100	100	39
1987	20267	7224	12939	11077	10680	1099	441	286	2321	1697	1				68032	9420	13270	1521	10115	3112	2640	794		1141	24	563	6212	261	392	49466	32	65	11	48	23	71	64	0	33	1	100	100	100	100	42
1988	31278	12291	10977	16381	10236	2809	603	264	1856	2211	2				88908	13477	13950	1693	4192	4095	3674	1032		1237	1600	1480	9510	491	219	56651	30	53	13	20	29	57	63	0	40	42	100	100	100	100	39
1989	18948	16025	12205	13156	7987	4187	864	306	1126	1156	1				75962	10678	14267	1640	3255	4166	2923	663		1708	1652	1115	10778	105	234	53184	36	47	12	20	34	41	43	0	60	59	100	100	100	100	41
1990	21352	10699	11293	14332	6825	8341	694	260	1765	2675	423				78659	7556	4690	1489	2406	3595	3653	804		2122	3955	50	7698	131	225	38375	26	30	12	14	35	30	54	0	55	60	11	100	100	100	33
1991	25670	8497	14372	18349	10098	5178	666	291	2105	3611	578				89415	7664	2951	946	1325	3143	3599	1055		2096	135	30	8856	131	375	32307	23	26	6	7	24	41	61	0	50	4	5	100	100	100	27
1992	14845	8657	15232	11216	11900	3384	782	188	2833	2419	601				72057	7147	13705	1054	209	2792	2330	1053		1519	4	40	6051	266	390	36560	32	61	6	2	19	41	57	0	35	0	6	100	100	100	34
1993	25298	11311	15391	16390	12497	1100	1409	174	1876	1723	560				87728	5230	1819	926	407	3834	2320	1262		1659	0	70	8049	301	450	26329	17	14	6	2	23	68	47	0	47	0	11	100	100	100	23
1994	14510	12368	13006	10069	10526	2639	894	334	857	1138	746				67085	7209	2031	1485	3263	4252	2661	1249		1862	140	45	7161	368	490	32217	33	14	10	24	29	50	58	0	68	11	6	100	100	100	32
1995	14961	9709	11510	8893	10303	1110	1354	334	1566	1807	689				62235	6258	2566	2188	2923	4628	3191	1054		2485	146	14	7006	367	429	33256	29	21	16	25	31	74	44	0	61	7	2	100	100	100	35
1996	17482	6988	14462	10906	11391	2293	1363	307	1764	1579	2168	211			70914	7653	4581	2109	2964	6391	3616	1152		2724	1331	28	8224	744	280	41796	30	40	13	21	36	61	46	0	61	46	1	97	100	100	37
1997	17115	10848	15030	11015	13293	990	1653	295	1457	1411	454	571			74133	7302	3557	373	2953	6523	2080	1432		1801	4	27	7433		251	33735	30	25	2	21	33	68	46	0	55	0	6	93		100	31
1998	37615	9809	8615	12245	10866	1750	1349	363	1808	1410	154	625			86610	7638	5910	262	2087	5528	559	1139		1587	86	23	7298		251	32367	17	38	3	15	34	24	46	0	47	6	13	92		100	27
1999	27494	6881	9638	8927	10478	1361	2013	349	1857	896	831	1143			71868	9818	5400	200	1662	7240	1285	944		1346	14	37	4611		1	32558	26	44	2	16	41	49	32	0	42	2	4	80		100	31
2000	19586	9522	7866	8423	10653	2829	1560	234	1071	1210	1194	308	184	3	64644	7565	5797	354	257	5552	1083	460		1412	9	13	4477		1	26979	28	38	4	3	34	28	23	0	57	1	1	94	0	22	29
2001	19334	11823	7786	9298	12057	2119	1843	303	2386	825	996	351		5	69126	8304	5121	597	32	3351	3677	453		1648	3	16	4202		0	27403	30	30	7	0	22	63	20	0	41	0	2	92		7	28
2002	15206	11561	8742	4965	10693	2321	1845	347	2051	1042	908	441		1	60121	8719	5162	672	771	6565	3721	357		2705	303	15	7309			36298	36	31	7	13	38	62	16	0	57	23	2	94		0	38
2003	11721	16311	8906	5881	11676	1160	2028	564	1256	560	733	389		2	61187	2703	686	887	25	4186	2634	21		47	5	3	4748			15944	19	4	9	0	26	69	1	0	4	1	0	92		0	21
2004	12823	15616	7075	8028	11958	2066	2248	551	1921	284	580	494		1	63645	3009	740	1044	443	872	4157	349	2081	5	1	1	2916			15617	19	5	13	5	7	67	13	79	0	0	0	86		0	20
2005	77452	11842	9732	5986	10791	2750	2451	2772	1026	440	217	521	1	1	125981	1315	73	738	168	975	1481	5	0	5	3	0	3191			7955	2	1	7	3	8	35	0	0	1	1	0	86	0	0	6
2006	40955	9847	5557	8243	7193	3063	1743	598	1692	571	32	377	93	0	79964	443	78	725	186	992	1027	66	696	245	0	0	3210		1	7669	1	1	12	2	12	25	4	54	13	0	0	89	0	77	9
2007	14422	17803	5500	9781	17331	2382	2502	1132	1922	847	1046	277	16	0	74961	595	357	602	7	606	3077	66	3622	5	0	1	1977			10914	4	2	10	0	3	56	3	76	0	0	0	88	0	0	13
2008	14347	13751	5537	7859	6290	2134	2103	601	1416	616	531	312	0	0	55496	2467	462	363	2	1053	4691	55	441	254		2	2993	0		12783	15	3	6	0	14	69	3	42	15	0	0	91	82	0	19
2009	22697	15946	5714	12378	11524	3860	2300	1007	1437	684	448	141	1	0	78138	1013	319	483	6	1009	1696	54	4374	5	0	1	2540	2		11503	4	2	8	0	8	31	2	81	0	0	0	95	64	0	13
2010	26724	21968	5551	14213	8732	3022	2082	1995	1543	2384	287	92	10	0	88603	2197	459	423	2	1010	4930	3	2804	5	0		1498	11		13342	8	2	7	0	10	62	0	58	0	0	0	94	52	0	13
2011	35117	23543	5475	15464	10141	6242	2281	5041	1527	1333	374	129	8	1	106676	1544	1130	455	7	728	3241	219	2146	6	0	3	926	4	0	10410	4	5	8	0	7	34	9	30	0	0	1	88	36	8	9
2012	47692	18596	4751	18284	12366	4594	3607	3628	1524	1128	681	138	4	0	116992	540	979	433	0	399	1640	108	19	6	0		475	2		4602	1	5	8	0	3	26	3	1	0	0	0	77	37	0	4
2013	22893	19883	5018	17533	11635	4272	5390	4918	1237	3016	661	159	13	0	96628	1930	618	441	64	498	3381	7	86	6		1	695	0		7727	8	3	8	0	4	44	0	2	0	0	0	81	2	0	7
2014	26792	12471	3858	17029	3938	3303	2895	5177	891	1459	952	3	0	0	78769	1181	345	0	1	494	612	84	204	22	0		695	18	0	3657	4	3	0	0	11	16	3	4	2	0	0	100	97	49	4
2015	10835	17817	4078	12218	3642	8000	2067	5705	1136	1242	2239	389	23	1	69393	4824	486	0			766	90	210	36					0	6413	31	3	0	0	0	9	4	4	3	0	0	0	0	1	8
2016	14843	23331	3828	16482	3448	3483	15623	3911	1380	3185	805	429	12	0	90760	40031	534	0	1	494	520	248	318	75			695	11	0	42927	73	2	0	0	13	13	2	8	5	0	0	62	48	77	32

Table 4. SCRS estimations (mostly carry overs) of major small tuna species in T1NC, requiring a revision by the respective CPCs.

a) Prior to 1980

Status	Flag	Species	1950					1960						1970									
			1951	1953	1954	1956	1957	1961	1962	1965	1966	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
CP	Curaçao	BLF																					55
		WAH													178	178	178	178	178	178	178		215
	EU.Bulgaria	BON														100							
	EU.Cyprus	LTA															6			7			
	Maroc	BON	900				2500		700														
	Mauritania	BOP															100	100				90	90
		LTA													50	50	50	50	50	50	50	50	50
	Mexico	KGM	220	329	329	439		1000	1000														
		SSM	780	1171	1171	1561																	
NCO	Aruba	WAH													100	100	100	100	100	100	100		115
	Grenada	BLF													100	100	100			100			
		BON								100	100	200	200	200	200	200	200			200			
		KGM								100													
	Israel	LTA													100	100	100				300		

b) 1980 onwards

Status	Flag	Species	1980										1990										2000				2010			
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2009	2010	2011	2012	2013
CP	Algerie	BLT																								806	970			
		BON																								976	1009			
		LTA																								119	131			
	Angola	FRI																						38						12
		BON																						118	118					
		LTA																						132	132					
	Barbados	WAH																					41							
	Brazil	BLF																				55								
		BRS																				1516				1042				
		KGM																				3595								
		LTA																				920	10	615	615					
	Côte d'Ivoire	LTA																								1041	1359			
	Curaçao	BLF	55	55	55	55	55	55	60	60	70	70	70		60					45	45	45	45	45	45					
		BON																									539	539	539	539
		LTA																									38	38	76	57
		WAH	215	215	215	215	215					280	280						230	230	230	230	230	230	230					
	Egypt	BON																					1442		1128					
	EU.Bulgaria	FRI		3																										
		BON												17										35	35					
	EU.Cyprus	LTA																		19	19		19	19	19					
	EU.France	BLF																		1040	1040	1040	1040	1040	1040				26	
		BON																		610	610									
		CER																		250	250									
		LTA																					610	610	610					
	EU.Greece	BLT																									169			
		BON																									531			
		LTA																									165			
	EU.Ireland	BON																										91	108	100
	EU.Italy	BLT																									574	653	613	
		BON																		2233	2233		4159	4159						
		LTA																								243	365	304	669	
	EU.Netherlands	FRI																												85
		BON																												1075
		LTA																												9
	EU.United Kingdom	LTA																											38	
	Ghana	FRI																												2382
		LTA																												1138
	Guatemala	FRI																									78		63	
	Liberia	LTA												237	237															
	Libya	LTA																							4					
	Mauritania	BOP						40		50	50	50	50																	
		LTA						60		50	50	50	50																	
	Mexico	BON																		1312										
		KGM																		4661										
		SSM																		11050										
	Panama	FRI																									425		463	
		LTA																											0	
		WAH																									111	99	210	
	Senegal	LTA																					207	207	207					
		MAW																					209	209	209					
	St. Vincent and Grenadines	BLF																							24					
		DOL																											84	
	Syria	BLT																								87	81	84	83	83
		LTA																						370		163	148	155	304	229
	Turkey	BLT																					316	316	316					
		LTA																					750	750	750					
	U.S.A.	KGM																								8247	5630	6939	9187	8062
		SSM																								1946	1846	1896	1864	1877
	Venezuela	FRI																		2578										
		BLF																		3										
		BON																		1348										
		BRS																		3609			1766	1766	1766					
		KGM																		2139			2424	2424	2424					
		LTA																					2247	2247	2247					
		WAH																		479										
NCC	Guyana	BRS																										116		
		KGM																										75		
NCO	Antigua and Barbuda	KGM														1														
	Argentina	BON																											33	
	Aruba	WAH	115	115	115	115	115	115				80				50				50	50	50	50	50	50					
	Benin	LTA				10		30											58				69	69	69					
		MAW																					205	205	205					
	Colombia	SSM																69												
	Cuba	BLF																		287										
		SSM												538						613										
	Dominica	BLF																									41		39	37
		WAH														59	59		58	58	58						13			
	Dominican Republic	KGM																						226	226					
		SSM																						158	158					
		WAH																						35	35					
	Grenada	BLF																								291	291	291	291	291
	Israel	LTA															119			119	119	119	119	119	119					
	Jamaica	KGM																							48					
	NEI (MED)	BON							359					311	311		300	300	300											
		LTA				200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200								
	Palestine	LTA																						60						
	Serbia & Montenegro	BON																						17						
		LTA																						16						
	Sta. Lucia	BLF																			40					165				
		WAH																			223									
	Togo	BON																		197	197	197								

Table 5. Summary of all the T2SZ samples available in the ICCAT-DB in relation to small tuna species. Number of fish and class range limits (min-max) by species, frequency type, flag and class interval. Cells shaded in yellow (possible errors) have the respective datasets under revision.

				Number (n) of fish in T2SZ (sampled)												Class ranges by species																							
Freq. group	Flag	Freq. type	Class Interval	FRI	BLF	BLT	BON	BRS	DOL	KGM	LTA	MAW	SSM	WAH	Total	FRI		BLF		BLT		BON		BRS		DOL		KGM		LTA		MAW		SSM		WAH	
				n	n	n	n	n	n	n	n	n	n	n		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
size (cm)	Angola	CFL	1	1147											1147	23	36																				
		SFL	1	6472							3207				9679	21	45													26	63						
			2	4462			5422				17496				27380	24	52					30	76							30	60						
	Brazil	SFL	1	18	1085										1103	42	51	13	163																		
			2	216	219				54					20	509	32	50	42	80							68	130									104	140
	Cape Verde	SFL	1	3711				1441			3553			21701	30406	21	138							74	180					21	85					46	194
			2	1146							495			5450	7091	18	60													22	92					50	180
	Chinese Taipei	SFL	2											970	970																					120	160
	Côte d'Ivoire	SFL	1	19641			4478		7839		25096	18372		1479	76905	13	189					20	85			17	197			10	176	15	125			17	187
	Cuba	SFL	1		21642										21642			20	77																		
			2		1434									222	1656			11	66																	94	174
	Curaçao	SFL	1	27754							6726				34480	23	62													27	79						
	EU.España	SFL	1	146899		19362	36127		682		70841				273911	19	73			14	56	13	75			34	124			24	115						
			2	306							509				815	38	60													30	58						
			5						348		1935			52	2335											30	125			31	115					100	180
	EU.France	SFL	1	128121							55329				183450	21	63													28	77						
			2				4367								4367							16	78														
	EU.Italy	SFL	1	166			3326				854				4346	35	46					30	102							68	155						
			2				6655		1590						8245							26	76			22	152										
			5				105								105							40	75														
	EU.Malta	SFL	1			194	18		5996		134				6342					21	39	34	67			10	148			12	140						
	EU.Portugal	SFL	1	50		9565	11549				806				21970	40	45			23	65	30	86							30	73						
	FR.St Pierre et Miquelon	SFL	1						32						32											63	104										
	Ghana	SFL	1	420							5247				5667	33	52													30	61						
	Guatemala	SFL	1	8220							3445				11665	22	51													27	74						
	Japan	SFL	2											123	123																					134	150
	Japan (foreign obs.)	CFL	1								10			4	14															67	160					118	165
		SFL	1	2	19					49	26		1	58	155	190	300	60	185									20	167	50	185		127	127	35	200
	Korea Rep.	SFL	1						245					61	306											50	132									82	161
	Maroc	SFL	1				2841								2841							31	92														
			2				1343								1343							36	70														
			5				662								662							33	71														
	Mexico	SFL	1		1910									1125	3035			22	107																	59	191
	Mixed flags (FR+ES)	SFL	1	87052							34634				121686	20	58													21	70						
	Mixed flags (KR+PA)	SFL	2											242	242																					134	156
	NEI (ETRO)	SFL	1	39605							14336				53941	24	57													26	76						
	Panama	SFL	1	36434							10165				46599	23	73													23	75						
			2											148	148																					130	164
	Russian Federation	SFL	1	7222		12546	14766				4069				38603	20	49			19	46	19	76							25	71						
	Senegal	LJFL	5				2781				8806	189			11776							5	110							7	98	20	80				
		SFL	1	2038			67899				192105	40676			302718	21	52					14	87							10	100	10	98				
			2								8509				8509															24	96						
	St. Vincent and Grenadines	SFL	1	11							8				19	36	42													40	53						
	Turkey	SFL	1	20					4		870				894	38	46									62	78			47	91						
	U.S.A.	CFL	1	2	2646		1222		36		7035			3659	14600	27	44	28	173			23	91			76	125			22	102					30	225
		SFL	1		14295	5	1073		22	159967	15238		136022	4486	331108			30	130	264	290	30	272			58	120	13	1000	25	110			10	110	15	198
	UK.Bermuda	SFL	2		25									293	318			22	96																	74	174
			5											136	136																					100	170
	UK.Sta Helena	SFL	1											212	212																					14	177
	Venezuela	LD1-FL	1	1312	1734										3046	17	66	21	75																		
		LJFL	1	100											100	30	64																				
		SFL	1	836598	541540									266	1378404	15	66	4	105																	70	195
weight (kg)	U.S.A.	HGTW	1		4645		45		516		100			4829	10135			1	34			1	49			1	88			1	13					1	63
		WGT	1		23805		3576		92547		596			70843	191367			1	84			1	30			1	103			1	14					1	136
TOTAL(MIN/MAX)				1359145	614999	41672	168255	1441	109911	160016	492180	59237	136023	116379	3259258	13	300	1	185	14	290	1	272	74	180	1	197	13	1000	1	185	10	125	10	127	1	225

Table 6. Based in t2sz_SMT_all_v1. Stocks definitions (ICCAT geographical regions). Red: out of range of species distribution. Green: length data available for recent years (> than 100 fish measured by year/gear combination). Yellow: stock defined but length data available for the last years insufficient (< than 100 fish measured by year/gear).

		Northeast	Southeast	Northwest	Southwest	Mediterranean
Acanthocybium solandri	WAH	Yes	Yes	Yes	No	
Auxis rochei	BLT	Yes	No	Yes	No	Yes
Auxis thazard	FRI	Yes	Yes	Yes	No	No
Euthynnus alletteratus	LTA	Yes	Yes	Yes	No	Yes
Orcynopsis unicolor	BOP	No				No
Sarda sarda	BON	Yes	No	Yes	No	Yes
Scomberomorus brasiliensis	BRS			No	No	
Scomberomorus cavalla	KGM			No	No	
Scomberomorus maculatus	SSM			No		
Scomberomorus regalis	CER			No	No	
Scomberomorus tritor	MAW	No	No			No
Thunnus atlanticus	BLF			No	No	

Table 7. Number of studies per species and ICCAT Region with values for each Life History parameter. Cells in red highlight data gaps.

Mediterranean

Species_name	Code	L_{max}	L_{inf}	k	t_0	T_{max}	Lm_{50}	Tm_{50}	$F_{meanbatch}$	WL_a	WL_b
Auxis rochei	BLT	16	10	10	10	7	3	3	2	12	12
Auxis thazard	FRI	0	0	0	0	0	0	0	0	0	0
Euthynnus alletteratus	LTA	20	10	9	9	10	7	3	1	18	18
Orcynopsis unicolor	BOP	4	2	2	2	2	3	3	0	4	4
Sarda sarda	BON	39	12	12	12	12	5	1	2	33	33
Total Result		**79**	**34**	**33**	**33**	**31**	**18**	**9**	**5**	**67**	**67**

Northeast

Species_name	Code	L_{max}	L_{inf}	k	t_0	T_{max}	Lm_{50}	Tm_{50}	$F_{meanbatch}$	WL_a	WL_b
Acanthocybium solandri	WAH	1	0	0	0	0	0	0	0	1	1
Auxis rochei	BLT	4	1	1	1	2	0	0	0	5	5
Auxis thazard	FRI	1	0	0	0	0	0	0	0	1	1
Euthynnus alletteratus	LTA	10	4	4	1	5	3	0	0	4	4
Orcynopsis unicolor	BOP	3	0	0	0	0	0	0	0	0	0
Sarda sarda	BON	3	2	2	2	0	0	0	0	4	4
Scomberomorus tritor	STR	5	2	2	0	1	6	0	0	3	3
Thunnus atlanticus	BLF	0	1	1	1	0	0	0	0	0	0
Total Result		**27**	**10**	**10**	**5**	**8**	**9**	**0**	**0**	**18**	**18**

Table 7. (continued).

Southeast

Species_name	Code	L_{max}	L_{inf}	k	t_0	T_{max}	Lm_{50}	Tm_{50}	$F_{meanbatch}$	WL_a	WL_b
Acanthocybium solandri	WAH	0	0	0	0	0	0	0	0	0	0
Auxis rochei	BLT	1	1	1	1	1	3	0	1	0	0
Auxis thazard	FRI	1	1	1	1	1	0	0	0	0	0
Coryphaena hyppurus	DOL	0	0	0	0	0	0	0	0	0	0
Euthynnus alletteratus	LTA	0	0	0	0	0	0	0	0	0	0
Sarda sarda	BON	0	0	0	0	0	0	0	0	0	0
Scomberomorus tritor	MAW	1	0	0	0	0	0	0	0	0	0
Total Result		**3**	**2**	**2**	**2**	**2**	**3**	**0**	**1**	**0**	**0**

Northwest

Species_name	Code	L_{max}	L_{inf}	k	t_0	T_{max}	Lm_{50}	Tm_{50}	$F_{meanbatch}$	WL_a	WL_b
Acanthocybium solandri	WAH	23	12	12	6	6	5	2	2	8	8
Auxis rochei	BLT	0	0	0	0	0	0	0	0	0	0
Auxis thazard	FRI	0	0	0	0	0	0	0	0	0	0
Euthynnus alletteratus	LTA	8	1	1	1	0	1	0	0	5	5
Sarda sarda	BON										
Scomberomorus brasiliensis	BRS	8	4	4	3	3	0	0	0	1	1
Scomberomorus cavalla	KGM	36	45	45	43	45	8	4	1	14	14
Scomberomorus maculatus	SSM	29	14	14	14	16	6	0	1	18	18
Scomberomorus regalis	SCE	10	0	0	0	0	6	0	0	2	2
Thunnus atlanticus	BLF	28	11	11	11	8	3	0	0	17	17
Total Result		**142**	**87**	**87**	**78**	**78**	**29**	**6**	**4**	**65**	**65**

Southwest

Species_name	Code	L_{max}	L_{inf}	k	t_0	T_{max}	Lm_{50}	Tm_{50}	$F_{meanbatch}$	WL_a	WL_b
Acanthocybium solandri	WAH	2	0	0	0	0	1	0	1	1	1
Auxis rochei	BLT	0	0	0	0	0	0	0	0	0	0
Auxis thazard	FRI	1	0	0	0	0	0	0	0	1	1
Euthynnus alletteratus	LTA	0	0	0	0	0	0	0	0	0	0
Sarda sarda	BON	4	3	3	3	0	0	0	0	1	1
Scomberomorus brasiliensis	BRS	19	12	12	11	10	7	1	1	5	5
Scomberomorus cavalla	KGM	15	11	11	11	13	2	0	0	2	2
Thunnus atlanticus	BLF	13	2	2	1	0	4	0	1	11	11
Total Result		**54**	**28**	**28**	**26**	**23**	**14**	**1**	**3**	**21**	**21**

Table 8. Most reliable parameters by region and species, and supporting references, selected to use for running the Data Poor Models.

Species	Parameter	Northeast	(source)	Southeast	(source)	Mediterranean	(source)	Northwest	(source)	Southwest	(source)
Acanthocybium solandri (WAH)	L_{max}							200	Hogarth, 1976	197	Viana et al., 2013
	L_{inf}							179.7	McBride et al., 2008		
	k							317	McBride et al., 2008		
	t_o							-1911	McBride et al., 2008		
	Tmax							9	McBride et al., 2008		
	Lm_{50}							92.5	Jenkins and McBride, 2009	110	Viana et al., 2013
	Tm_{50}							0.64	Jenkins and McBride, 2009		
	$F_{meanbatch}$							1055000	Jenkins and McBride, 2009	1.32	Viana et al., 2013
	WL_a	0.02749	Santana et al., 1993 (Size distribution)					6.1E-10	McBride et al., 2008, W in kg and FL in mm	0.0016	Frota et al., 2004
	WL_b	2.72252	Santana et al., 1993 (Size distribution)					3.3298	McBride et al., 2008, W in kg and FL in mm	3.275	Frota et al., 2004
Auxis rochei (BLT)	L_{max}	39	Grudtsev, 1992 (spines)			50	Collette and Nauen, 1983				
	L_{inf}	41.4	Grudtsev, 1992 (spines)	51.47	Grudtsev and Korolevich, 1986	49.238	Kahraman et al., 2011				
	k	0.32	Grudtsev, 1992 (spines)	0.32	Grudtsev and Korolevich, 1986	0.312	Kahraman et al., 2011				
	t_o	-0.83	Grudtsev, 1992 (spines)	-0.83	Grudtsev and Korolevich, 1986	-0.3011	Kahraman et al., 2011				
	Tmax	5	Grudtsev, 1992 (spines)	4	Grudtsev and Korolevich, 1986	5	Kahraman et al., 2011				
	Lm_{50}			25.5	Edoukou et al., 2018	32,6-34,81	Hattour, 2000; Saber et al., 2017				
	Tm_{50}					1.02	Kahraman et al., 2011				
	$F_{meanbatch}$					31000-130000	Collette and Aadland, 1996				
	WL_a	0.03582	Grudtsev, 1992 (spines)			0,003483	Saber et al., 2017				
	WL_b	3.435	Grudtsev, 1992 (spines)			3,432-3,527	Saber et al., 2017				
Auxis thazard (FRI)	L_{max}										
	L_{inf}			51.47	Grudtsev and Korolevich, 1986						
	k			0.32	Grudtsev and Korolevich, 1986						
	t_o			-0.83	Grudtsev and Korolevich, 1986						
	Tmax			4	Grudtsev and Korolevich, 1986						
	Lm_{50}										
	Tm_{50}										
	$F_{meanbatch}$										
	WL_a									0.0089	Frota et al., 2004
	WL_b									3.17	Frota et al., 2004

NOTE: Parameters for Females, except *a* and *b* for WL relationship (sexes combined). WL eviscerated weight, FL; L_{inf}, K, t_0 from same study.

Table 8. (continued).

Species	Parameter	Northeast	(source)	Southeast	(source)	Mediterranean	(source)	Northwest	(source)	Southwest	(source)
Euthynnus alletteratus(LTA)	L_{max}	82.6	(spines)			122	Claro, 1994	106.68	IGFA,2011		
	L_{inf}	112	(spines)			117-130,8	Hattour, 2009; Hajjej et al., 2012	86	Cabrera et al., 2005		
	k	0.126	(spines)			0,131-0,19	Hattour, 2009; Hajjej et al., 2012	0.26	Cabrera et al., 2005		
	t_o	---	(spines)			-2,22 - -1,13	Hattour, 2009; Hajjej et al., 2012	-0.32	Cabrera et al., 2005		
	Tmax	8	(spines)			7-10	Hattour, 2009; Hajjej et al., 2012				
	Lm_{50}	42	Diouf, 1980			44,8-51,13	Hattour, 2009; Hajjej et al., 2012	39.7	Ramirez-Arredondo, 1993		
	Tm_{50}					1,89-2	Hattour, 2000; Hattour, 2009				
	$F_{meanbatch}$					451484	Hajjej et al., 2017				
	WL_a	0.0138	Diouf, 1980			0,01242-0,0329	Hajjej et al., 2011; Saber et al., 2017	0.0000205	1996, W in g and FL in mm		
	WL_b	3.035	Diouf, 1980			2,8101-3,058	Hajjej et al., 2011; Saber et al., 2017	2.96	1996, W in g and FL in mm		
Sarda sarda (BON)	L_{max}	65.3	Baibbat et al., 2016			91.4	Collette and Nauen, 1983				
	L_{inf}	73.01	Baibbat et al., 2016			69.565	Kahraman et al., 2014				
	k	3.3075	Baibbat et al., 2016			0.439	Kahraman et al., 2014				
	t_o	2.4469	Baibbat et al., 2016			-1.327	Kahraman et al., 2014				
	Tmax	4.89	Baibbat et al., 2016			5	Cayré et al., 1993				
	Lm_{50}	42.6	Baibbat et al., 2016			36,6-39,93	Hattour, 2000; Saber et al., 2017				
	Tm_{50}					0.71	Kahraman et al., 2014				
	$F_{meanbatch}$					79432	Macias et al., 2005				
	WL_a	5.00E-05	Baibbat et al., 2016			0,0082	2017			0.0135	Hansen, 1987
	WL_b	2.7852	Baibbat et al., 2016			3,13-3,21	2017			2.952	Hansen, 1987
Scomberomorus cavalla (KGM)	L_{max}							180.2	Manooch et al., 1987	136	Nóbrega and Lessa, 2009
	L_{inf}							121,6-132,8	Ortiz and Palmer, 2008, range: Southeast coast of USA_Gulf of Mexico USA	132.7	Nóbrega and Lessa, 2009
	k							0,228-0,17	Ortiz and Palmer, 2008, range: Southeast coast of USA_Gulf of Mexico USA	0.159	Nóbrega and Lessa, 2009
	t_o							-1,692_-2,464	Ortiz and Palmer, 2008, range: Southeast coast of USA_Gulf of Mexico USA	0.387	Nóbrega and Lessa, 2009
	Tmax							26_24	Ortiz and Palmer, 2008, range: Southeast coast of USA_Gulf of Mexico USA	15	Nóbrega and Lessa, 2009
	Lm_{50}							58.5	Figuerola-Fernández et al., 2007	70	Lessa et al, 2009
	Tm_{50}									15	Nóbrega and Lessa, 2009
	$F_{meanbatch}$							1644805	SEDAR, 2014		
	WL_a							0.0000528	Aguilar-Salazar et al., 1990, W in g and FL in mm	0.00001	Lessa et al., 2004
	WL_b							2.7	Aguilar-Salazar et al., 1990, W in g and FL in mm	2.9554	Lessa et al., 2004

NOTE: Parameters for Females, except *a* and *b* for WL relationship (sexes combined). WL eviscerated weight, FL; L_{inf}, K, t_0 from same study.

Table 9. The detailed information on the research activities to be carried out by species for 2018-2019 under the ICCAT SMTYP.

Species	Research line	Geographical area	CPCs	Coordinator
Little tuna	Aging and growth	North East Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Cabo Verde	S. Baibbat
		South East Atlantic	Angola, South Africa, Cote d'Ivoire, São Tomé e Príncipe, Gabon	
	Reproduction	North East Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Cabo Verde	D. Macias
		South East Atlantic	Angola, South Africa, Cote d'Ivoire, São Tomé e Príncipe, Gabon	
		Mediterranean Sea	Tunisia, EU-Spain, Algeria	
	Stocks structure/delimitation	North East Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Cabo Verde, Morocco	J. Vinas
		South East Atlantic	Angola, South Africa, Cote d'Ivoire, São Tomé e Príncipe, Gabon, Liberia	
		Mediterranean Sea	Tunisia, EU-Spain, Algeria	
Atlantic Bonito	Aging and growth	**North East Atlantic**	**Senegal, EU-Spain, EU-Portugal, Mauritania, Cabo Verde, Morocco**	S. Baibbat
		South East Atlantic	Angola, South Africa, Cote d'Ivoire, São Tomé e Príncipe, Gabon	
		Mediterranean Sea	Tunisia, EU-Spain	
	Reproduction	North East Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Cabo Verde, Morocco	D. Macias
		South East Atlantic	Angola, South Africa, Cote d'Ivoire, São Tomé e Príncipe, Gabon	
		Mediterranean Sea	Tunisia, EU-Spain, Algeria	
	Stocks structure/delimitation	North East Atlantic	Senegal, EU-Spain, EU-Portugal, Mauritania, Cabo Verde, Morocco	J. Vinas
		South East Atlantic	Angola, South Africa, Cote d'Ivoire, São Tomé e Príncipe	
Wahoo	Aging and growth	North East Atlantic	**EU-Spain, Mauritania**	**S. Baibbat**
		South West Atlantic	**Brazil**	
	Stocks structure/delimitation	North East Atlantic	EU-Spain, Cabo Verde, Mauritania	J. Vinas
		South East Atlantic	São Tomé e Príncipe	
		South West Atlantic	Brazil	

Table 10. Required budget for the research activities to be carried out during 2019 under the ICCAT SMTYP.

Activity	Amount (€)
Reproductive biology study	€20,000
Age and growth study	€20,000
Genetics study for stock differentiation	€50,000
Sampling collection and shipping	€10,000
Total	**€100,000**

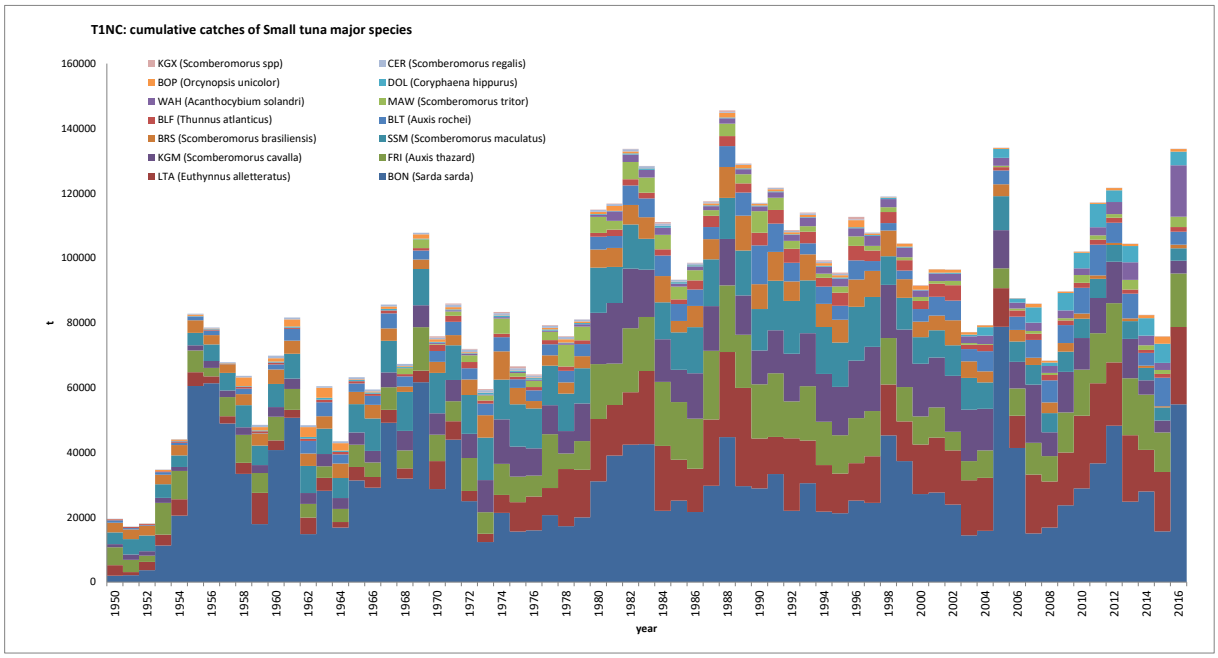

Figure 1. Task I nominal catches (t) of small tuna between 1950 and 2016 accumulated by species.

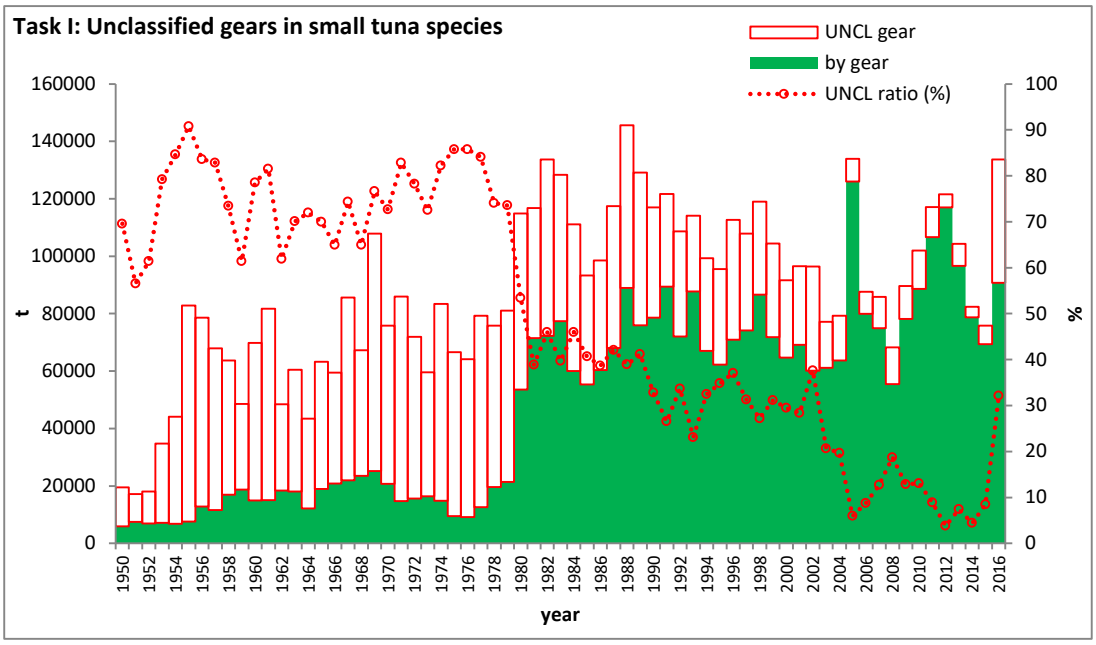

Figure 2. Cumulative small tuna species (all combined) Task I catches (t) between 1950 and 2016, comparing the catch series with a fishing gear associated against the unclassified gear (UNCL) catch series. On the eight axis, the ratio (%) over time of the unclassified gears catch series is shown.

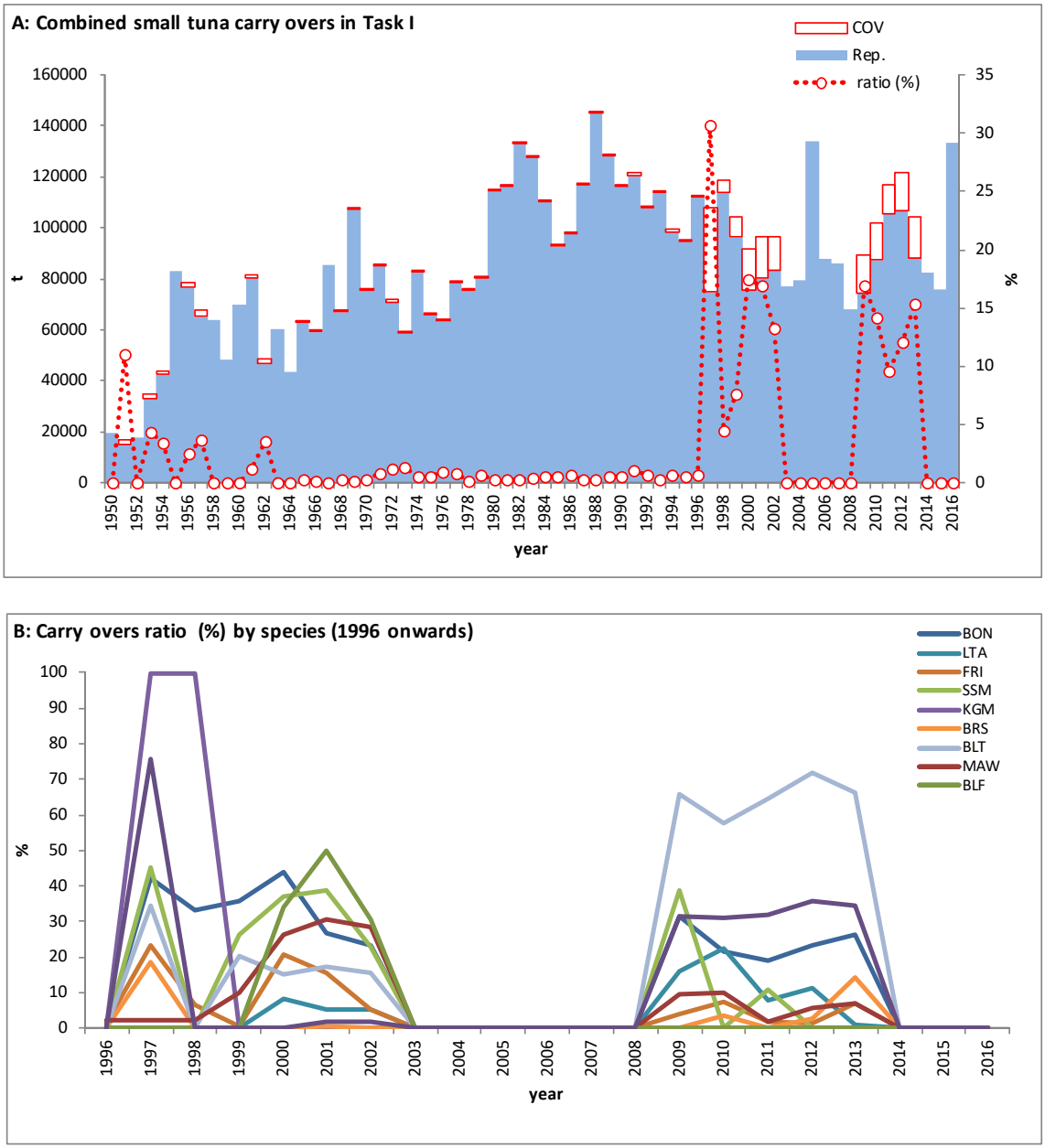

Figure 3. Weight of the "carry overs" (SCRS estimations) on the small tuna species. Panel A shows the overall effect (all small tuna species combined). Panel B shows the ratio of each species between 1996 and 2015.

Appendix 1

Agenda

1. Opening, adoption of Agenda and meeting arrangements
2. Review of fishery statistics
   - 2.1 Task I (catches) data
   - 2.2 Task II (catch-effort and size samples) data
   - 2.3 Other information (tagging)
   - 2.4 Fishery indicators (including length data analysis)
3. Review of available and new information on biology and other life-history information of small tunas such as stock structure.
4. Update of Data Poor Methods and development of management advice
   - 4.1 WAH
   - 4.2 BON
   - 4.3 LTA
5. Review development of a meta-database for small tunas and appropriate approaches for future assessment of small tuna stocks
6. Review status of SMTYP program to improve collaboration among scientists and obtain the information required for assessment
7. Recommendations
8. Other matters
9. Adoption of the report and closure

Appendix 2

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Appendix 3

List of Papers and Presentations

Reference	Title	Authors
SCRS/2018/023	On the catches of minor tunas by the EU purse seiners: data analysis and proposal to correct the Task I and to create Task II catch and effort and catch at size files for minor tunas landed by the EU purse seiners	Fonteneau *et al.*
SCRS/2018/024	Element de biologie de l'*Auxis rochei* echantillonee au niveau de la cote algerienne centre.	K. Ferhani, A. Kouadri Krim
SCRS/2018/025	The current status of the small tuna fishery in Atlantic Ocean and Mediterranean: perspectives for stock assessment	Lucena Frédou, F. and Frédou, T.
SCRS/2018/026	Updated annual indices of spawning biomass of Little tunny, auxis sp., king mackerel, Spanish mackerel and common dolphin Based on ichthyoplankton surveys In the gulf of Mexico (1986-2016)	Ingram, G.W. Jr., Hanisko, D.S., Pollack, A.G. and Zapfe, G.
SCRS/2018/027	Preliminary stomach contents analysis of bullet tuna *Auxis rochei* (Risso, 1810) in Tunisian waters	Hajjej G., Missaoui H., and Jarboui O.
SCRS/2018/028	Biological aspects of Atlantic Bonito *Sarda sarda* from Spanish and Portuguese waters	Saber S., Ortiz de Urbina J., Lino P.G., Gómez-Vives M.J., Ciércoles C., Coelho R., Lechuga R., and Macías D.
SCRS/2018/029	Biological aspects of Little Tunny *Euthynnus alletteratus* from Spanish and Portuguese waters	Saber S., Ortiz de Urbina J., Lino P.G., Gómez-Vives M.J., Coelho R., Lechuga R., and Macías D.
SCRS/2018/030	Annual abundance indices for wahoo based on recreational fishery surveys in the U.S. Gulf of Mexico and U.S. South Atlantic (1986-2015)	Ingram, G.W. Jr.
SCRS/2018/031	Etude de la biologie et de l'exploitation de la bonite à dos rayé au Sud du Maroc	Baibbat S., Abid N., Abdeillah I., Mohamed F., and Benazzouz B.
SCRS/2018/033	The simplified evaluation of the possible future Russian small tunas by-catch	Petukhova, N.G
SCRS/2018/034	Etude de quelques paramètres de la biologie de reproduction de *Auxis rochei* (Risso, 1810) capture dans de Golfe Guinée par les Pêcheurs artisans	Edoukou A., Diaha N.C., Amandé M.J., Assan N.F, N'guessan Y., and N'da K.

Appendix 3 (continued)

List of Papers and Presentations

Reference	Title	Authors
SCRS/P/2018/006	Living Working Document: Gonad stages of small tunas	Saber S., Lino P.G., Ciércoles C., Gómez-Vives M.J., Lechuga R., Godoy D., Ortiz de Urbina J., Coelho R., and Macías D.
SCRS/P/2018/007	Preliminary results from the implementation of data-poor methods for small tunas	Pons M., Cope J., Kell L., and Hilborn R.
SCRS/P/2018/008	Reconstitution des statistiques de capture des thons mineurs pêches au large de la Mauritanie	Meissa B., and Isselmou C.B.
SCRS/P/2018/009	Production of small tunas in Liberia in 2017	Wilson III R.B.
SCRS/P/2018/010	Preliminary results on the estimation of growth parameters for *Euthynnus alletteratus* and *Sarda sarda*	N'gom F., Goudiaby K.D., and Ndiour Y.
SCRS/P/2018/011	AOTTP – Preliminary Observations on Little Tunny and Wahoo	ICCAT Secretariat
SCRS/P/2018/012	Multilocus evidences of genetic population differentiation at small geographical range for a migratory pelagic species Bullet tuna	Ollé J., Pérez-Bielsa N., Saber S., Allaya H., Macías D., and Viñas J.
SCRS/P/2018/013	Review of Small Tunas data: sharing and standardizing	Lino P.G., and Coelho R.
SCRS/P/2018/014	Fishing for Small Tunas in São Tomé and Principe	Conceição I.

Appendix 4

SCRS Documents and Presentations - Abstracts as provided by the authors

SCRS/2018/023 - This paper is estimating the yearly landings of SMT by Spanish and French PS and sold as *faux-poissons* in the Abidjan and other markets during the 1991-2016 period. This work is mainly based on the analysis of log books and of the multispecies sampling of these species conducted in Dakar and Abidjan. A method is proposed to estimate the monthly landings by flag & by species of minor tunas by 1° square. This result was obtained by the SMS method (Fonteneau et al 2016) based on a combined set by set analysis of log books and multispecies samples, where large numbers of SMT have been sampled yearly since 1990. These estimated catches also include the landings of SMT by PS outside Abidjan (an average of 30% of average catches during the 1991-2016 period) that are not included in the today TASK1. This analysis shows that the today TASK1 and TASK2 ICCAT statistics of minor tunas caught by species by the EU PS are often questionable or wrong. Our results show that *Auxis* average catches by the EU PS fleet may have been reaching an average 5300 t. (last 26 years), *Euthynnus* catches reaching only 1500 t. This species being predominantly caught in given coastal areas shown by fishing maps, while the catches of *Auxis* are mainly scattered in wide offshore areas. SMT are predominantly caught associated to FADs (an average of about 83 % of total SMT catches, period 1991-2016, but also in free schools in some coastal areas off Senegal, Cap Lopez and Guinea. Our analysis remains preliminary and an in depth revision of the SMT catch statistics of all PS fleets is recommended. This future work should be based on a new analysis and full validation of *faux-poissons*, log books and sampling data bases during the last 26 years.

SCRS/2018/024 – This study is based on samples *Auxis rochei* from commercial fishing and the economic surveys of the fishing activity in the Center region. Qualitative and quantitative analysis of the diet of this species showed that this species has preferentially feeding. The breeding season started in May, the maximum average of RGS is registered in July. The growth parameters of the Von Bertalanffy model of both sexes and estimated from the size frequency analysis are: L = 58.3cm, K = 0.3 y-1 and t_0 = -0.36 year. The parameters *a* and *b* of the relationship between the fork length and the total weight are 0.0025 and 3.527 (both sexes).

SCRS/2018/025 – In this paper we described the spatial- temporal catches and length data available for the small tuna species in the Atlantic and Mediterranean. We also revised the current knowledge of the available information on Task 1 and 2 and the life history parameters of the species. This information will be useful to identify species and model to be prioritized for a future assessment, contributing to the Small Tunas Work Plan for 2018-2019. Data on catches for BON and LTA are well reported in Mediterranean and Africa Coast. This is also observed for FRI, which is also reported with high catches in the coast of South America. KGM and WAH, although do not dominated in catches, are well represented in most areas of the tropical Atlantic. In relation to the methods, Catch-based and methods which consider the mean length and the life history parameters would be the most recommended for the species BON, LTA, FRI and WAH and KGM, the 3 most captured species (BON, LTA and FRI) and species considered as high risk (WAH and KGM).

SCRS/2018/026 – Fishery-independent indices of spawning biomass of little tunny (*Euthynnus alletteratus*), two combined *Auxis* species, king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculatus*) and common dolphin (*Coryphaena hippurus*) are presented utilizing NOAA Fisheries ichthyoplankton survey data collected from 1986 through 2016 in the Gulf of Mexico. Indices for little tunny, Auxis sp., king mackerel, and Spanish mackerel were developed using catch rates of larvae sampled with both neuston and bongo gear, while those for common dolphin were developed using catch rates of larvae sampled with only neuston gear. Also, survey data from spring, summer and fall ichthyoplankton surveys were used for development of little tunny, *Auxis* sp., and common dolphin indices, while only summer and fall survey data were used for king and Spanish mackerel. A delta-lognormal modelling approach was utilized, including the following covariates: time of day, season, area sampled, year, and gear.

SCRS/2018/027 – The diet composition of bullet tuna, *Auxis rochei* (Risso, 1810) was studied using 234 specimens collected from January 2015 to June 2016 in the coastal areas of Tunisian waters. Among 234 stomachs examined, 126 were empty (%VI = 53.85). After the stomach contents analysis, 13 prey taxa belonging to 11 families were identified. This study was based mainly on the evolution of the index of relative importance (IRI) with respect to sex, fish size and season. *A. rochei* are carnivorous fish that feed opportunistically on whatever abundant resource is available in the environment with a preference for Teleosts, crustaceans and cephalopods. Teleosts were found in the majority of stomachs, with a total relative importance (%IRI) of 80.65% % and *Sardinella aurita* was the most important prey species (%IRI = 74.17). All other prey (crustaceans and molluscs) are secondary or incidental.

SCRS/2018/028 – This study provides information on some biological aspects of *Sarda sarda* from the western Mediterranean (Mediterranean Spanish coast) and in the Atlantic Ocean (south of Iberian Peninsula). A total of 1583 individuals were measured between 2003 and 2017. The L-W relationship was calculated with W equal to $6.321\ 10^{-3}FL^{3.210}$. The sex ratio was 1:1 in the length class group between 40 and 42cm FL. Histological analysis of the ovaries and the monthly variation of the gonadosomatic index for both sexes suggested that the spawning season for *Sarda sarda* in the western Mediterranean Sea takes place from April to July and, from April to June in the Northeastern Atlantic. The lengths at first maturity (L_{50}) using macroscopic and microscopic criteria were estimated to be 39.9 and 40.3 cm FL, respectively.

SCRS/2018/029 – This study provides information on some biological aspects of *Euthynnus alletteratus* from the western Mediterranean (Spanish coast) and in the Atlantic Ocean (south of Iberian Peninsula). A total of 1266 individuals were measured between 2003 and 2017. The L-W relationship was calculated with W equal to $1.242\ 10^{-2}FL^{3.058}$. Histological analysis of the ovaries and the monthly variation of the gonadosomatic index for both sexes suggested that the spawning season for *Euthynnus alletteratus* in the western Mediterranean Sea takes place from June to August. The lengths at first maturity (L_{50}) were estimated to be 50.1 and 43.4 cm FL for female and male, respectively.

SCRS/2018/030 – Data collected and estimated during angler interviews by the Marine Recreational Fisheries Statistical Survey and the Marine Recreational Information Program were used to develop standardized catch per unit effort (CPUE) indices for wahoo stocks of the central and eastern U.S. Gulf of Mexico and U.S. South Atlantic. A species association approach was explored to identify wahoo directed trips, and standardized indices of wahoo CPUE were developed using a delta-lognormal modelling approach using the following variables: hour of interview, month of interview, area of fishing, state in which the interview occurred, if a bag limit was imposed at the time of the interview or not, and year.

SCRS/2018/031 – Les structures démographiques de la bonite à dos rayé, *Sarda sarda* (Block, 1793), sur les côtes sud de l'atlantique Marocain ont été étudiées à partir des données d'échantillonnage biologique des débarquements des unités côtières ciblant cette espèce entre 2012 et 2015. Au total, 2688 individus ont été mesurés pour l'analyse de la fréquence de taille et 158 individus pour la détermination des paramètres biologiques. La saison de reproduction a été déterminée par l'analyse de l'évolution mensuelle de l'indice gonado-somatique et l'évolution mensuelle du pourcentage de maturité sexuelle. La structure démographique de la bonite est dominée par des tailles comprises entre 45 et 52 cm et cette espèce se reproduit entre mai et juillet.

SCRS/2018/033 – The last years Russian vessels caught 4 small tunas species as a by-catch in the Atlantic. For the period from 2000 to 2016 the Russian small tunas by-catches varied from 88 t in 2008 to 3,335 t in 2011. Average by-catch for this period is 1,125 t. According to observations, small tunas by-catches of Russian fishery trawler vessels have increased since 2010. This research demonstrates the simplified method for the evaluation of the possible future Russian small tunas by-catch. Such method is based on the historical relationship of the Russian small tunas by-catch with total small tunas catches in Atlantic.

SCRS/2018/034 – L'étude de la biologie de la reproduction de *Auxis rochei* a été effectué dans le Golfe de Guinée dans le but de mettre en évidence les différents paramètres de reproduction. Ainsi, 252 spécimens ont été collectés de janvier à décembre 2016 et les différentes mensurations et prélèvement effectués. Les résultats ont montrés qu'*A. rochei* est une espèce saisonnière (saisons froides) qui se rencontre dans les eaux ivoiriennes au stade avancé, du stade II au Stade VI, chez les mâles et du stade III au stade VI pour les femelles. La sexe ratio est en faveur des mâles. La taille de première maturité sexuelle est de 24,70 cm pour les femelles, de 26,36 cm pour les mâles et de 25,50 cm pour les deux sexes confondus. La fécondité absolue moyenne est de 194.039 ± 75.834 ovocytes.

SCRS/P/2018/006 – The SCRS_P_2018_006 presented a provision of the Working Living Document (WLD) for small tuna maturity staging with a large amount of detailed photos (macro and micrographs) of the different gonad stages of *Auxis rochei*, *Sarda sarda* and *Euthynnus alletteratus*. Maturity ogives are usually estimated through macroscopical maturity data, which is a relatively quick method for assessing maturity. However, it is important that the maturity scale used for each species is consistent across the laboratories and countries involved in stock assessment. This work has been carried out within the framework of the ICCAT Year Research Program for Small Tunas. The sampling and lab work undertaken in 2017 included: a total of 500 fish sampled in the western Mediterranean and 267 fish sampled in the Atlantic (south of Iberian Peninsula); 360 fresh gonads (Atlantic and Mediterranean) photographed, of which 320 gonad

tissues were histologically processed for microscopic examination. The objective of this WLD is to create a living bank of images in order to facilitate the interpretation of small tunas reproductive status, which will be an invaluable support and enhancement to the descriptions of maturity stages given in the maturity tables.

SCRS/P/2018/007 – Small tunas sustain important regional commercial fisheries in many coastal communities throughout their spatial distribution and their assessment is essential to be able to provide management advice which can help to ensure their long-term sustainability. For most of these species there is a shortage of data that inhibits the performance of a "full" stock assessment and this is probably the most important reason why they have not been assessed so far. Last year, ICCAT have suggested that different "data-limited" approaches should be evaluated in order to provide scientific information on the status of these stocks and guide management actions. The objective of the present study was to evaluate different data-limited assessments using simulation analysis. We tested different catch and length data scenarios in order to give some recommendations for future analysis to assess these species. Limitations in the use of catch-based methods were related not only with the length of the time series of catch, but also with the trend and contrast in those time series. Limitations on the applicability of length-based methods were related not only with the sensitivity to the life history input parameters used, but also with the effect of different gear selectivity on the distribution of the length composition data available from different fleets.

SCRS/P/2018/008 – Le présent travail consiste à récupérer des jeux de données historiques sur les thonidés mineurs exploités en Mauritanie. Ces données ont été récupérées, traitées et analysées pour la période 2006-2016 pour la pêche artisanale et hauturière ciblant les petits pélagiques. Plusieurs bases de données de l'IMROP ont été mobilisées et utilisées pour ce travail notamment la base de données de la pêche artisanale (Système de Suivi de la pêche artisanale et côtière, SSPAC), la base de données des journaux de pêche et les données d'observation scientifique en mer. Aussi, un suivi rapproché auprès des usines de congélations des espèces des thons a été initié depuis l'année 2016. Ce travail a permis de reconstituer les captures de la Bonite à dos rayé «*Sarda sarda*» pêchée par la flottille artisanale, côtière et hauturière. Les données obtenues ont été vérifiées et croisées avec les estimations antérieures. Elles concernent principalement les captures de Sarda sarda qui représente plus de 50% des captures de thons mineurs pêchés en Mauritanie. Les données obtenues sont actuellement disponibles dans la base de données de l'ICCAT.

SCRS/P/2018/009 – The small tuna data are collected from the marine small scale fisheries, largely from the semi- industrial sector, since indeed Liberia does not have tuna vessels docking or landing their harvest in Liberia's port. This sector is comprised of 45 canoes (National Fisheries and Aquaculture of Liberia Artisanal Database 2017) that target only tuna and tuna like species using monofilament gillnets and longlines. Data collectors are assigned in 22 landing sites which are some of the major fishing landing sites out of the 114 fishing landing sites in the country. The method use to collect the data is fisheries dependent sampling base. The data are reported at the end of every month and inputted into Microsoft access database where it is later analyze by using Microsoft access or Microsoft excel. The Total Production of Yellowfin from 2011-2017 is 522 mt, and Skipjacks is 459 mt, while the production of little tunny is 1647 mt, respectively (Source National Fisheries and Aquaculture of Liberia Artisanal Database 2017).

SCRS/P/2018/010 – This presentation presents the preliminary results on the estimation of growth parameters of Von Bertalanffy equation for Little tunny *Euthynnus alletteratus* and Atlantic bonito *Sarda sarda* from otolith slides over the first two months. The values of the daily growth parameters are L_∞ = 42.72093 cm, K = 0.269717 and t_0 = -61.4221 for little tunny and L_∞= 84.72331 cm, K = 0.14547 and t_0 = 20.72705 for the bonito. The study is in progress. These results should be improved by using a stratified sampling size class to cover all size ranges.

SCRS/P/2018/011 – The Atlantic Ocean Tropical tuna tagging programme (AOTTP) is committed to tagging 120,000 tropical tuna. The focus species are bigeye, skipjack, and yellowfin but 5000 little tunny, and 5000 wahoo are also being targeted. So far 1313 little tunny, and 42 wahoo have been tagged and released at sea in the ca 2 years since the project began. 220 tagged little tunny have been recovered (17%) with a mean time at liberty of 83 days and a maximum of 379 days. Mean distance migrated between release and recapture is 185 nautical miles with a maximum of 629. Only one wahoo of the 42 released has been recaptured at the St Peter and St Paul Islands off Brazil. This fish was at liberty for 210 days but a distance of only 8 nautical miles was recorded between release and recapture. Little tunny have been tagged on both sides of the tropical Atlantic but no 'exchange' has yet been noted. There is some growth data (length increment) available. Clearly more small tunas need to be tagged by AOTTP which will step up its efforts.

SCRS/P/2018/012 – Exploited fish populations can undergo a loss of genetic variability that ultimately may lead to loss of regional small populations. This situation could occur in the small tuna species, where some locations have a high commercial value and a target for artisanal fisheries. In this study, we analyzed an extensive sampling (431 individuals) of Bullet tuna (*Auxis rochei*) along the north and south coast of the west Mediterranean and a location in the east Atlantic close of the Strait of Gibraltar using the combination of mitochondrial DNA and microsatellite genetic markers. Surprisingly, genetic analysis revealed that seven individuals of the Ceuta locality (about 26%) were identified as Frigate tuna (*A. thazard*) suggesting a mixed fishery of two species with possible implications in stock assessment. Population genetics results, for both markers, showed a clear heterogeneity between samples of the Iberian Peninsula and North African locations. Large sampling area along the Mediterranean Peninsula coast failed to show genetic heterogeneity. Theses result have a clear impact in the conservation and management strategies of this species, and if it is confirmed in other small pelagic species, the pattern of population structure in the Mediterranean could be more complex than initially expected.

SCRS/P/2018/013 – The open database provided by Juan-Jordá in the 2016 SMT meeting with a thorough review of the Scombridae life history parameters was filtered to contain only the SMT species defined in ICCAT. In addition the references database that supported the life history parameters database, also provided by Juan-Jordá in open format, is an excellent starting point for a shared SMT publication database. Therefore a proposal for updating and sharing references will be presented. The updated database will allow for data mining and spatial visualization of current status and data gaps in life history parameters of SMT species which will be used to assess future research needs. A proposal for shared protocols and methodologies as well as establishing reference sets agreed within the group by species will be presented.

SCRS/P/2018/014 – Presented a brief overview of the artisanal fisheries in São Tomé and Príncipe targeting different Small Tunas species. Estimated catches (task I and II data) of the different Small Tunas species caught by the artisanal fleet are provided for 2017, and some revisions made to the data presented in the past. In addition, there is the promise that in the next few years they will be able to present data size for small tunas.

Appendix 5

SCRS Catalogues for Small tunas
1996-2016

Major small tuna species (Tables 1 to 13) SCRS standard catalogues on statistics (Task-I and Task-II) by stock/area, major fishery (flag/gear combinations ranked by order of importance) and year (1986 to 2016). Only the most important fisheries (representing about 90 to 95 % of Task-I total catch) are shown. For each data series, Task I (DSet= 't1', in tonnes) 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'= CAS exists) that represents the Task-II data availability in the ICCAT-DB. See the legend for the colour scheme pattern definitions.

Table	Species	Stock/area	Scie. Name	% weight in Task I (1950-2016)	Weight rank (Order)
1	BLF	A+M	Thunnus atlanticus	2.0	8
2	BLT	A+M	Auxis rochei	4.8	7
3	BON	AT	Sarda sarda	33.9	1
4	BON	MD	Sarda sarda		1
5	BRS	A+M	Scomberomorus brasiliensis	5.2	6
6	DOL	A+M	Coryphaena hippurus	1.2	11
7	FRI	AT	Auxis thazard	12.4	3
8	KGM	A+M	Scomberomorus cavalla	11.0	4
9	LTA	AT	Euthynnus alletteratus	13.6	2
10	LTA	MD	Euthynnus alletteratus		2
11	MAW	A+M	Scomberomorus tritor	2.0	9
12	SSM	A+M	Scomberomorus maculatus	10.9	5
13	WAH	A+M	Acanthocybium solandri	1.7	10
*	BOP	A+M	Orcynopsis unicolor	0.9	11
*	CER	A+M	Scomberomorus regalis	0.4	12
*	KGX	A+M	Scomberomorus spp	0.1	13

* Nor enough data for SCRS catalogues

Legend (t2)	
a	t2ce
b	t2sz
c	cas

-1	no T2 data
a	t2ce only
b	t2sz only
c	cas only
bc	t2sz + cas
ab	t2ce + t2sz
ac	t2ce + cas
abc	all

Appendix 6

Terms of reference for Small Tunas Year Research Programme
Biological samples collection
For growth, maturity and genetics studies

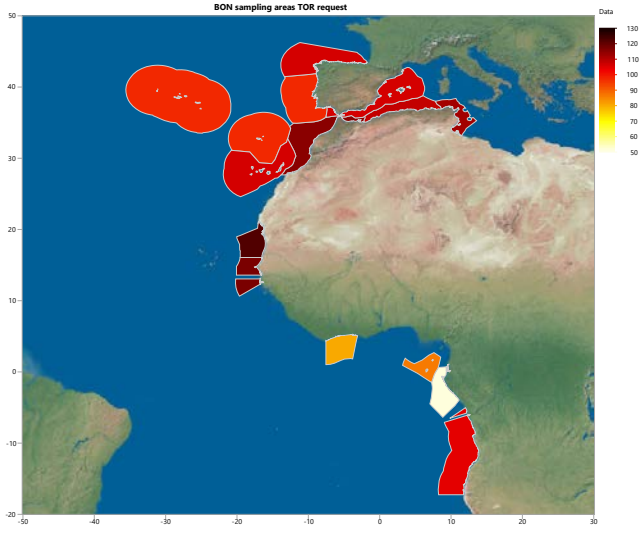
Background and objectives

The ICCAT Small Tunas Year Program (SMTYP) was adopted by the Commission in its 2012 meeting in Agadir (Morocco). The main objectives of this project are to improve historical Task I and II data and to collect biological data for small tunas (SMT), especially the growth, the maturity and stock structure data which are necessary for their assessment in the near future and thus provide scientific advice to ICCAT for their management.

As approved by the SCRS in 2017, the SMTYP aims in 2018 to continue collecting biological samples aiming growth, maturity and stock structure studies on small tunas species. The 2017 Small Tuna Species Group intersessional meeting it was decided to prioritize three species: Little tunny (LTA) (*Euthynnus alletteratus*), Atlantic Bonito (BON) (*Sarda sarda*) and Wahoo (WAH) (*Acanthocybium solandri*), based on their economical importance and the lack of knowledge on their biology.

The main objective of this Call for Tenders is to collect biological samples for estimating the growth parameters, assessing the maturity (size/age at the first maturity, spawning season) and stock structure (mainly genetic analysis) of three prioritized species in the Atlantic and the Mediterranean Sea. Secondarily, this Call for Tenders aims at start analyzing the samples collected, namely as regards the biological parameters mentioned above. In particular, the preliminary analysis of stock structure of one of the three species.

As part of this biological study, scientific institutes and public or private entities are asked to submit tenders to provide biological data and samples for LTA, BON and WAH. The organization of scientific institutes in a consortium to submit one single offer project would be preferable. All the data collected under the SMT research program shall be used only for scientific purposes and in accordance with ICCAT rules. Any other use of these data should be specifically authorized by ICCAT. Given the limited budget available in 2018, priority will be given to the collection of samples of LTA, BON and WAH from geographical areas that the Small Tunas Species Group identified as of high priority (see map and table below).



CPC EEZ	BON	LTA	WAH	Total
Algerie	109	80		**189**
Angola	105	93		**198**
Brazil			171	**171**
Cape Verde		85	184	**269**
Côte d'Ivoire	81	92	122	**295**
EU.España	107	98	165	**370**
EU.Portugal	98	56		**154**
Gabon	52	67		**119**
Liberia		73		**73**
Maroc	116	72		**188**
Mauritania	123	96	196	**415**
S. Tomé e Príncipe	87	77	163	**327**
Senegal	118	109		**227**
Tunisie	113	97		**210**
Total	**996**	**998**	**1001**	**2995**

Minimum number of samples to be collected by species and CPC EEZ.

Contractor tasks

The contractor will work in close consultation with the ICCAT Secretariat. The contractor will provide a detailed description of the biological sampling scheme explaining how the biological activities should be conducted. For stock structure (genetics), the contractor shall also provide a preliminary results of the stock structure of one the three species identified above. It must be noted that for biological sampling and analysis, small-scale and short term sampling is considered of little use for meeting the project objectives. As such tenders should be made on a **regional and collaborative basis**.

The tender should be responsible for the following:

a) The contractor must provide the Secretariat with a detailed description of the biological sampling scheme (biological sampling ports, type of biological samples to be collected and analyzed (gonads, otoliths, spines, tissue), number of fish to be sampled by month, biological parameters to be estimated, etc.). The biological sampling period should be as long as possible. A detailed description of the methodology to be used for identify stock structure, the expected results for this analysis, and the full cost of stock structure analysis.
b) The contractor must follow strictly the protocols in the ICCAT Manual for the collection and analysis of the growth and maturity data (www.iccat.int/en/ICCATManual.asp?mId=3).
c) The contractor shall provide a detailed report summarizing the sampling results and the preliminary stock structure results.

Contractor minimum qualifications

- Documented multi-year experience in small tuna's research and/or research on large pelagic species with experience on fishery data collection.
- University degree in one of the following: fisheries science, marine biology, statistics, natural sciences, biological sciences, environmental sciences or closely related fields (in case of individual scientists).
- Excellent working knowledge of one of the three official languages of ICCAT (English, French or Spanish). A high level of knowledge of English is desirable.

Deliverables

1. A SCRS document and a power point presentation of the preliminary results to the 2019 SMT Intersessional meeting or the ICCAT SCRS 2019 Species Group meeting.

2. The draft report to be submitted at the latest by 7 December 2018, and shall include:

   a) Executive summary
   b) Full description of the work carried out
   c) Detailed description of the sampling has been realized for each of the three areas of research: Growth, Reproduction and Stock structure for each of the three species (LTA, BON, WAH)
   d) Detailed description of preliminary genetics results of the chosen species
   e) References and literature cited.

3. The final report shall be updated taking into account the comments provided by the ICCAT Secretariat and the Small Tunas Species group rapporteur and be submitted by 21 December 2018 at the latest.