INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

COMMISSION INTERNATIONALE POUR LA CONSERVATION DES THONIDES DE L'ATLANTIQUE

COMISIÓN INTERNACIONAL PARA LA CONSERVACIÓN DEL ATÚN ATLÁNTICO

REPORT OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

(Madrid, Spain, 29 September to 3 October 2014)

October 2014

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TABLE OF CONTENTS

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1. Opening of the meeting

The 2014 Meeting of the Standing Committee on Research and Statistics (SCRS) was opened on Monday, September 29, at the Hotel Velázquez in Madrid by Dr Josu Santiago, Chair of the Committee. Dr Santiago welcomed all the participants to the annual meeting.

The ICCAT Executive Secretary, Mr. Driss Meski, addressed the meeting and welcomed all the participants to Madrid. He noted that 2014, as with previous years, has been very busy for both the SCRS and the Secretariat, with many ICCAT scientific meetings being held during the year; not to mention other meetings held outside ICCAT. He then reiterated that the Secretariat is always committed to assisting the SCRS in its work and expressed his certainty that the work during the week would meet the high expectations of the Contracting Parties. The opening address of the Executive Secretary is attached as **Appendix 11**.

The Chair of the SCRS, Dr Josu Santiago, thanked the Executive Secretary and acknowledged the support of the Secretariat throughout his time as Chair of the SCRS. He noted that the increasing demand for advice by the Commission translates into an enormous workload for both the SCRS and the Secretariat. He highlighted the importance of the SCRS Science Strategic Plan for organising and planning the work of Committee. He concluded by asking for the collaboration of all scientists present and expressed his hope for a successful meeting.

2. Adoption of Agenda and arrangements for the meeting

The Tentative Agenda was revised and adopted with some changes (attached as **Appendix 1**). Full assessments were carried out this year on East and West Atlantic skipjack (SKJ) and Mediterranean swordfish (SWO). Also an update of the 2012 stock assessment was conducted for the eastern Atlantic and Mediterranean and western Atlantic bluefin.

The following scientists served as rapporteurs of the various species sections (Agenda Item 8) of the 2014 SCRS Report.

Tropical tunas- General			J.G. Pereira
YFT	-	Yellowfin tuna	C. Brown
BET	-	Bigeye tuna	D. Die
SKJ	-	Skipjack tuna	D. Gaertner
ALB	-	Albacore	H. Arrizabalaga, J. Ortiz de Urbina (Med.)
BFT	-	Bluefin tuna	C. Porch (West), S Bonhommeau (East)
BIL	-	Billfishes	F. Arocha
SWO	-	Swordfish	M. Neves dos Santos (Atl.), G. Tserpes (Med.)
SBF	-	Southern bluefin	
SMT	-	Small tunas	N. Abid
SHK	-	Sharks	E. Cortes

The Secretariat served as rapporteur for all other Agenda items.

3. Introduction of Contracting Party delegations

The Executive Secretary introduced the 25 Contracting Parties present at the 2013 meeting: Algeria, Brazil, Canada, Cape Verde, China, (P. R.), Côte d'Ivoire, European Union, Ghana, Guinea Equatorial, Guinea Rep. Japan, Korea Rep., Mauritania, Mexico, Morocco, Namibia, Norway, Russian Federation, São Tomé and Príncipe, Senegal, South Africa, Tunisia, Turkey, United States and Uruguay. The List of Participants at the Species Groups Meetings and the Plenary Sessions is attached as **Appendix 2**.

4. Introduction and admission of observers

Representatives from the following Cooperating non-Contracting Party, Entity, or Fishing Entity (Chinese Taipei), inter-governmental organizations (Food and Agriculture Organization of the United Nations – FAO), and non-governmental organizations (Federation of Maltese Aquaculture Producers – FMAP, International Seafood Sustainability Foundation – ISSF, Marine Stewardship Council – MSC, Oceana, Pew Environment Group, The Ocean Foundation, and WWF Mediterranean Programme Office) were admitted as observers and welcomed to the 2014 SCRS (see **Appendix 2**).

5. Admission of scientific documents

The Secretariat informed the Committee that 180 scientific papers had been submitted at the 2014 inter-sessional meetings. The Secretariat also informed that this year, for the first time, a deadline of 6 days before the beginning of the Species Groups meetings was established for submitting titles and abstracts. The objective of this deadline is to facilitate the work of the rapporteurs in preparing the meeting. Taking into account the limited time that the groups have to complete their work, adherence to deadlines greatly contributes to improving the work of the SCRS.

Besides the scientific documents, there are 9 reports of inter-sessional meetings and Species Groups, 39 Annual Reports from the Contracting Parties, and non-Contracting Cooperating Parties, Entities and Fishing Entities, as well as various documents by the Secretariat. The List of SCRS Documents is attached as **Appendix 3**.

6. Report of Secretariat activities in research and statistics

The Secretariat presented information contained in the 2014 Secretariat Report on Research and Statistics (SCI-008) related to fisheries and biological data submitted for 2013, including revisions to historical data. The activities and information included in this report refer to the period between 1 December 2013 and 5 September 2014 (the reporting period). Regarding the activities conducted by the Secretariat, in the most recent years, in addition to the normal activities developed on statistics, publications, data funds management and others, the Secretariat is dedicating (apart from the usual preparation of the majority of the datasets required by each assessment) a lot of additional work to stock assessment activities, whether participating actively in the assessment or coordinating and managing external support to the SCRS work.

For the first time, the Secretariat applied the SCRS filtering criteria to accept/reject statistical forms to the 2013 datasets reported (Filters 1 & 2, Addendum 2 to Appendix 8 of 2013 SCRS) adopted in 2013. The results are based on a total of 68 flags (from 49 CPs & 4 NCCs: 47 CPs + 13 EU members + 4 UK-OT members + 4 NCCs), possibly with reporting obligations. The forms incapable of correction were considered unreported data, and Flags reporting “zero” catch were understood as accomplishing the reporting task. Among the four scenarios presented, scenario 2 (gives the most optimistic scenario on filter application) was the one chosen by the Group. Detailed results can be found in SCRS/2014/129. Overall, the results of applying the filters to accept/reject the data reported in forms ST01-T1FC and ST02-T1NC were not very encouraging, but should improve after several iterations. Data that did not pass the filtering criteria and had to be corrected (directly or indirectly through a revision request) by the Secretariat took a significant amount of staff time and effort. The reporting status of Task II, after applying the filtering criteria agreed by SCRS in 2013, shows worse results for T2CE than for T2SZ datasets. In general, those datasets have poor (less information) reporting ratios than for Task I. Both T2CE and T2SZ datasets were analysed by major ICCAT species (major tunas, major sharks, and, any of the 13 small tuna species and dolphinfish). Also regarding basic data submission, the Secretariat informed the SCRS of redundant (partial and different in structure) reporting obligations for ICCAT CPCs in terms of fishing vessel information (T1NC and CP38 forms). Reporting both forms, with the same data but structured differently is a duplication of effort for the ICCAT CPCs. The Secretariat presented a proposal to the SCRS aimed to merge both forms by creating a new form that covers the data from both.

For the reporting period, the Secretariat has received by-catch and discard information, mainly from the TINC data submission forms. Additional data for seabirds and sea turtles were submitted separately by CPCs. The Secretariat mentioned newly developed observer data reporting forms for recording detailed observer programme data. As the vast majority of by-catch information recorded by CPCs comes from observer programmes these forms provide a means for not only capturing observer data, but for the submission of by-catch data as well (i.e. any data not already submitted at a species specific level in the TI and TII data collection forms). The Secretariat then provided a summary of the use of various data funds. These did not include activities funded by GBYP, EBRP or JDMIP.

The Committee was presented with an update of the various ICCAT publications. The new deadline for documents was met with less than optimal success. Currently, the deadline is 6 and 3 days before the meeting to submit titles and documents for the Species Groups. However, more than 50% of the documents have been submitted after the deadlines. The Committee agreed that deadlines help the rapporteurs to better organize the meetings and allow the proper consideration of documents, prior to commencement of the meetings. It was suggested that the registered delegates be allowed access to the documents as soon as they are available and that deadlines for registration will facilitate this distribution.

The Secretariat noted the intensive work load in 2014. Although most tasks were completed, they were accomplished only by use of extensive overtime work. Indeed, some tasks fell by the way side in an effort to prioritize. Issues with VBA in the current version of Microsoft Office caused some slowdowns in the migration of database applications to the updated Microsoft platform (.NET). The Task I database redesign was initiated but still needs completion. The current rate of tasks is unsustainable for the Secretariat and improved CPC submission of information will assist in reducing this workload. Finally, the SCRS expressed its support and congratulations for the work done by the Secretariat in 2014.

The Coordinator of the JDMIP presented a document (SCI-009) that describes the activities of the JDMIP since its inception in December 2009. The ICCAT/Japan Data Management Improvement Project (JDMIP) trust fund has been dedicated to assisting developing CPCs to effectively implement ICCAT measures including those related to the monitoring, control and surveillance of tuna fishing activities as well as the improvement of data collection, analysis and reporting. Document SCI-009 provides the progress report of activities carried out in the fifth year of the JDMIP as well as a summary of the general outcome since 2014 is the final year of the project. Specifically, the report summarizes 2014 activities including Steering Committee meetings, training programs in Cape Verde and West Africa, enhancement of data collection capabilities in Belize and São Tomé and Príncipe and observer programs in Ghana. The JDMIP program also supported attendance at ICCAT meetings throughout the year.

Following the Coordinator's presentation, the Executive Secretary announced the initiation of a new five-year project, the ICCAT-Japan Capacity Building Assistance Project (JCAP) which will be financed by the Japanese Government from December 2014 and invited the interested CPCs to communicate ideas in the informal meeting on capacity building the following day.

The CPCs expressed their gratitude to the assistance of the JDMIP to continue improving its sampling, training and statistics collection programs. It was also acknowledged the importance of the support provided to scientists from the developing CPCs for participating at SCRS meetings, increasing their contribution, experience and knowledge of the ICCAT objectives. The SCRS and CPCs expressed the need for the continuity of this effort and support.

7. Review of national fisheries and research programs

In accordance with the revised guidelines for the preparation of annual reports *(ICCAT Ref. [12-13])*, only information relative to new research programs (Part I of the Annual Report) was presented to the Committee. The Committee considered the need to include information of interest for its work, separating it from the Annual Report which, with its current structure, is more geared to providing information to the Commission on compliance. The Committee reiterated the need to follow the revised guidelines for the preparation of the Annual Reports including the summary Tables.

Algeria

Les captures algériennes des thonidés et des espèces voisines enregistrées pour l’année 2013 sont de l’ordre de 521 t pour l’espadon, de 243,8 t pour le thon rouge et de 1430 t pour les thonidés mineurs. Nous notons une augmentation des productions de l’espadon pour l’année 2013 en comparaison avec celle de l’année 2012.

S’agissant de la pêche au thon rouge, 4 thoniers nationaux de type senneurs ont participé à la campagne de pêche au thon rouge dont les longueurs sont comprises entre 25 et 30 m. La totalité du quota alloué à l’Algérie a été capturée, soit 243,8 t. Ce qui montre une amélioration de la technique de pêche au thon vivant par la senne. Un échantillonnage de 9 spécimens morts de thon rouge a fait l’objet de mensuration de taille et du sexage à bord du navire de pêche.

Concernant l'espadon *Xiphias gladius*, des échantillons de taille et de poids ont été effectués au niveau des ports de débarquement sur un échantillon de 136 individus.

Sur le plan statistique, un dispositif harmonisé de suivi et de collecte est opérationnel à l'échelle nationale. Celui-ci vise non seulement à identifier l'ensemble des navires en activités mais également à estimer les produits de la pêche qualitativement et quantitativement.

Ce dispositif est renforcé par la réalisation régulière de campagnes d'évaluations des ressources halieutiques des eaux algériennes. Concernant, les grands migrateurs halieutiques, un axe de recherche sur l'étude de juvéniles de thon rouge est a été mis en place, notamment la croissance, ainsi qu'un dispositif pilote d'échantillonnage biologique d'espadon, et ce dans le cadre des travaux de recherche du Centre National de la Recherche et du Développement de la Pêche et de l'Aquaculture « CNRDPA ».

Brazil

In 2013, the Brazilian fleet fishing for tuna and tuna-like fish consisted of 261 boats, registered in 12 different ports. Of those, 3 were foreign chartered vessels, representing only 1.1% of the fleet. The Brazilian catch of tunas and tuna-like fish, including marlins, sharks and other species of less importance (e.g. wahoo, dolphinfish, etc.) was 18,370.5 t (live weight), representing a decline of about 27,000 t from 2012, when more than 45,000 t were landed. These 2013 figures, however, should be considered as preliminary and largely incomplete. Most of the catches again were made by baitboat vessels (13,270.1 t; 72.2%), targeting skipjack (SKJ), which accounted for the majority of their catches (12,701.1 t; 91.2%), as well as of the total production of tuna and tuna-like species landed in Brazil (65.9%). Longline catches reached 3,198.4 t, made mainly of albacore (ALB) (1,746 t); swordfish (SWO) (1,338.7 t), and blue shark (BSH) (1,024.9 t). About 5% of all Brazilian catches of tunas and tuna-like fish (915.9 t) came from 419 artisanal and small-scale boats (10 to 20 m LOA), based predominantly in the southeast region and targeting a variety of species, with various fishing gears, including longline, trolling and other surface gears. The main species caught by this fleet, as usual, were dolphinfish and yellowfin tuna. Due to the discontinuity of the financial support provided by the Ministry of Fisheries and Aquaculture to the Scientific Subcommittee of the Standing Committee for the Management of the Tuna Fisheries in Brazil, several scientific activities were suspended, such as the collection of biological data, including the size of the fish caught. Nevertheless, initiatives are on course to reverse this regrettable situation. Research on the by-catch of seabirds and sea turtles in the longline fishery, however, has continued, including the development of measures to avoid their catches.

Canada

Bluefin tuna are harvested in Canadian waters from July through December over the Scotian Shelf, in the Gulf of St. Lawrence, in the Bay of Fundy, and off Newfoundland. The adjusted Canadian quota for 2013 was 484.5 t which includes an 86.5 t transfer from Mexico. A total of 676 licensed fishermen were active (i.e. licenses that had landings) in the directed bluefin fishery using rod and reel, handlines, tended lines, electric harpoon and trap nets to harvest 413 t. An additional 67.4 t was harvested as by-catch in the pelagic longline fleet in the swordfish and other tunas fishery. These figures include 1.5 t of mortality associated with tagging studies. There were no observed dead discards of bluefin tuna from the 2013 large pelagic fisheries. All landed fish were individually tagged with a unique number and weighed out at dockside.

The swordfish fishery in Canadian waters takes place from April to December. Canada's adjusted swordfish quota for 2013 was 1,569.8 with landings reaching 1,505.5 t. The tonnage taken by longline gear was 1,230.7 t while 274.8 t were taken by harpoon. Of the 77 licensed swordfish longline fishermen, 59 were active in 2013 with a number of these vessels (28) fishing with harpoon or harpoon and trolling gear only. Only 43 of 1,203 harpoon licenses reported swordfish landings in 2013.

The other tunas (albacore, bigeye and yellowfin) are at the northern edge of their range in Canada and are harvested from May through October. Canadian catches of these other large pelagic species are an integral component of the Canadian fishery. In 2013, other tunas accounted for approximately 14%, by weight, of the commercial large pelagic species landed in Atlantic Canada.

All commercial vessels fishing Atlantic pelagic species are required to hail out their intention to fish prior to a trip and hail in harvests from sea. The Canadian Atlantic statistical systems provide real time monitoring of catch and effort for all fishing trips targeting pelagic species. At the completion of each fishing trip, independent and certified Dockside Monitors must be present for off-loading to weigh out the landing, and verify log record data. Logbook entries must be completed for each trip whether a fish is harvested on a trip or not. There were no landings of tuna or tuna like species at Atlantic Canadian ports by foreign vessels in 2013.

Canada continues to actively support research that improves the methodology and approaches used to assess the Atlantic bluefin tuna, swordfish and various shark species. Among other things, Canadian scientists continue studies on the age determination and natal origin of bluefin tuna caught by the rod and reel fisheries conducted in the Gulf of St. Lawrence and off Nova Scotia's Atlantic coast. Additional studies are comparing trends in primary productivity and ocean climate with the abundance and distribution of bluefin tuna and forage species in the southern Gulf of St. Lawrence. Efforts are ongoing to improve the length-weight and dressed to round conversions that allow landed dressed weights to be identified with an age through the use of a length based age slicing routine. For sharks, research has concentrated on PSAT tagging, with an emphasis in recent years on shortfin mako and porbeagle shark movements and post-release mortality.

Cape Verde

En 2013, la flottille thonière semi industrielle et industrielle cap-verdienne est composée de trois petits senneurs, soixante-douze bateaux à propos multiples et deux grands senneurs qui exploitent essentiellement l'albacore (*Thunnus albacares*), le thon obèse (*Thunnus obesus*) et le listao (*Katsuwonus pelamis*). Par ailleurs, certaines pêcheries artisanales (surtout à la ligne à la main) et la pêche sportive capturent aussi les petits thonidés (thazard bâtard, thonine, auxide, etc.) et les poissons porte-épée (marlins et espadon) respectivement. Le total des captures de thon a augmenté en 2013, à environ 15.000 tonnes (4.193 tonnes d'albacore, 7.306 tonnes de listao, 1.333 tonnes de patudo). Les captures ont connu une légère hausse par rapport à 2012 (13.200). Une flotte étrangère autorisée opère aussi, dans la ZEE du Cap Vert, sur la base d'accords ou de contrats de pêche. Les navires appartiennent surtout aux pays de l'Union Européenne et asiatiques. Les demandes de licence des navires étrangers, indiquent, généralement, comme espèces cibles, les thons. En tous cas, les principales espèces pêchées continuent à être des requins et des espadons, selon les captures déclarés par quelques embarcations de l'Union européenne. Dans la pêche nationale, le requin ne dépasse pas 0,3% du total des débarquements, comme capture accessoire. La pêche sportive continue avec une grande importance économique, sociale, culturale et politique, mais n'existe pas encore un suivi de cette pêcherie. Le suivi régulier des activités de pêche des thoniers est toujours assuré par l'INDP. Le travail consiste à la collecte des statistiques de captures et d'effort de pêche. Ce travail est complété par des informations de diverses sources (usines, Direction des ressources marins, Douane etc.). Des échantillonnages multispécifiques sont également réalisés en pêche industrielle et pêche artisanale.

China (Rep.)

The number of vessels from China operated in the Atlantic Ocean decreased from 24 in 2012 to 17 in 2013. The longline was the only fishing gear used to fish tunas, tuna-like species and sharks and the target species were still bigeye tuna and bluefin tuna. The total catch was 3,519.6 t (in round weight), 751.6 t lower than that in 2012 (4,271.2 t). The catch of bigeye tuna and bluefin tuna amounted to 2,371.3 t and 38.1 t in 2013, respectively. The catch of bigeye tuna accounted for 67.4% of the total in 2013, however, it was 859.9 t lower than that in 2012 (3231.2 t). Yellowfin tuna, swordfish and albacore tuna were taken as by-catch. The catch of yellowfin tuna decreased from 264.1 t in 2012 to 211.4 t in 2013. The catch of swordfish was 291.9 t, with a great decrease compared with previous year (374.5 t in 2012). The catch of albacore tuna was 146.2 t, which was 64.1 t more than that in 2012 (82.1 t). The data compiled, including TASK I and TASK II as well as the number of fishing vessels, have been routinely reported to the ICCAT Secretariat by the Bureau of Fisheries and Fisheries Law Enforcement (BOFFLE), Ministry of Agriculture of PRC. PRC has carried out a national scientific observer program for the tuna fishery in ICCAT waters since 2001. Two observers in 2013 have been dispatched on board two Chinese Atlantic tuna longliners covering the areas of S6°20'~N13°18', W24°06'~W38°35', S7°21'~N12°24', W3°41'~W38°10' (targeting bigeye tuna) and N54°06'~N54°56', W25°46'~W30°29', N53°46'~N54°53', W26°10' ~W31°28' (targeting bluefin tuna) since September 2013. Data of target species and non-target species (sharks, sea turtles, especially) were collected during the observation.

Côte d'Ivoire

En Côte d'Ivoire, les quantités totales des thonidés pêchés au cours de l'année 2013 se résument comme suit. Dans les pêcheries artisanales et industrielles le listao est l'espèce dominante et elle représente plus des 2/3 des captures débarquées dans ledit pays.

Les perceptives, en vu d'une amélioration de la pêcherie des thonidés et espèces associées sur le plan quantitatif, voire qualitatif en Côte d'Ivoire sont les suivantes.

En effet, vu l'importance de ces thonidés dans l'économie nationale et dans le souci d'une meilleure gestion du stock existant, une connaissance de la biologie et un renforcement du personnel enquêteur est indispensable.

Aussi, s'avère-t-il urgente de permettre à la Côte d'Ivoire d'être désormais partie prenante dans le programme de suivi des statistiques ? puis qu'elle dispose depuis fin 2011 d'un thonier senneur battant pavillon ivoirien avec des observateurs à bord.

European Union

Several Member States of the European Union (EU) have fleets actively fishing in the ICCAT Convention area. These are: Croatia, Cyprus, France, Greece, Ireland, Italy, Malta, The Netherlands, Portugal, Spain, and United Kingdom. Though Croatia joined the EU on 1 July 2013, the present report takes into consideration Croatian activities in the ICCAT area for the whole of the year 2013.

The EU fleet targets most of the species that are regulated by ICCAT i.e. bluefin tuna, skipjack, yellowfin, bigeye, albacore, swordfish, marlins, sailfish and sharks. Other groups of species such as small tunas (bullet tuna, Atlantic bonito, frigate tuna, little tunny and dolphinfish) are also caught by the EU fleets operating in the ICCAT Convention area. The EU fleet uses a wide range of fishing gears: purse seiners, baitboats, longlines, hand-lines, troll, harpoons, mid-water trawls, traps and sport fishing. The EU is one of the major players in the ICCAT area and its catches represent around 4% of the total catches of the ICCAT Contracting Parties.

This diversity also constitutes a concrete challenge in faithfully reporting on such variety, namely through Task I and II data, but also information on by-catch, interactions with associated species, the composition of fleets, etc. Moreover, the EU pays special attention to ensure a timely and complete submission of information by keeping the EU Member States updated on the different ICCAT reporting obligations, clearly identifying data, deadlines, formats, and contact persons responsible for the compilation of reports and data submission to ICCAT.

Ghana

The tuna industry in Ghana comprises the skipjack (*Katsuwonus pelamis*), yellowfin (*Thunnus albacares*) and bigeye tuna (*Thunnus obesus*). 20 baitboats, and 17 purse seiners are currently fishing within the EEZ of Ghanaian coastal waters and beyond, exploiting these tuna species amongst other minor tuna-like species such as Atlantic little tuna (*Euthynnus alletaratus*) and frigate tuna (*Auxis thazard*). During the year under review, skipjack catches were the highest (72%) followed by yellowfin (21%), bigeye (4%) and other tuna-like species including (3%) respectively.

Both fleets employ Fish Aggregating Devices (FADs) in fishing and collaborate extensively sharing their catch during fishing operations. Over 85% of catches are conducted off FADs. Catches of the principal tuna species for the year 2013 dropped slightly to 62,290 t from 69,852 t in 2012.

Recent improvements in sampling coupled with the provision of more logbook information from the fishery have contributed to a better understanding of the spatio-temporal distribution of the species. It is envisaged that further synthesis of the database on Ghana from series spanning 1980-2013 would give a clear sampling strategy to improve the catch and species composition of the entire catch (Task II) in relation to innovations observed in the fishery. Completion of the revision of Ghana's Task II in 2013 by experts would enable the assessment of tropical species be carried out with minimal assumptions.

An observer programme was organized in 2013 on board 10 purse seine vessels with the aim of training officers in proper methods of estimating catches and filling out information in logbooks. Also the programme was conducted to estimate the proper species composition of the catch.

Beach sampling of the billfishes continued off the western coastline of Ghana from artisanal drift gill operators with virtually low catches of swordfish and white marlin.

Guinea (Rep.)

La République de Guinée jouit d'une situation privilégiée en matière de ressources halieutiques. Deux types de pêche (artisanale et industrielle) exploitent les ressources que recèlent les eaux maritimes guinéennes. La pêche artisanale est totalement dominée par les pêcheurs nationaux alors que la pêche industrielle est tributaire de flotte étrangère composée de navires alignés sous le couvert d'arrangements divers (Accords de pêche, Affrètements, Consignations).

Dans le cadre de la convention de l'ICCAT, trois thoniers senneurs ayant pavillon guinéen ont été alignés en 2013. Il s'agit de navires suivant : Avra, Belouga et Mervent qui débarquent généralement leurs captures à Abidjan en Côte d'Ivoire et parfois à Dakar au Sénégal et au port de Tema au Ghana.

Les captures totales réalisées en 2013 par ces trois thoniers sont estimées à 8 822 955 kilogrammes de thons contre 10 964 000 kg déclarées en 2012.

Les débarquements ainsi quantifiés en 2013 sont composés de deux espèces de thons le listao (*Katsuwonus pelamis*) et l'albacore (*Thunnus albacares*).

Depuis 2010, des mesures appropriées sont prises par les autorités du Ministère de la Pêche et de l'Aquaculture pour le suivi de l'activité des thoniers battants pavillons guinéens et la fourniture régulière des statistiques à l'ICCAT.

Japan

Longline is the only tuna-fishing gear deployed by Japan at present in the Atlantic Ocean. The final coverage of the logbook from the Japanese longline fleet was 90-100% before 2012. The current coverage for 2013 is estimated to be about 94%. In 2013 fishing days were 15,900, which was 62% of the average value of the last ten years. The catch of tunas and tuna-like fishes (excluding sharks) is estimated to be about 27,000 t, which are about 93% of the past ten years average catch. The most important species was bigeye, representing 50% of the total tuna and tuna-like fish catch in 2013. The next dominant species was albacore with 18% in weight and the third species was yellowfin (17%). Observer trips on longline boats in the Atlantic were conducted and a total of 620 fishing days were monitored between August 2013 and April 2014.

Korea

In 2013, 13 Korean longliners engaged in fishing for tuna and tuna-like species in the Atlantic Ocean. The total Korean longliners catches were 2,146 t and declined by 34.8% from the previous year. Bigeye tuna, albacore tuna and yellowfin tuna dominated the catches with 1,151 t, 218 t and 212 t, respectively. Northern swordfishes were 64 t, of which 19 t was discarded and southern swordfishes was 47 t. And the catches of shark species were 423 t. The fishing area was almost the same as in the previous years, which had been in the tropical area of the Atlantic Ocean (20°N ~20°S, 20°E~60°W) throughout the year from January to December. Two observers were deployed onboard a longline vessel from January to May and from March to July 2013. Observer coverage was about 11.6% in number of hooks. In 2013, 1 Korean purse seiner caught about 80 t of Atlantic bluefin tuna. Data collection and reporting complies with the Act on Fisheries Information and Data Reporting revised and put into effect from 5 December 2012. It includes the recording in the logbook of the discards/release for target and by-catch species and also the method of by-catch mitigation used and obligates the monthly submission of these data to the National Fisheries Research and Development Institute (NFRDI). In accordance with the Act, the NFRDI undertakes the cross-checking of data between logbook, catch document, observer report and VMS data.

Mauritania

En Mauritanie, les espèces de thons hauturiers sont ciblées uniquement par des flottilles étrangères (espagnole, sénégalaise et japonaise), opérant sous le régime de licence libre. Les flottilles de ces parties contractantes débarquent leur production dans des ports étrangers.

Les espèces de thons côtiers sont pêchées accessoirement par les unités industrielles de petits pélagiques. Les captures déclarées par ces pêcheries sont étroitement corrélées avec celles des sardinelles (proie préférentielle) qui sont ciblées par ces flottilles. Ces statistiques montrent que la capture accessoire du thon hauturier réalisée par la pêche industrielle a atteint, en 2013, 845 tonnes (soit une diminution de presque 84 % par rapport à 2012) composée essentiellement de *Sarda sarda* avec une contribution de 30 % contre 12 % pour l'Auxis sp. et 30 % pour Euthynnus sp.

Les captures débarquées par la pêche artisanale et côtière sont en augmentation continue. Elles ont atteint en 2013 une valeur de 1 663 tonnes composée essentiellement du thazard noir (*Acanthocybium solandri*), représentant une contribution de l'ordre de 85%, et de *Scomberomorus tritor* (5%). L'apparition d'*Acanthocybium solandri*, de façon timide en 2012 mais exceptionnelle en 2013 est donc un phénomène majeur à signaler.

Mexico

El presente informe describe las características de la pesca del atún aleta amarilla o rabil (*Thunnus albacares*) con palangre en el Golfo de México, y las especies que integran la captura incidental, destacando el cumplimiento a las regulaciones nacionales y/o aplicación de las recomendaciones y resoluciones emanadas de la Comisión Internacional para la Conservación del Atún Atlántico (CICAA).

La pesca de atún aleta amarilla o rabil (*Thunnus albacares*) en el Golfo de México se lleva a cabo por embarcaciones de mediana altura a través del palangre. En ésta además de la especie objetivo, se capturan incidentalmente otras especies como: el barrilete o listado (*Katsuwonus pelamis*), el patudo o bigeye (*Thunnus obesus*), el atún aleta azul o atún rojo del Atlántico (*Thunnus thynnus*), tiburones y pez espada, entre otros.

El marco legal normativo que regula esta pesquería incluye la Ley General de Pesca y Acuacultura Sustentables (LGPAS), y la Norma Oficial Mexicana que regula el aprovechamiento de las especies de túnidos con embarcaciones palangreras en aguas de Jurisdicción Federal del Golfo de México y Mar Caribe (NOM-023-PESC-1996), la cual se actualizó en febrero de 2014 para actualizar e incorporar las regulaciones adoptadas por CICAA.

La Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA) a través de la Comisión Nacional de Acuacultura y Pesca (CONAPESCA) es la autoridad nacional encargada de implementar las políticas, programas y normatividad que faciliten el desarrollo competitivo y sustentable del sector pesquero y acuícola de México. Por su parte, el Instituto Nacional de Pesca (INAPESCA) es el responsable de desarrollar la investigación científica y recopilar las estadísticas sobre la pesca del atún con palangre en el Golfo de México.

Morocco

Au cours de l'année 2013, la pêche des espèces de thonidés et des espèces apparentées a atteint une production totale de l'ordre de 7 815.1 t, soit une baisse d'environ 9.5 % en termes de volume par rapport à 2012.

Les captures du thon rouge ont atteint 1 270 t; celles de l'espadon se sont élevées à 1 832 t en 2013, ce qui représente une augmentation d'environ 16 % par rapport à l'année précédente. Cette hausse était principalement attribuée aux captures de la palangre. Les prises de thon obèse sont restées relativement stables autour de 300 t. Les prises de l'albacore ont plus que doublé par rapport à l'année précédente et ont atteint 137 t. Les prises de listao ont par contre accusé une légère baisse de 9 % et n'ont pas dépassé 2 044 t.

Les captures des thonidés mineurs ont atteint 962 t, soit une diminution de 41 % par rapport à 2012. Quant aux requins, leurs prises sont restés relativement stables (1 057 t), dont 63 % de la taupe bleu.

Sur le plan recherche scientifique, l'année 2013 a été marquée par la participation active du Maroc à travers INRH, dans le projet de recherche sur le thon rouge englobant tout l'Atlantique (ICCAT/ GBYP), et ce à travers les actions suivantes : 1) Continuation de la collecte de 50 échantillons biologiques et génétiques pour l'étude de la croissance et la structure des stocks de thon rouge ; 2) Marquage de plus de 260 thons rouges adultes dont 17 avec des marques électroniques à bord de la madrague marocaine « Essahel » ; 3) participation au programme de marquage de thon rouge juvénile dans le détroit de Gibraltar.

Namibia

Namibia, as a member of ICCAT, strives to fully implement all ICCAT conservation and management measures. Foreign fishing vessels entering Namibian ports are thoroughly inspected to ensure that they have not contravened national laws and regulations of Namibia or those of other states, as well as conservation and management measures developed by ICCAT and any other RFMOs of which Namibia is a member. In addition, monitoring measures are in place to ensure that all products coming from licensed tuna fishing vessels, when entering or leaving the country, are accompanied by a duly completed and validated statistical document.

Namibia continued to undertake research in 2013 on all ICCAT species caught by boats operating in Namibian waters. Data obtained from log sheets supplied to fishing vessels, as well as data collected by Fisheries Inspectors deployed at all landing points and those data collected by Fisheries Observers onboard those fishing vessels were analysed and the preliminary results were submitted to ICCAT in July 2013. A drastic decrease in most of the species landed (both targeted and by-catches) was recorded in 2013 as compared to 2012.

Fisheries observers were also tasked to observe the activities of fishing vessels at sea and report any violations for possible action to be taken against the culprits. Furthermore, Namibia had deployed Fisheries Inspectors both at sea onboard Fisheries Patro vessels and in the harbours to ensure strict compliance with the country's rules and regulations related to the exploitation of marine living resources, including those adopted by Namibia as part of its obligations to International Organisations, such as ICCAT.

Norway

Norway caught 2 specimens of Atlantic bluefin tuna (*Thunnus thynnus*) as by-catch in 2013. There have been no reported catches of Atlantic swordfish (*Xiphias gladius*) and Atlantic bonito (*Sarda sarda*) in Norway in 2013. Several observations of Atlantic bluefin tuna were done along the coast of Norway in 2013. Norway continuously works on historical data on tuna and tuna like species and aims to put the data on these species into an ecosystem perspective. Norway participated at the SCRS annual science meeting in 2013.

Russia

Fishery. In 2013 and 2014 a specialized (purse seine) tuna fishery fleet of the Russian flag did not carry out any operations. In 2013 trawling vessels caught 1,319 t of tuna of 3 species and 125 t of Atlantic bonito as by-catch in the central eastern Atlantic. In the first half of 2014 the trawling vessels caught 661 t of tuna of 3 species and 63 t of Atlantic bonito.
Scientific researches and statistics. In 2013 FSUE "AtlantNIRO" observers collected biological and fishery material on tunas onboard trawlers in the central eastern Atlantic (area SJ71 according to ICCAT classification). Fish length and weight were measured, fish sex, gonads maturity stages and stomach fullness indices were determined. Species of the "Small Tunas" group were taken in trawls as by-catch, from a few individual specimens up to a few dozen. Data on frigate tuna, bullet tuna, Atlantic black skipjack and Atlantic bonito were collected; 2,015 specimens for weight measurements and 1,766 specimens for biological analyses.

Senegal

La flottille thonière industrielle sénégalaise est composée en 2013 de six (6) canneurs qui exploitent essentiellement les thons tropicaux notamment l'albacore (*Thunnus albacares*), le thon obèse (*Thunnus obesus*) et le listao (*Katsuwonus pelamis*) et un (1) palangrier qui cible l'espadon. Par ailleurs, une partie des pêcheries artisanales (la ligne à la main, la ligne de traîne et la senne tournante) et la pêche sportive capturent les poissons porte-épée (marlins, espadon et voilier) et les petits thonidés (thonine, maquereau, bonite, auxide etc.). Les prises totales des canneurs sénégalais sont estimées à 5 910 tonnes dont 1 218 tonnes d'albacore, 4 012 tonnes de listao, 638 tonnes de patudo et 42 tonnes de thonnie et d'auxide. Les captures de 2013 ont légèrement baissé par rapport à 2012 (6 181 t). En 2013, les prises de la pêche palangrière sont estimées à 424 tonnes (410 t en 2012). Les captures sont constituées essentiellement de l'espadon, requins, marlins. Concernant aux pêcheries artisanales, les prises de petits thonidés et espèces apparentées en 2013 sont estimées à 7 094 t. La tendance est à la hausse par rapport à 2012 (5 542 t). Quant à la pêche sportive, les captures ont été estimées à 31 t, dont 24 t de marlins, 4 t de voiliers et 6 t d'albacore. On note que la tendance est à la baisse pour les trois principales espèces par rapport à 2012.

Pour la recherche et les statistiques, l'équipe mise en place au port de Dakar par le CRODT assure le suivi des activités de pêche de la totalité des thoniers qui fréquentent le port de Dakar. Le travail consiste à la collecte des statistiques de captures et d'effort de pêche. Ce travail est complété par des informations de diverses sources (usines, armements, Direction des pêches maritimes, Douane etc.). Des échantillonnages multispécifiques sont également réalisés en pêche industrielle. Le suivi des débarquements, de l'effort de pêche et des tailles des istiophoridés est intensifié au niveau des principaux ports de la pêche artisanale.

South Africa

The South African tuna and billfish resources are exploited by baitboat and longline methods. The tuna pole season, which commences annually from September – May, started poorly at the end of 2012 through to May 2013 resulting in a slightly decreased effort (number of days) and catch of 3 411 t of juvenile and sub-adult albacore (*Thunnus alalunga*). An increase in yellowfin tuna (*Thunnus albacares*) catches (327 t) were caught in the ICCAT region by 129 baitboat vessels. The South African flagged longline vessels have traditionally used swordfish (*Xiphias gladius*) targeting methods in the Indian and Atlantic Oceans, whilst the Japanese foreign flagged vessels target the tropical tunas (yellowfin and bigeye tuna, *Thunnus obesus*) with effort focused in the Indian Ocean. Although the local South African fleet targets swordfish, their catch comprises of 50-60% swordfish and the remainder tropical tunas and sharks (blue and mako sharks). Increases in catches of swordfish (171 t), bigeye (293 t) and yellowfin (70 t) were recorded in 2013, most likely due to the doubled effort in the ICCAT region. 16 vessels (11 local and 5 foreign) set 966 000 hooks in the ICCAT region. The southern bluefin tuna (*Thunnus maccoyii*) is not generally targeted because of the minimal quota granted by CCSBT, thus landings totalled 44 t in 2013. Albacore forms the basis of the baitboat fleet and swordfish the basis of the local longline fleet, and the unpredictable fluctuations of albacore and the reduced catches of swordfish over at least the last 5 years has seen the local vessels begin to struggle to maintain viable operations in their sectors. Six local longline vessels continue to target blue sharks (*Prionace glauca*) and shortfin mako sharks (*Isurus oxyrinchus*), landing 179 t and 177 t, respectively. Strategies to reduce shark targeting will be implemented from 2014. The necessity to conduct research into the stock origin and intermixing of tuna and swordfish populations at the boundary between the Atlantic and Indian Oceans is a high research priority in South Africa.

Tunisia

En 2013, les plans de gestion et de conservation des thonidés de l'ICCAT ont été consolidés par les programmes de contrôle et d'inspection le long des côtes tunisiennes, notamment pendant les périodes d'interdiction de la pêche de thon rouge et d'espadon.

Les recommandations de l'ICCAT (13-07 et 11-21) ont été transposées dans la réglementation tunisienne en vertu de l'arrêté du ministre de l'agriculture du 10 juin 2013, portant modification de l'arrêté du 21 mai 2008 relatif à l'organisation de la pêche de thon rouge.

Dans ce contexte et dans le cadre de la mise en œuvre des Recs. de l'ICCAT et notamment la Rec. 12-03, le nombre des navires autorisés à la pêche au cours de l'année précédente est resté le même que l'année 2012, soit un taux de réduction de 50 % de l'effectif total des thoniers actifs.

En 2013, outre les programmes de documentation sur papier de thon rouge et d'espadon, la Tunisie a implémenté le programme de document statistique électronique (eBCD de l'ICCAT). A cet effet, des difficultés techniques ont été rencontrées notamment dans la gestion du système eBCD à savoir la gestion des utilisateurs et les fonctionnalités en relation avec les observateurs régionaux.

Concernant les thonidés mineurs et l'espadon, des études de prospection et un plan de gestion sont en cours de réalisation. Pour les requins, un programme de recherche a été arrêté pour la collecte des informations sur ces espèces et sur les prises accessoires.

En 2013, le programme des observateurs scientifiques à bord des navires de capture de thon rouge et d'espadon et le programme de livres de bord ont révélé que les captures accidentelles des tortues marines et les mammifères marins sont nulles.

Turkey

Total catch amount of marine fish of Turkey was 295,167.9 t during the year 2013. The portion of tuna and tuna-like fishes in total catch was 16,125.5 t. In 2013, the catches of tuna and tuna like species were 551.4 t, 13,157.6 t, 96.8 t, 70.6 t, 1,385.8 t, and 863.3 t for bluefin tuna, Atlantic bonito, swordfish, albacore, little tunny and bullet tuna, respectively. Almost all bluefin tunas were caught by purse seiners, which have an overall length 30-60 meters. The fishing operation was conducted intensively off Antalya Bay in the south of Turkey and in the eastern Mediterranean region. The bluefin tuna catch started at the end of May and finished in mid June.

United States

Total (preliminary) reported U.S. catch of tunas (YFT, SKJ, BET, ALB, BFT) and swordfish, including dead discards, in 2013 was 7,581 t, an decrease of about 25% from 10,025 t in 2012. Swordfish catches (including estimated dead discards) decreased from 3,610 t in 2012 to 2,955 t in 2013, and provisional landings from the U.S. fishery for yellowfin tuna decreased in 2013 to 2,331 t from 4,099 t in 2012. U.S. vessels fishing in the northwest Atlantic caught in 2013 an estimated 659 t of bluefin tuna, a decrease of about 260 t compared to 2012. Provisional skipjack tuna landings increased by about 5 t to 117 t from 2012 to 2013, bigeye tuna landings increased by 13 t compared to 2012 to an estimated 880 t in 2013, and albacore landings increased from 2012 to 2013 by 181 t to 599 t.

Uruguay

Durante el año 2013, la flota atunera de bandera uruguaya no mantuvo actividades. Diversos factores ocasionaron esta inactividad, entre los principales se destacan los gremiales. De todas formas, a través de un acuerdo de pesca con Japón, operaron en aguas de la ZEE de Uruguay dos buques dirigidos principalmente a la captura de atún ojo grande. La captura total desembarcada fue de aproximadamente 480 toneladas, siendo el albacora (209 t), el tiburón azul (130 t) y el pez espada (103 t) las especies más capturadas. Se continuó desarrollando el seguimiento de la captura y el esfuerzo en base a información proveniente de partes de pesca y del programa de observadores, el cual cubrió el 100% de los viajes de pesca de la flota japonesa. Se marcaron un total de 973 peces, la mayoría de los cuales fueron tiburón azul (81,2%). Se realizaron experimentos para evaluar medidas de mitigación de la captura incidental durante operaciones de pesca comercial y de investigación. Uruguay participó y aportó numerosos trabajos en diversas reuniones del SCRS, incluyendo la reunión de preparación y evaluación de albacora (3 documentos), preparación y evaluación de pez espada (2 documentos), reunión de tiburones (1 documento) y ecosistemas (2 documentos). Uruguay comenzó el proceso de revisión y actualización de sus Planes de Acción Nacional de Aves Marinas y Tiburones, y continuó con la implementación de los mismos. La flota japonesa trabajó cumpliendo las medidas de calado nocturno y utilizando línea espantapájaros. Además, cumplió con el Decreto uruguayo de prohibición de retención de *Lamna nasus*, y con las Recomendaciones de la CICAA para la liberación de los tiburones martillo, azotador, oceánico y jaquetón. Se continuó con el trabajo de control en puerto de buques de tercera bandera iniciado durante 2009. Se realizaron inspecciones en puerto para determinar cuáles son las especies desembarcadas, cuál es su origen y controlando aspectos formales de la documentación de los barcos. Todas las Recomendaciones de la CICAA aprobadas durante la Reunión de la Comisión en el año 2013 han sido internalizadas en Uruguay, y actualmente rigen bajo decreto.

- Cooperating Parties, Entities and Fishing Entities

Chinese Taipei

In 2013, the number of authorized fishing vessels was 117 with 75 targeting bigeye tuna and 42 targeting albacore, and the total catch of tuna and tuna-like species was about 27,700 t. The most dominant species was albacore, its catch accounting for 39% of the total catch in weight, and the following species was bigeye tuna, with catch accounting for 37% of the total catch. We have implemented a national scientific observer program for the tuna fishery in ICCAT waters since 2002. In 2013, there were 22 observers placed on fishing vessels operating in the Atlantic Ocean, and the observer coverage was over that set by ICCAT. The research programs conducted by scientists in 2013 included research on CPUE standardizations and assessments of bigeye tuna, yellowfin tuna, albacore, swordfish and sharks; the impact of climatic change on major tuna stocks; the estimation of historical catches for dominant sharks; the research on incidental catch of ecological related species; and the update of the Taiwanese National Plan of Action to reduce incidental catch of seabirds. The research results were presented at the inter-sessional working group meetings and regular meetings of the SCRS. As for the reporting obligation, the related statistical information and information required by ICCAT Recommendations were submitted to the ICCAT Secretariat within the required timeframe.

8. Executive Summaries on species

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

The Committee also pointed out that the texts and tables of these Summaries generally reflect the information available in ICCAT immediately prior to the SCRS plenary sessions, since they were prepared during the meetings of the Species Groups. Therefore, the catches reported to ICCAT during or after the SCRS meeting cannot be included in these Summaries.

8.1 YFT – YELLOWFIN TUNA

A stock assessment for yellowfin tuna was conducted in 2011, at which time catch and effort data through 2010 were available. The catch table presented in this Executive Summary (**YFT-Table 1**) has been updated to include reported catches through 2013, including revisions to Ghanaian catches for the period 1973-2012 that have been incorporated since the last assessment. The revisions to Ghanaian catches for the period 2006-2012 reflected in this table are still under review by the SCRS. Readers interested in a more complete summary of the state of knowledge on yellowfin tuna stock status should consult the detailed report of the 2011 ICCAT Yellowfin Tuna Stock Assessment Session (Anon. 2012c).

Other information relevant to yellowfin tuna is presented elsewhere in this SCRS Report:

The Tropical Tunas Work Plan (**Appendix 4**) includes plans to address research and assessment needs for yellowfin tuna.

YFT-1. Biology

Yellowfin tuna is a cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three oceans. The sizes exploited range from 30 cm to 170 cm FL; maturity occurs at about 100 cm FL. Smaller fish (juveniles) form mixed schools with skipjack and juvenile bigeye, and are mainly limited to surface waters, while larger fish form schools in surface and sub-surface waters. Spawning on the main fishing grounds, the equatorial zone of the Gulf of Guinea, occurs primarily from December to April. Juveniles are generally found in coastal waters off Africa. Spawning also takes place in the Gulf of Mexico, in the southeastern Caribbean Sea, and off Cape Verde, although the peak spawning occurs at different times during the year. The relative importance of the spawning grounds is unknown. Although such separate spawning areas might imply separate stocks or substantial heterogeneity in the distribution of yellowfin tuna, a single stock for the entire Atlantic is assumed as a working hypothesis. This assumption is based upon information such as observed transatlantic movements (from west to east) indicated by conventional tagging and longline catch data that indicates yellowfin are distributed continuously throughout the entire tropical Atlantic Ocean. However, movement rates and timing, routes, and local residence times remain highly uncertain. In addition, some electronic tagging studies in the Atlantic as well as in other oceans suggest that there may be some degree of extended local residence times and/or site fidelity.

Natural mortality is assumed to be higher for juveniles than for adults; this is supported by tagging studies of yellowfin in the Pacific and Indian Oceans. Uncertainties remain as to the scale of these natural mortality rates. Males are predominant in the catches of larger sized fish (over 145 cm), which could be explained if females experience a higher natural mortality rate (perhaps as a consequence of spawning). On the other hand, females are predominant in the catches of intermediate sizes (120 to 135 cm), which could support a hypothesis of distinct growth curves between males and females, with females having a lower asymptotic size (140 cm) than males (150 cm). Recent results from studies in the Indian Ocean tend to support this latter hypothesis. The current working hypotheses for the stock assessment do not consider sex-specific natural mortality or growth.

The working hypothesis is that growth rates are relatively slow initially, increasing at the time the fish leave the nursery grounds; this characterization is supported by analyses of size frequency distributions as well as from tagging data. Nevertheless, questions remain concerning the most appropriate growth model for Atlantic yellowfin tuna, as analyses of hard part growth increments support somewhat different growth patterns.

These uncertainties in stock structure, natural mortality, and growth have important implications for the stock assessment. The proposed Atlantic Ocean Tropical Tuna Tagging Program, if fully funded, should help resolve these uncertainties.

The younger age classes of yellowfin tuna (40-80 cm) exhibit a strong association with FADs (natural or artificial fish aggregating devices/floating objects). The Committee noted that this association with FADs, which increases the vulnerability of these smaller fish to surface fishing gears, may also have a negative impact on the biology and on the ecology of yellowfin due to changes in feeding and migratory behaviors.

YFT-2. Fishery indicators

Catch levels for 2013 are considered provisional. Therefore, recent trends in catch are described with respect to 2012. Overall Atlantic catches declined by nearly half from the peak catches of 1990 (193,114 t) to the 102,294 t estimated for 2012. A provisional 108,343 t was estimated for 2010 at the time of the assessment; 112,777 t is currently being estimated for 2010 after revisions to reports and estimates.

In the eastern Atlantic, purse seine catches declined by nearly half from 128,307 t in 1990 to a low of 48,160 t in 2007, and has increased to 69,570 t in 2012 (**YFT-Table 1; YFT-Figure 2**). Baitboat catches declined by more than 70% from 1990 to 2012 (from 19,648 t to 5,816 t). Longline catches, which were 10,253 t in 1990, have declined to 5,510 t in 2012. In the western Atlantic, purse seine catches (predominantly from Venezuela) declined by nearly 90% from a peak in 1994 (19,612 t) to 1,373 t in 2009, before reversing the trend and increasing to 7,903 t in 2013. Baitboat catches also reached a low (886 t) in 2008, declining nearly 90% from 7,094 t in 1994, recovered somewhat in subsequent years, but fell again to 1,108 t in 2012. Longline catches, which were 11,790 t in 1994, have fluctuated since between 10,000 t and 16,000 t, and were 12,153 t in 2012.

The most recent available catch distribution is given in **YFT-Figure 1**. However, it should be noted that official reports are not yet available from several Contracting and/or non-Contracting Parties, and that this figure incorporates provisional scientific estimates of Ghanaian catches for 2006-2012.

Purse seine catch levels had been held in check until 2007 in large part by a continued decline in the number of purse seine vessels in the eastern Atlantic. As a recent indicator, the number of purse seiners from the European and associated fleet operating in the Atlantic had declined from 44 vessels in 2001 to 25 vessels in 2006, with an average age of about 25 years (see **SKJ-Figure 9** for trends in number of vessels and carrying capacity). By 2009, however, the number of purse seiners increased by about 45% to 36 in 2009, as vessels moved from the Indian Ocean to the Atlantic. At the same time, the efficiencies of these fleets have been increasing, particularly as the vessels which had been operating in the Indian Ocean tended to be newer and with greater fishing power and carrying capacities. Overall carrying capacity of the total purse seine fleet in 2010 had increased to about the same level as in the 1990s and FAD based fishing has accelerated more rapidly than free school fishing (although both have substantially increased), with the number of sets on FADs reaching levels not seen since the mid-1990s. The number of European and associated fleet purse seiners operating in the Atlantic declined slightly to 32 as of 2013, but fishing power and carrying capacity remain high.

Significant catches of yellowfin tuna (over 1000 tons) obtained in 2011 by EU purse seiners south of 15°S off the coast of West Africa (in association with skipjack and bigeye on FADs) had previously been noted by the Committee, and it was recommended that future catches in the area be monitored considering that this area is very special in its environment and low oxygen levels. Catches in this area have been greatly reduced in the years since 2011. A recent fishery change that should be noted is the implementation in 2012 and 2013, for the first time, of the strategy of fishing on floating objects off of Mauritania (north of 15°N). Catches on floating objects in this area tended to consist almost entirely of skipjack. Effort directed in this manner may therefore have a reduced impact on yellowfin tuna.

The species composition and catch at size of landings from the Ghanaian fleet of baitboats and purse seiners has been thoroughly reviewed since the last assessment. This review has led to the adoption of new estimates of Task I and Task II catch and effort and size for these fleets for the period 1973-2005. Estimates for the period 2006-2012 are now available, and are included in **YFT-Table 1**. These estimates are under review, and should be regarded as provisional. A comparison of the current estimated historical total catch trend with that available for the last assessment is shown in **YFT-Figure 3.**

Available catch rate series from purse seine data, after an initial period of apparent declines, showed high variability without clear trend in recent years **(YFT-Figure 4**). Baitboat catch rate trends **(YFT-Figure 5)** also exhibit large fluctuations, with a somewhat declining overall trend. Such large fluctuations may reflect changes in local availability and/or fishing power, which do not necessarily reflect stock abundance trends. Standardized catch rates for the longline fisheries **(YFT-Figure 6)** generally show a declining trend until the mid-1990s, and have fluctuated without clear trend since.

The average weight trends by fleet (1970-2010) are shown in **YFT-Figure 7**. The recent average weight in European purse seine catches, which represent the majority of the landings, had declined to about half of the average weight of 1990. This decline is at least in part due to changes in selectivity associated with fishing on floating objects beginning in the 1990s. A declining trend is also reflected in the average weight of eastern tropical baitboat catches. Longline mean weights have been more variable.

Apparent changes in selectivity can also be seen in the overall trends in catch at age shown in **YFT-Figure 8**. The variability in overall catch at age is primarily due to variability in catches of ages 0 and 1. These ages are generally taken by the surface fisheries around FADs.

YFT-3. State of the stock

A full stock assessment was conducted for yellowfin tuna in 2011, applying both an age-structured model and a non-equilibrium production model to the available catch data through 2010. As has been done in previous stock assessments, stock status was evaluated using both production and age-structured models. Models used were similar in structure to those used in the previous assessment, however, other alternative model structures of the production model and the VPA were explored in sensitivity runs. These runs confirmed that some of the estimated benchmarks obtained from production models are somewhat sensitive to the assumption used that MSY is obtained at half of the virgin biomass. This assumption was used in the production models that contributed to benchmark estimates found in this report.

The estimate of MSY (~144,600 t) may be below what was achieved in past decades because overall selectivity has shifted to smaller fish (**YFT-Figure 8**); the impact of this change in selectivity on estimates of MSY is clearly seen in the results from age structured models (**YFT-Figure 9**). Bootstrapped estimates of the current status of yellowfin tuna based on each model, which reflect the variability of the point estimates given assumptions about uncertainty in the inputs, are shown in **YFT-Figure 10**. When the uncertainty around the point estimates from both models is taken into account, there was only an estimated 26% chance that the stock was not overfished and overfishing was not occurring in 2010 (**YFT-Figure 11**).

In summary, 2010 reported catches were well below MSY levels, stock biomass was estimated to most likely be about 15% below the Convention objective and fishing mortality rates most likely about 13% below F_{MSY}. The trends in the most recent years through 2010 were uncertain, with the age-structured models indicating increasing fishing mortality rates and decline in stock levels over the last several years, and the production models indicating the opposite trends.

YFT-4. Outlook

Projections were conducted as part of the assessment considering a number of constant catch scenarios, and the results from all models were summarized to produce estimated probabilities of achieving the Convention Objective ($B>B_{MSY}$, $F<F_{MSY}$), for a given level of constant catch, for each year up to 2025 (**YFT-Figure 11** and **YFT-Table 2**). Maintaining catch levels at 110,000 t was expected to lead to a biomass somewhat above B_{MSY} by 2016 with a 60% probability. Higher catch levels would have a lower probability of achieving that goal and may require a longer time frame for rebuilding.

The incorporation of the revised catch estimates for Ghana, as well as additional reporting and corrections, has resulted in a somewhat different catch history from what was available for the last assessment (**YFT-Table 1, YFT-Figure 3**). Following the recent low in 2007, overall catches of yellowfin tuna increased nearly 20% by 2009, before dropping again in recent years to lower levels. The relative contribution of purse seine gear to the total catch has increased by more than a third since 2007, which is related to the increasing purse seine effort trend. Estimates of fishable biomass trends from production modeling indicated a slow, continued rebuilding tendency, but estimates of spawning stock and total biomass trends from the age-structured assessment indicated recent decline and corresponding increasing F. In either case, continued increasing catches would be expected to slow or reverse rebuilding.

YFT-5. Effect of current regulations

Closures in various time-areas in the eastern tropical Atlantic have been in place during some prior years, imposing restrictions on either FAD-associated sets or all surface gears. Recommendation 11-01 implemented a new closure of surface fishing on FADs in the area from the African coast to 10ºS, 5ºW-5ºE during January-February in the Gulf of Guinea. This closure came into effect for the first time in 2013. Sufficient data are not yet available to fully evaluate the effect of this closure on the stock, although the measure appears to have had a substantial effect on the reported catch and effort within the time-area closure. Rec. 11-01 also implemented a TAC of 110,000 t for 2012 and subsequent years. The overall catch in 2012 (101,866 t) and 2013 (92,615 t) were lower than this TAC.

In 1993, the Commission recommended "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992". As measured by fishing mortality estimates from the age-structured model, effective effort in 2010 appeared to be near (estimates range from about 5% above to about 10% below) the 1992 levels.

YFT-6. Management recommendations

The Atlantic yellowfin tuna stock was estimated to be overfished in 2010. Continuation of catch levels on the order of 110,000 t was expected to lead to a biomass somewhat above B_{MSY} by 2016 with a 60% probability. Catches approaching 140,000 t or more would reduce the chances of meeting Convention Objectives below 50%, even after 15 years (2025). In addition, the Commission should be aware that increased harvests on FADs could have negative consequences for yellowfin and bigeye tuna, as well as other by-catch species. Should the Commission wish to increase long-term sustainable yield, the Committee continues to recommend that effective measures be found to reduce FAD-related and other fishing mortality of small yellowfin. The Committee notes that the closure implemented in Rec. 11-01 may be more effective than that implemented by Rec. 04-01.

ATLANTIC YELLOWFIN TUNA SUMMARY

Maximum Sustainable Yield (MSY)	144,600[1] (114,200 - 155,100)
2013 Yield	92,615 t
Relative Biomass B_{2010}/B_{MSY}	0.85 (0.61-1.12)[2]
Relative Fishing Mortality: $F_{current\ (2010)}/F_{MSY}$	0.87 (0.68-1.40)[2]

Management measures in effect:

[Rec. 93-04]:
- Effective fishing effort not to exceed 1992 level

[Rec. 11-01] (in effect beginning in 2013):
- Time-area closure for FAD associated surface fishing; TAC of 110,000 t beginning in 2013
- Specific limits of number of longline and/or purse seine boats for a number of fleets

Other measures also impacting yellowfin tuna

[Rec. 09-01], para. 1 of [Rec. 06-01], [Rec. 04-01]:
- Limits on numbers of fishing vessels less than the average of 1991 and 1992.
- Specific limits of number of longline boats; China (45), Chinese Taipei (75), Philippines (10), Korea (16).
- Specific limits of number of purse seine boats; Panama (3).

NOTE: $F_{current(2010)}$ refers to F_{2010} in the case of ASPIC, and the geometric mean of F across 2007-2010 in the case of VPA. As a result of the constant trend in recruitment estimated by the VPA model, F_{MAX} is used as a proxy for F_{MSY} for VPA results. Relative biomass is calculated in terms of spawning stock biomass in the case of VPA and in fishable biomass in the case of ASPIC.

[1] Estimates (with 80% confidence limits) based upon results of both the non-equilibrium production model (ASPIC) and the age-structured model (VPA).

[2] Median (10^{th}-90^{th} percentiles) from joint distribution of age-structured and production model bootstrap outcomes considered.

YFT-Table 1. Estimated catches (t) of yellowfin tuna (*Thunnus albacares*) by area, gear and flag.

			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL			162006	193113	166294	162677	161895	172390	153497	148946	136745	143871	135636	131642	153979	134525	122256	119095	103212	106834	96582	109348	120429	112777	104016	102293	92615
	ATE		125104	160383	129397	124966	123150	124175	118223	115890	104405	112951	104926	96019	113656	104865	97274	87857	77144	78563	72415	91225	101771	91926	86493	82845	71913
	ATW		36902	32731	36897	37712	38745	48215	35274	33056	32341	30919	30710	35623	40323	29660	24982	31238	26068	28272	24167	18123	18657	20851	17522	19448	20702
	MED		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Landings	ATE	Bait boat	12168	19648	17772	15095	18471	15652	13496	11365	12683	14265	16729	10022	14034	11145	9967	14639	9725	9463	7044	8367	9592	7143	8330	5816	6692
		Longline	7566	10253	9082	6518	8537	14638	13723	14236	10495	13872	13561	11369	7570	5790	9075	11442	7317	7234	13437	8566	7385	5544	6640	5510	5434
		Other surf.	2586	2175	3748	2450	2122	2030	1989	2065	2136	1674	1580	2424	2074	1826	2540	2928	4047	4833	3774	2379	3866	1690	1253	1949	1772
		Purse seine	102784	128307	98795	100902	94021	91856	89016	88224	79090	83141	73056	72203	89979	86104	75693	58848	56055	57033	48160	71913	80928	77550	70270	69570	58014
	ATW	Bait boat	4834	4718	5359	6276	6383	7094	5297	4560	4275	5511	5349	6753	5315	6009	3764	4868	3867	2695	2304	886	1331	1436	2311	1108	776
		Longline	17128	18851	13667	16594	12129	11790	11185	11882	11554	11671	13326	15760	14872	11921	10166	16019	14449	14249	13557	13192	12660	13095	10521	12146	10919
		Other surf.	3293	2362	3457	3483	4152	9719	12454	5830	4801	4581	5345	5241	7027	3763	6445	7134	5118	6880	5959	1973	3285	3590	2425	2885	1101
		Purse seine	11647	6800	14414	11359	16081	19612	6338	10784	11710	9157	6523	7870	13108	7966	4607	3217	2634	4442	2341	2067	1373	2722	2256	3302	7903
	MED	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ATW	Longline	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	0	5	6	5	9	8	9	7	3
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landings	ATE	Angola	67	292	510	441	211	137	216	78	70	115	170	35	34	34	34	34	111	0	405	98	701	520	485	191	
		Belize	0	0	0	0	0	0	1	0	3	0	0	5	0	0	0	0	0	0	0	0	402	1794	3172	5861	939
		Benin	7	1	1	1	1	1	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
		Cambodia	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	2870	2136	1932	1426	1536	1727	1781	1448	1721	1418	1663	1851	1684	1802	1868	3236	8146	7493	5923	8601	5493	5856	6002	4603	3321
		Cayman Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	139	156	200	124	84	71	1535	1652	586	262	1033	1030	1112	1056	1000	365	214	169	220	170	130
		Chinese Taipei	96	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	3363	4946	4145	2327	860	1707	807	1180	537	1463	818	879
		Congo	21	22	17	18	17	14	13	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cuba	703	798	658	653	541	238	212	257	269	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Curaçao	0	0	0	0	0	0	0	3183	6082	6110	3962	5441	4793	4035	6185	4161	0	1939	1368	7351	6293	5302	4413	6792	3727
		Côte D'Ivoire	0	0	0	0	0	0	0	0	2	0	0	673	213	99	302	565	175	482	216	626	90	470	385	1471	2077
		EU.España	61649	68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	31105	31469	24884	21414	11937	11761	13651	24679	33072	25912	21384	18994	12129
		EU.Estonia	0	0	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.France	30807	45684	34840	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211	32753	32429	23949	22922	19073	11363	16164	19126	20460	22381	18853	20420
		EU.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	
		EU.Latvia	0	0	255	54	16	0	55	151	223	97	25	36	72	334	334	334	334	334	0	0	0	0	0	0	
		EU.Lithuania	0	0	332	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	182	179	328	195	128	126	231	288	176	267	177	194	4	6	4	5	16	274	865	300	990	537	452	355	324
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	21	22	1
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
		Gabon	0	0	0	0	12	88	218	225	225	295	225	162	270	245	44	44	44	44	0	0	0	0	0	0	
		Gambia	0	2	16	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Georgia	0	0	25	22	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	7035	11988	9254	9331	13283	9984	9268	8182	15080	13222	20815	12304	23392	18100	15002	14044	13019	13595	11115	14127	18237	15732	11043	9347	13167
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2906	5265	3461	3736	2603	3124	2803	2949	4023
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	892	892	199	0	
		Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	298	292	1559	1157
		Honduras	0	0	0	2	0	0	4	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	5882	5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2286	1550	1534	1999	5066	3088	4206	8496	5266	3563	3041	3348	3637	3720
		Korea Rep.	1480	324	259	174	169	436	453	297	101	23	94	142	3	8	209	984	95	4	303	983	381	324	20	26	9
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	208	73	73	0	0	0	0	0	0	0	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	79	108	95	183	95	102	110	110	44	272	55	137
		Mixed flags (FR+ES)	584	634	1614	1370	1892	1704	1418	607	865	863	1092	1539	911	419	1113	1185	0	0	0	0	0	0	0	0	
		NEI (ETRO)	5436	12601	4856	10921	9875	8544	8970	9567	6706	7225	5418	5448	10169	8209	5396	4294	1781	219	0	0	0	0	0	0	
		NEI (Flag related)	280	1115	2310	1315	1157	2524	2975	3588	3368	5464	5679	3072	2090	133	466	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	35	14	72	69	3	147	59	165	89	139	85	135	59	28	11	1	9	90	0	6
		Nigeria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	3	1	
		Norway	1787	1790	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	901	1498	7976	8338	10973	12066	13442	7713	4293	2111	1315	1103	574	1022	0	1887	6170	8557	9363	6175	5982	5048	4358	5004	3899
		Philippines	0	0	0	0	0	0	0	0	0	126	173	86	0	50	9	68	13	30	88	53	152	89	134	5	56
		Russian Federation	0	0	3200	1862	2160	1503	2936	2696	4275	4931	4359	737	0	0	0	0	4	42	211	42	33	0	0	0	
		S. Tomé e Príncipe	299	164	187	170	181	125	135	120	109	124	114	122	122	122	122	134	145	137	0	160	165	169	0	0	
		Senegal	2	90	132	40	19	6	20	41	208	251	834	252	295	447	279	681	1301	1262	819	588	1279	1212	1050	1683	1247
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	6	0	11	0	0	0	0	0	0	0	0	0	0	

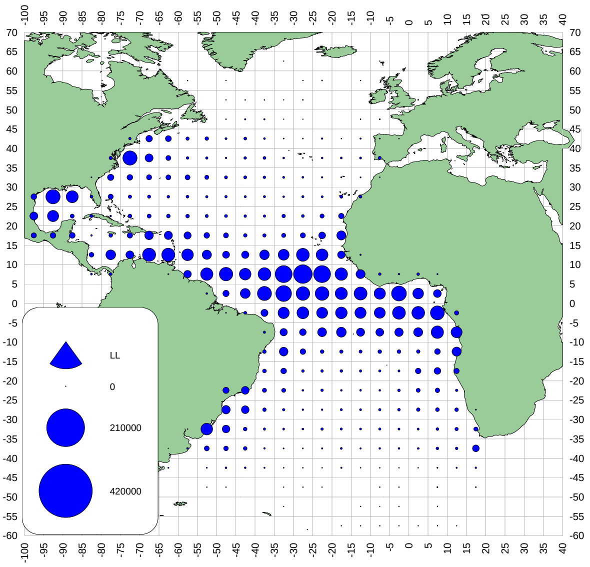
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1658	0	
		South Africa	671	624	52	69	266	486	183	157	116	240	320	191	342	152	298	402	1156	1187	1063	351	303	235	673	174	440
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	14	0	101	209	83	74	28	0	0	
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	4246	3615	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
		UK.Sta Helena	100	92	100	166	171	150	181	151	109	181	116	136	72	9	0	0	0	344	177	97	104	65	163	149	53
		Ukraine	0	0	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	145	483	450	331	23	10	124	52
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATW	Argentina	33	23	34	1	0	0	0	0	0	0	0	0	0	0	0	327	327	0	0	0	5	0	0	0	
		Barbados	62	89	108	179	161	156	255	160	149	150	155	155	142	115	178	211	292	197	154	156	79	129	131	195	188
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	143	1164	1160	943	264	42	41	4306
		Brazil	2533	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503	6985	7223	3790	5468	2749	3313	3617	3499	2836	401
		Canada	7	7	29	25	71	52	174	155	100	57	22	105	125	70	73	304	240	293	276	168	53	166	50	93	74
		China PR	0	0	0	0	0	0	0	0	0	628	655	22	470	435	17	275	74	29	124	284	248	258	126	94	81
		Chinese Taipei	762	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1540	1679	1269	400	240	315	211	287	305	252	380
		Colombia	136	237	92	95	2404	3418	7172	238	46	46	46	46	46	46	46	46	46	46	0	0	0	0	0	0	
		Cuba	91	53	18	11	1	14	54	40	40	15	15	0	0	65	65	65	65	65	0	0	0	0	0	0	
		Curaçao	170	170	150	160	170	155	140	130	130	130	130	130	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	
		Dominica	0	18	12	23	30	31	9	0	0	0	80	78	120	169	119	81	119	65	103	124	102	110	132	119	120
		Dominican Republic	0	0	0	0	0	0	0	0	0	89	220	226	226	226	226	226	226	226	0	0	0	0	0	0	
		EU.España	3	2	1462	1314	989	7	4	36	34	46	30	171	0	0	0	0	0	1	84	81	69	27	33	32	34
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	513	556	0	
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151	60	88	179	260	115	127	92	4
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Grenada	235	530	620	595	858	385	410	523	302	484	430	403	759	593	749	460	492	502	633	756	630	673	0	0	
		Jamaica	0	0	0	0	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	3178	1734	1698	1591	469	589	457	1004	806	1081	1304	1775	1141	571	755	1194	1159	437	541	986	1431	1539	1106	1024	743
		Korea Rep.	1055	484	1	45	11	0	0	84	156	0	0	0	0	0	0	0	580	279	270	10	52	56	470	472	203
		Mexico	345	112	433	742	855	1093	1126	771	826	788	1283	1390	1084	1133	1313	1208	1050	938	890	956	1211	916	1174	1414	1004
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	
		NEI (Flag related)	2500	2985	2008	2521	1514	1880	1227	2374	2732	2875	1730	2197	793	42	112	0	0	0	0	0	0	0	0	0	
		Panama	1595	2651	2249	2297	0	0	0	0	0	0	5	0	0	0	0	0	0	2804	227	153	119	2134	0	0	1819
		Philippines	0	0	0	0	0	0	0	0	0	36	106	78	12	79	145	299	230	234	151	167	0	0	0	30	72
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	1	40	48	22	65	16	43	37	35	48	38	1989	1365	1160	568	4251	0	2680	2989	2547	2274	854	963	551	325
		Sta. Lucia	70	58	49	58	92	130	144	110	110	276	123	134	145	94	139	147	172	103	82	106	97	223	114	98	136
		Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1943	1829
		Trinidad and Tobago	11	304	543	4	4	120	79	183	223	213	163	112	122	125	186	224	295	459	615	520	629	788	799	931	1128
		U.S.A.	8462	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5710	7695	6516	5568	7091	5529	2473	2788	2510	3010	4100	2332
		UK.Bermuda	22	15	17	42	58	44	44	67	55	53	59	31	37	48	47	82	61	31	30	15	41	37	100	66	36
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6
		Uruguay	64	18	62	74	20	59	53	171	53	88	45	45	90	91	95	204	644	218	35	66	76	122	24	6	7
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	681	689	661	555	873	816	720	330	207	419
		Venezuela	15567	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	11663	18651	11421	7411	5774	5097	6514	3911	3272	3198	4783	4419	4837	5050
	MED	EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Discards	ATE	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ATW	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	5	9	8	9	7	3
		U.S.A.	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The total Ghanaian catches of the table, between 2006 and 2012, are preliminary scientific estimations and do not correspond to the official catches (t) reported by Ghana (YFT total [2006 to 2012]: 11931, 15463, 14250 , 18355, 12512, 10754, 9240).
Angola & Sierra Leone official catches were not accepted by the WG because of the inconsistencies found when compared with historical data.
Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

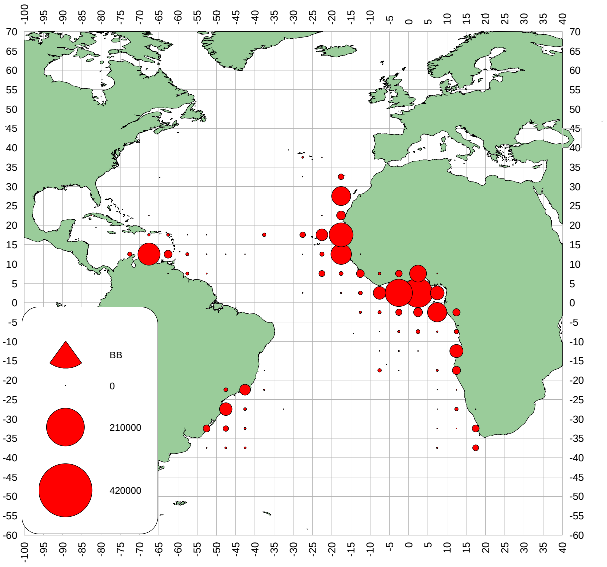
YFT-Table 2. Kobe II matrices giving the probability that the biomass will exceed the level that will produce MSY and the fishing mortality will fall below the fishing mortality rate that would maintain MSY, in any given year, for various constant catch levels based on combined model results.

Constant Catch (t, in 1000s)	*Probability (%) that $B>B_{MSY}$ and $F<F_{MSY}$ in each year*													
	2012	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025*
50	25	51	70	78	84	87	89	**91**	**92**	**93**	**94**	**95**	**95**	**96**
60	24	48	66	76	81	85	87	89	**90**	**92**	**93**	**93**	**94**	**94**
70	24	45	63	73	78	82	85	87	89	**90**	**90**	**92**	**92**	**93**
80	24	43	59	69	75	79	82	84	86	87	88	89	**90**	**90**
90	24	40	54	65	71	75	78	81	82	84	85	86	87	88
100	24	37	49	59	66	70	73	76	78	80	81	82	83	84
110	23	35	45	53	59	64	67	70	72	74	75	76	77	78
120	23	32	40	46	51	55	58	61	64	65	66	68	69	70
130	23	29	35	39	43	45	47	49	51	53	54	55	56	58
140	22	26	29	31	33	34	36	36	37	38	39	39	40	40
150	20	21	22	22	22	21	21	21	21	21	21	21	20	20

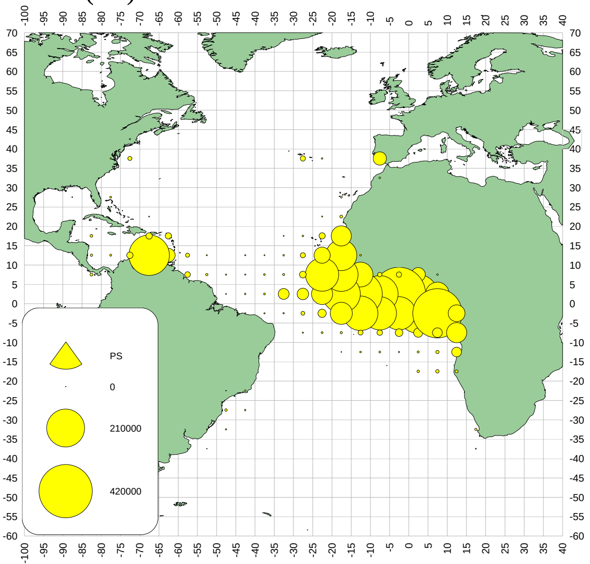
a)



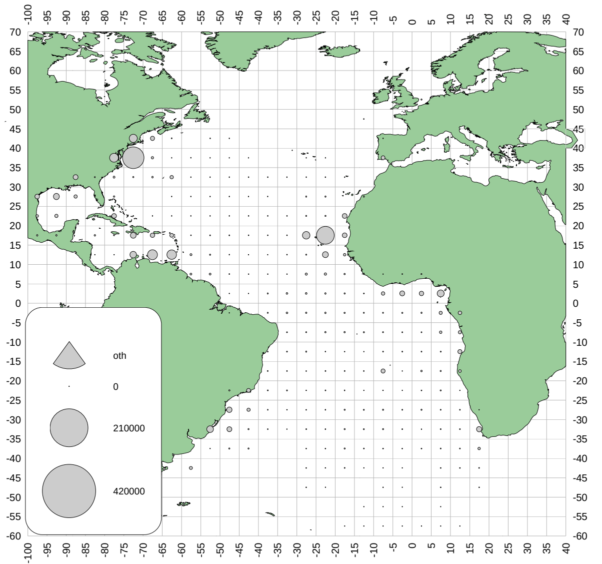
a. YFT (LL)



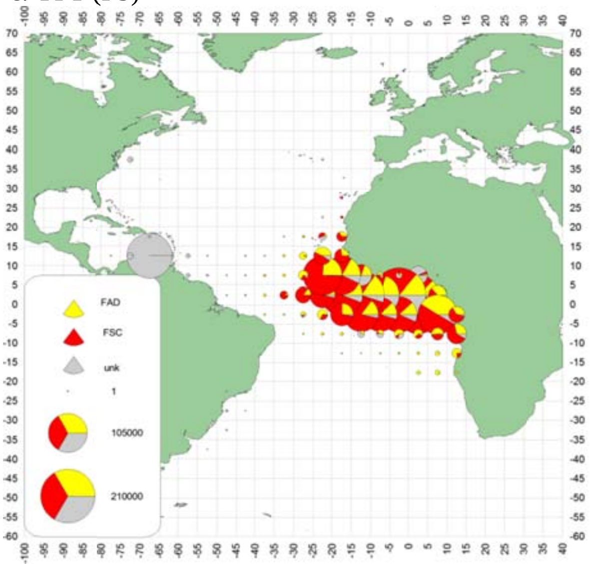
b. YFT (BB)



c. YFT (PS)

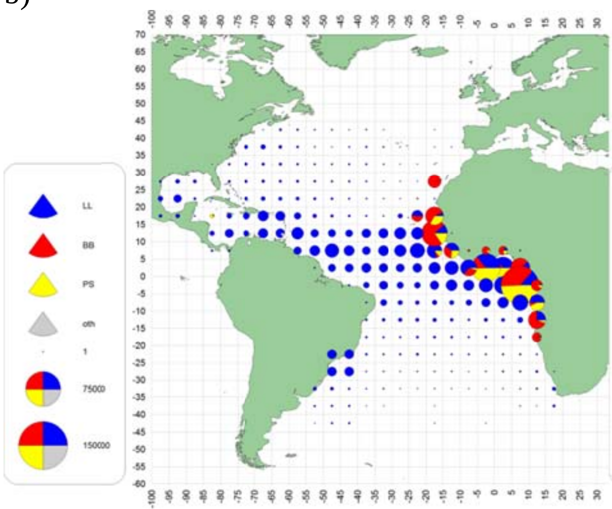


d. YFT (oth)

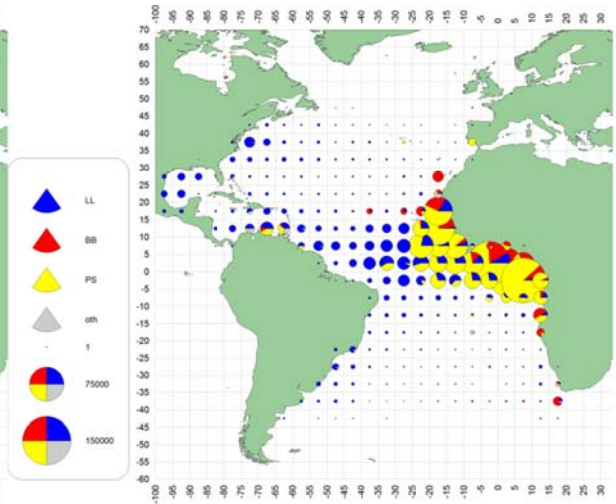


e. YFT (FAD/FREE 1991-2012)

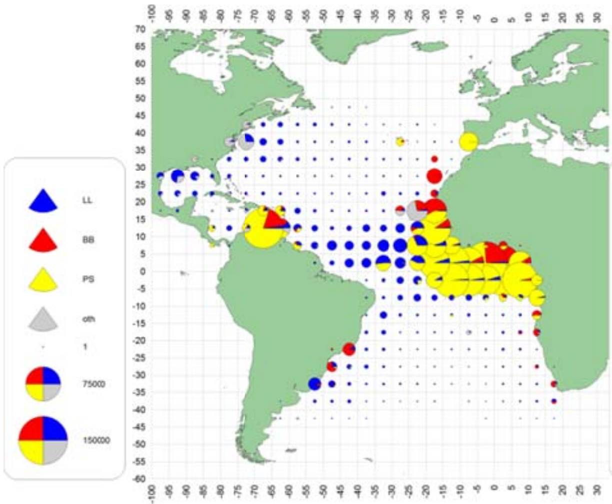
b)



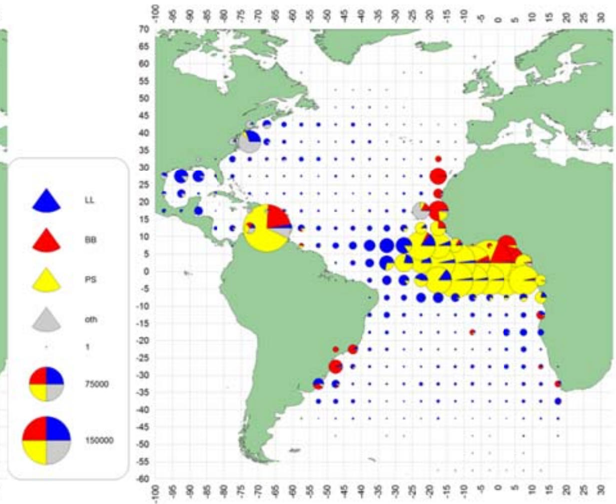
a. YFT(1960-69)



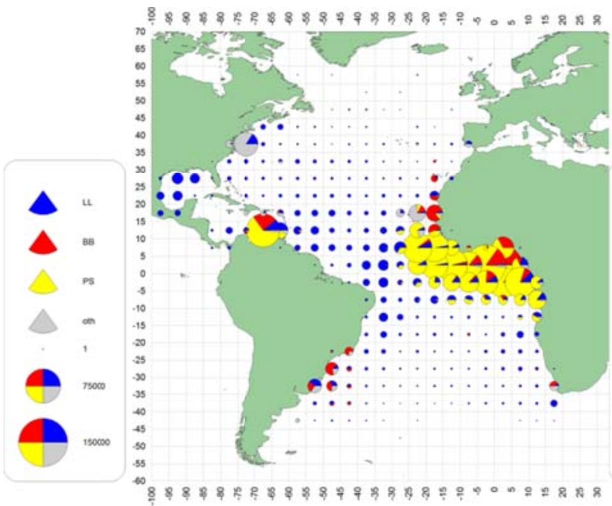
b. YFT(1970-79)



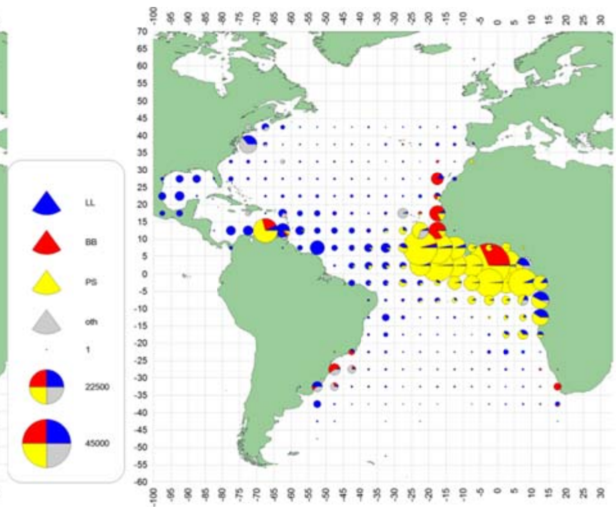
c. YFT(1980-89)



d. YFT(1990-99)

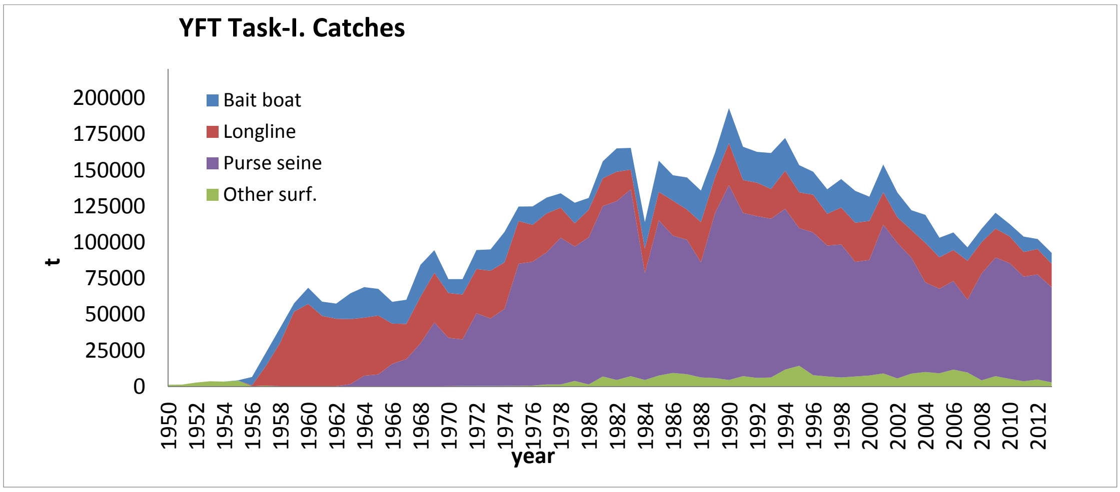


e. YFT (2000-09)

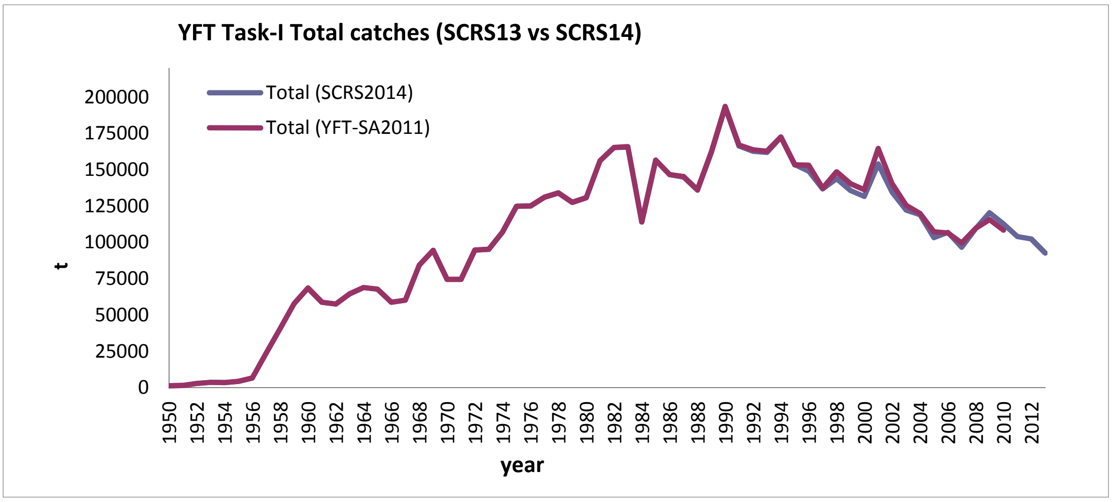


f. YFT(2010-12)

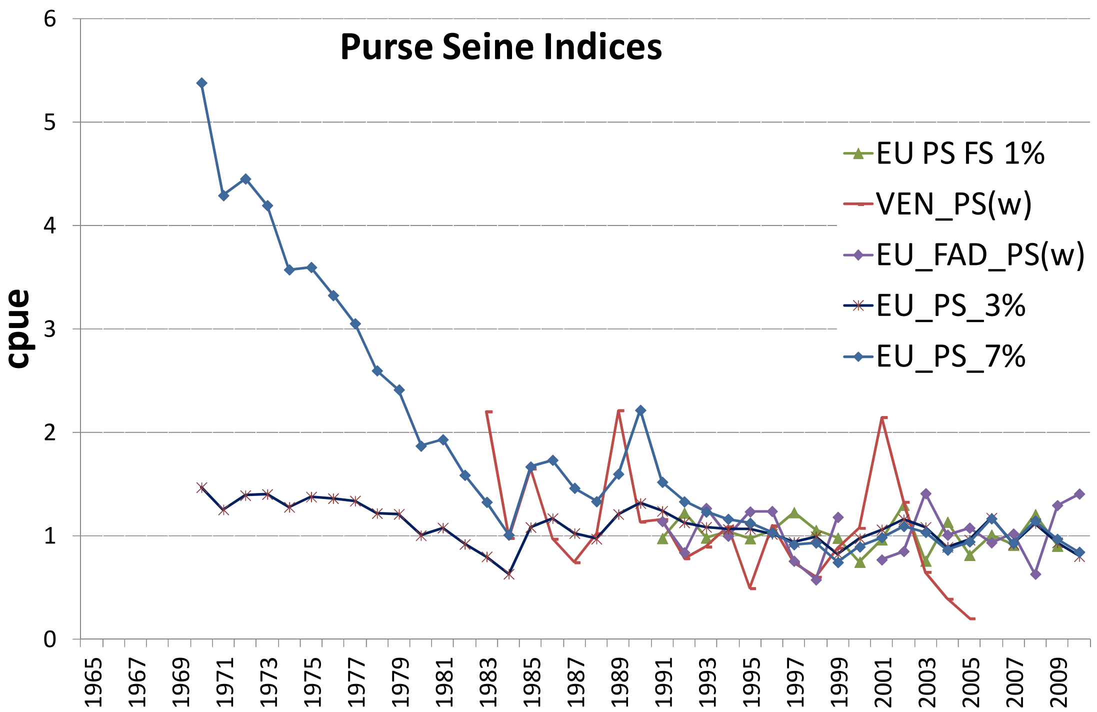
YFT-Figure 1. Geographical distribution of yellowfin tuna catches a) by major gears [a-e] and b) decade [a-f]. The maps b) (a-e) are scaled to the maximum catch observed during 1960-2009. Map f is scaled to the maximum catch observed from 2010-2012.



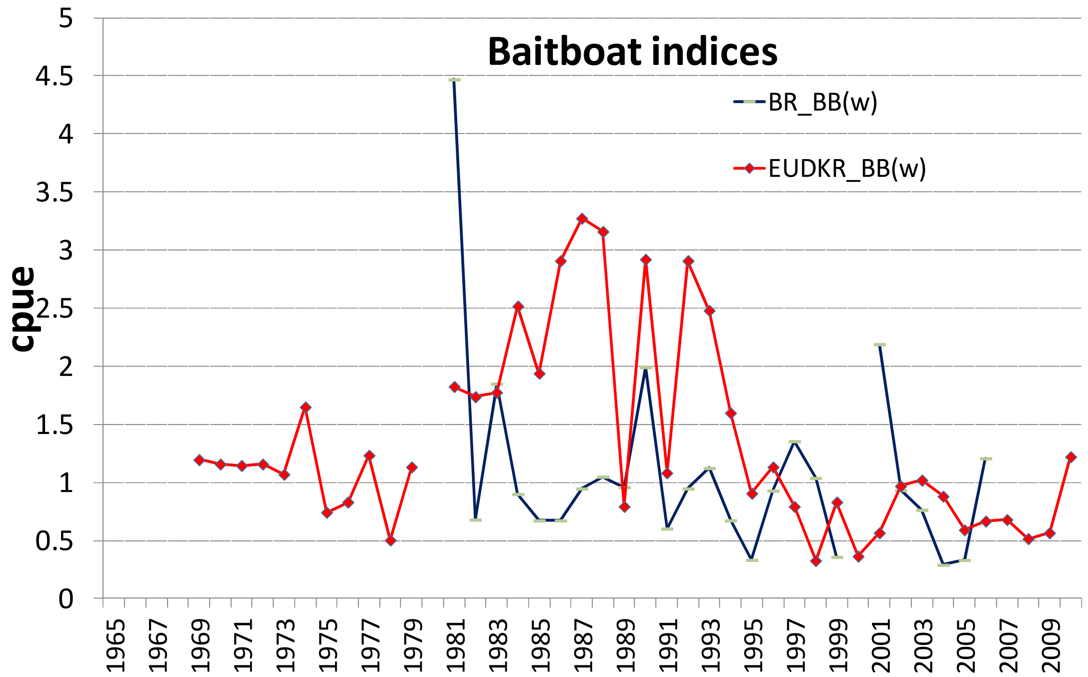
YFT-Figure 2. Estimated annual catch (t) of Atlantic yellowfin tuna by fishing gear, 1950-2013.



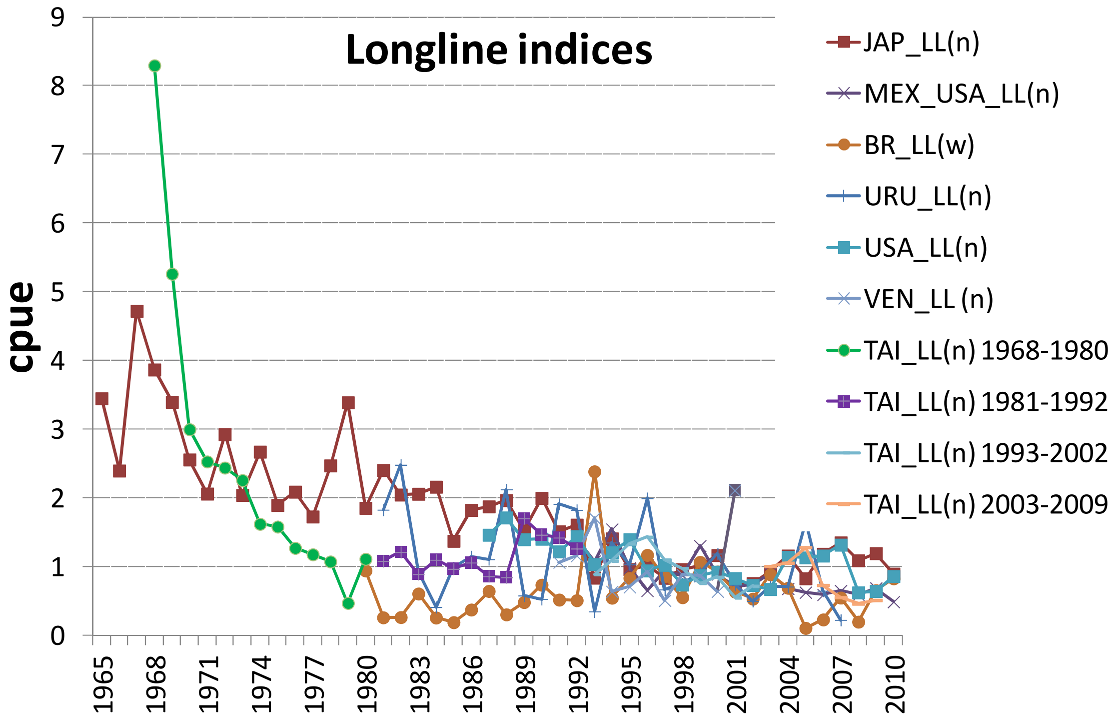
YFT-Figure 3. Comparison of the current estimated historical total catch trend with that available for the last assessment.



YFT-Figure 4. Yellowfin relative catch rate trends (both nominal and applying various annual increases in effectiveness) from purse seine fleets, in weight.

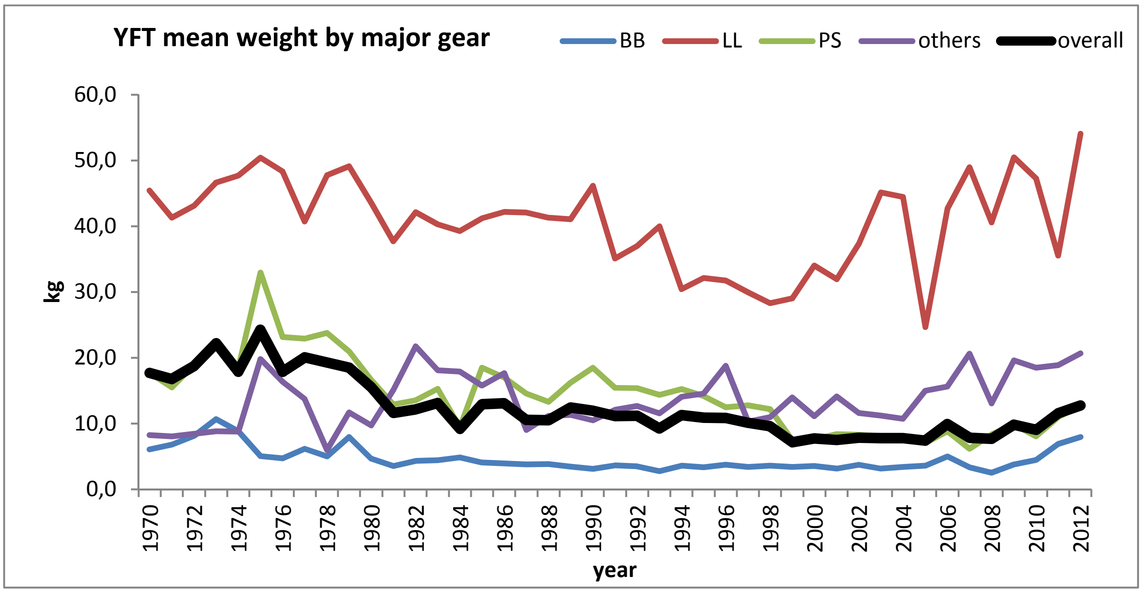


YFT-Figure 5. Yellowfin standardized catch rate trends from baitboat fleets, in weight.

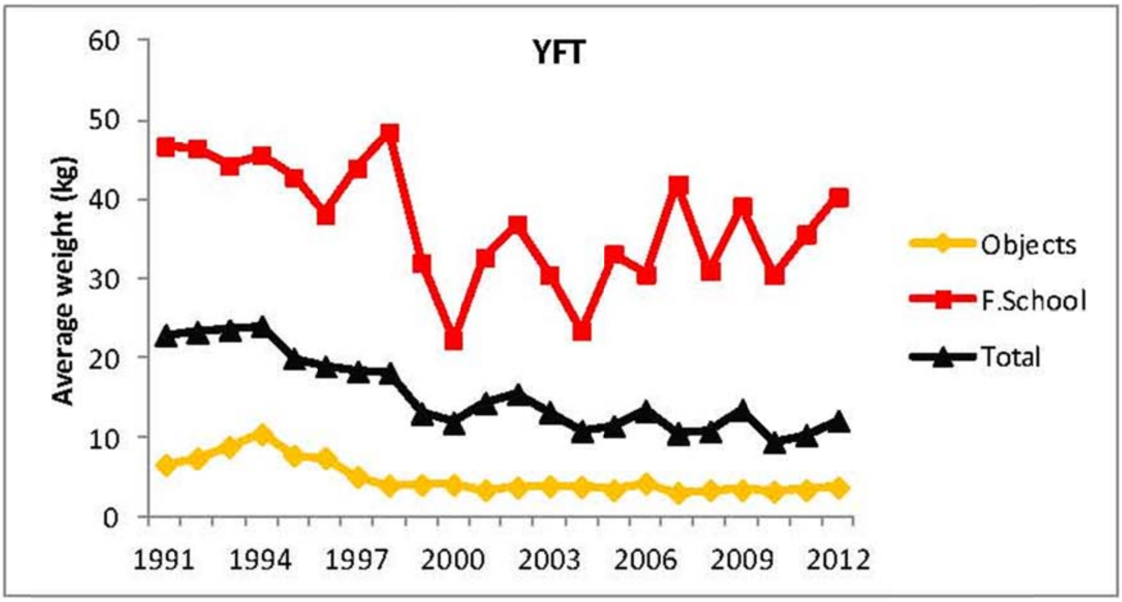


YFT-Figure 6. Yellowfin standardized catch rate trends from longline fleets, in weight (w) and numbers (n).

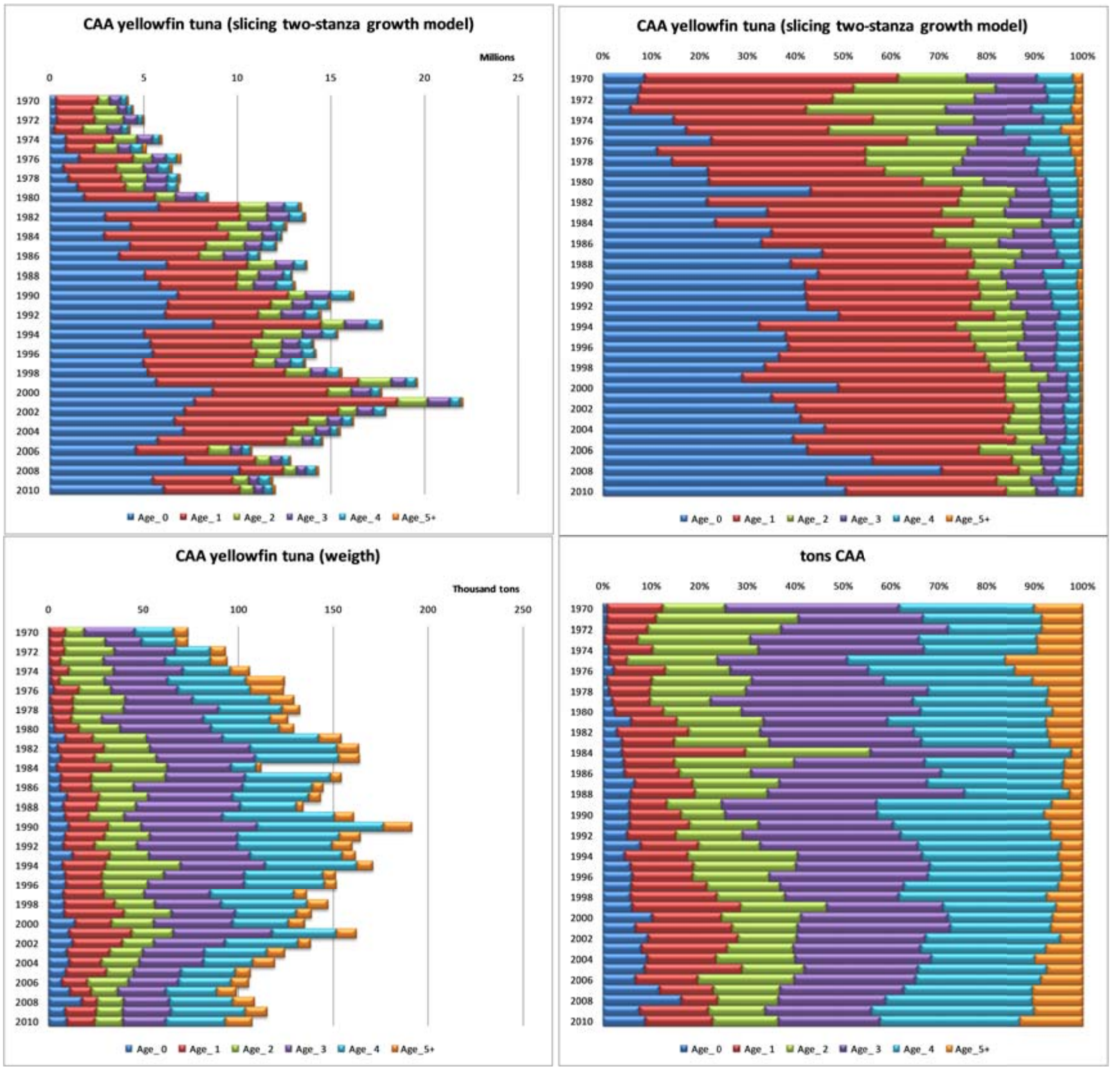
a)



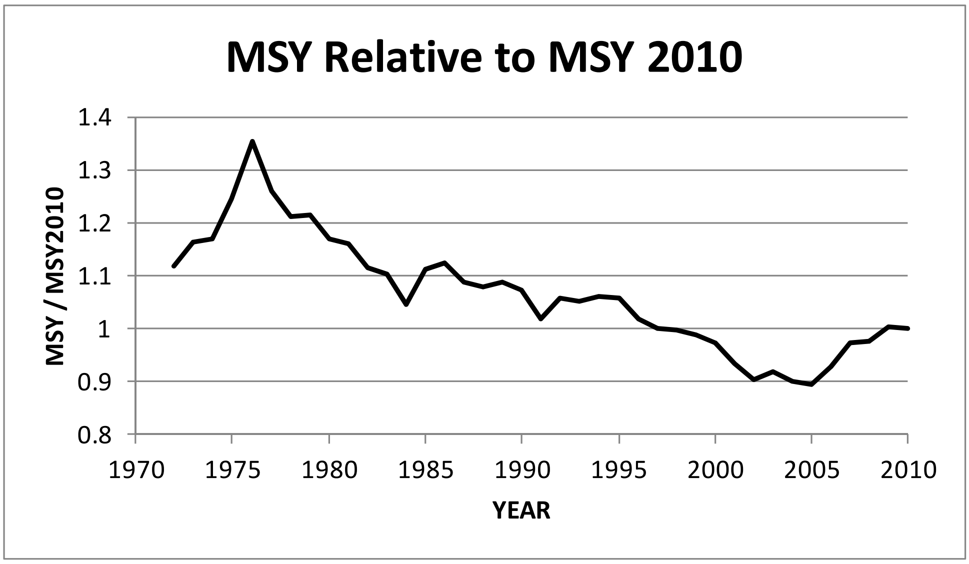
b)



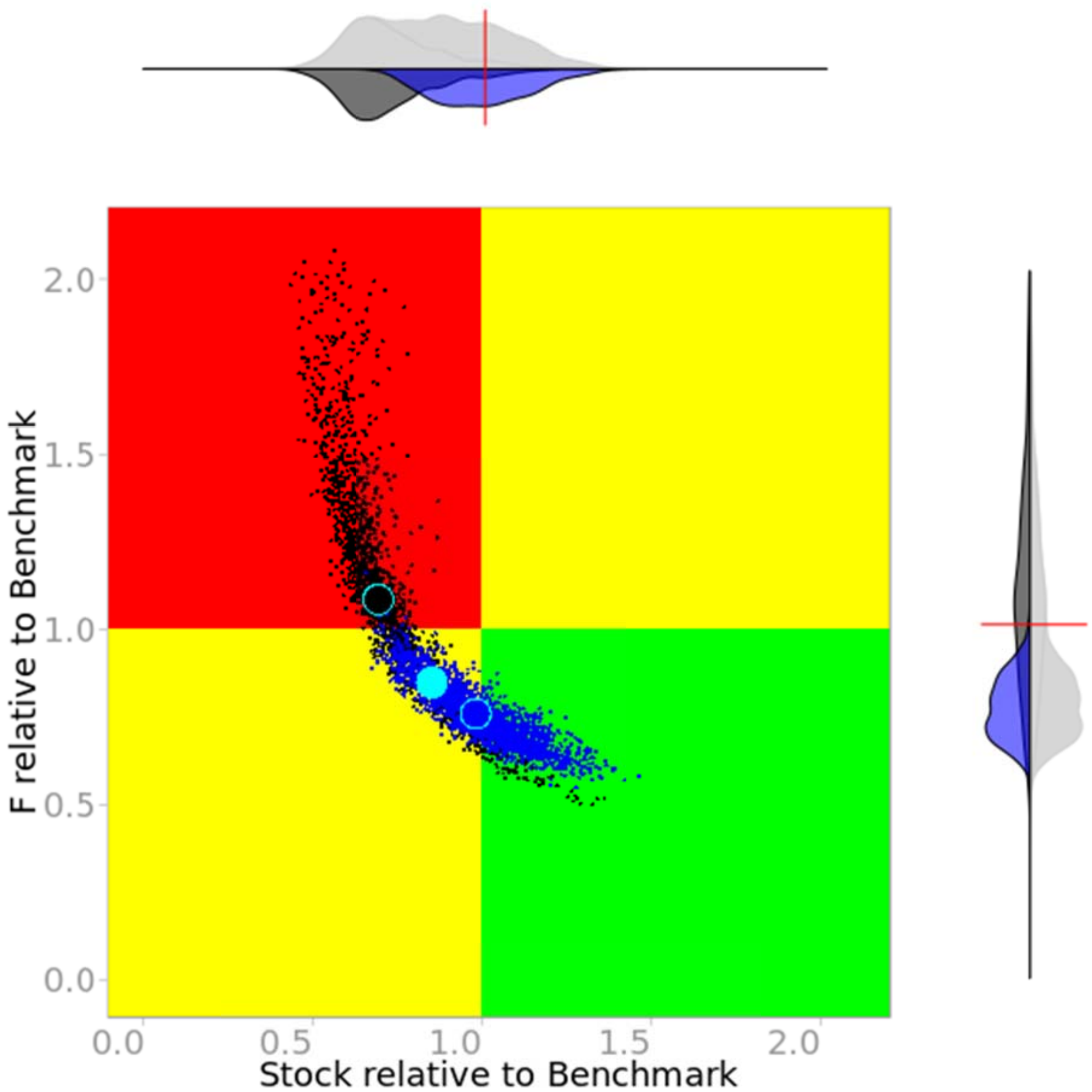
YFT-Figure 7. Trend of mean weight for yellowfin tuna based on the catch-at-size data a) by major fisheries (1970-2012) (NOTE: 2011 and 2012 are preliminary values based on some reported CAS series) and b) for European purse seiners (total) and separated between free schools and FAD associated schools (1991-2012).



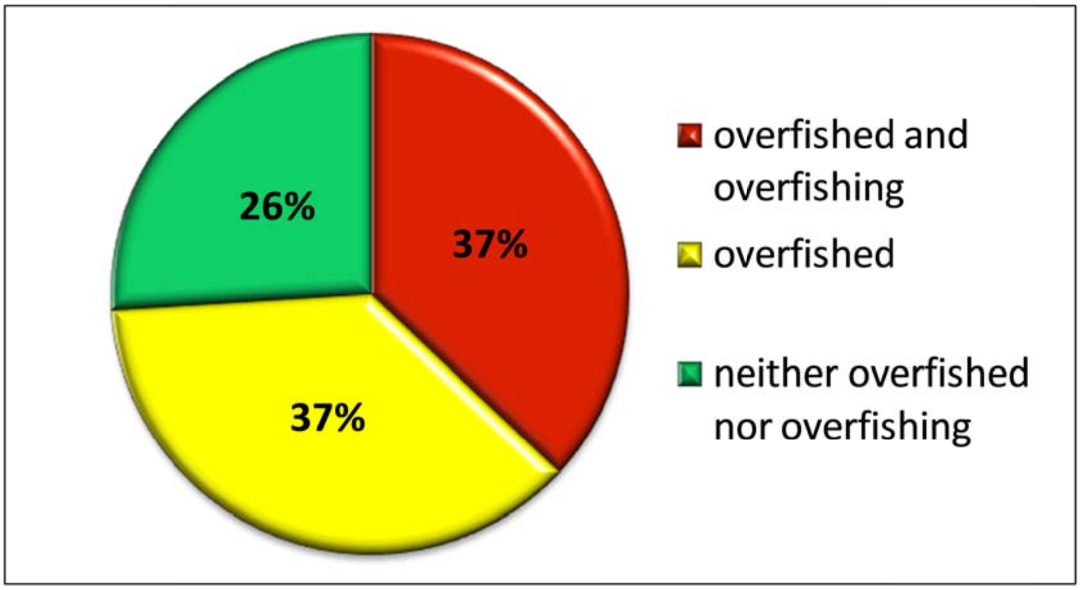
YFT-Figure 8. Distribution of Atlantic yellowfin catches by age (0-5+) in numbers of fish (top row) and in weight (bottom row) for 1970-2010.



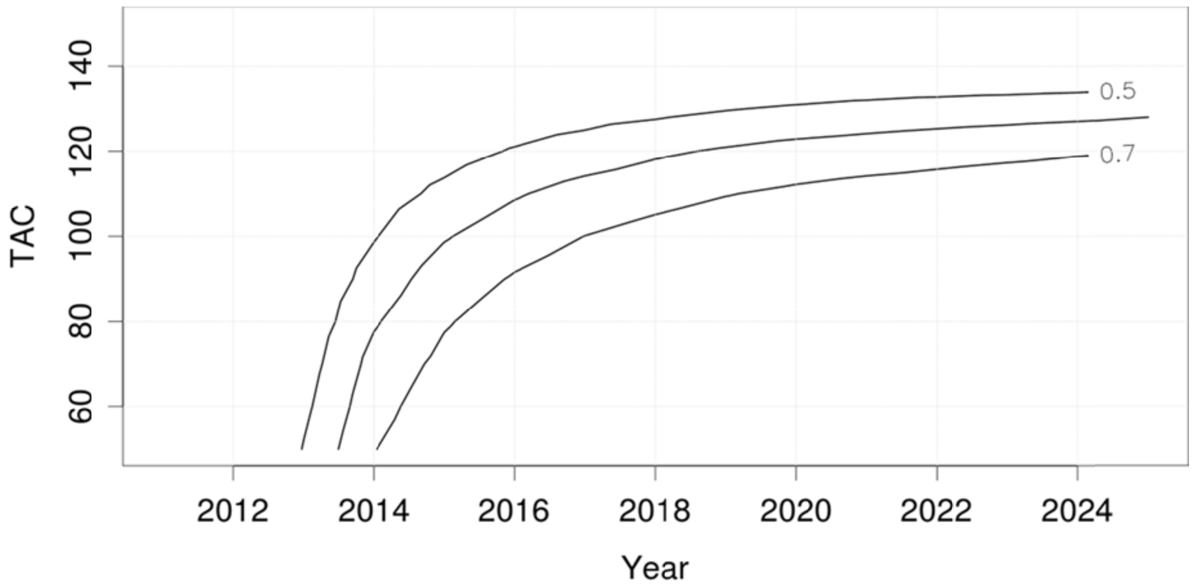
YFT-Figure 9. Estimates of historical MSY values, relative to the MSY estimated for 2010, for Atlantic yellowfin obtained through the age-structured model analysis, which considers the changes in selectivity that have occurred.



YFT-Figure 10. Current status (2010) of yellowfin tuna based on age structured and production models. The results are shown combined in a joint distribution. The clouds of points depict the bootstrap estimates of uncertainty for the most recent year (black=production model, blue=age structured). The median point estimate for each models results are shown in open (cyan) circles, and the median point estimate for the combined model results is shown as a solid (cyan) circle. The marginal density plots shown above and to the right of the main graph reflect the frequency distribution of the bootstrap estimates of each model with respect to relative biomass (top) and relative fishing mortality (right). The frequency distributions of the combined model bootstraps are shown in light blue. The red lines represent the benchmark levels (ratios equal to 1.0).



YFT-Figure 11. Summary of current status estimates for the yellowfin tuna stock based on age structured and production models making use of the catch and effort data through 2010.



YFT-Figure 12. Probability plot based on Kobe II matrices giving the probability that the biomass will exceed the level that will produce MSY and the fishing mortality will fall below the fishing mortality rate that would maintain MSY, in any given year, for various constant catch levels based on combined model results.

8.2 BET- BIGEYE TUNA

The last stock assessment for bigeye tuna was conducted in 2010 through a process that included a data preparatory meeting in April (Anon. 2011a) and an assessment meeting in July (Anon. 2011e). The last year fishery data used was 2009 but most indices of relative abundance stopped in 2008.

BET-1. Biology

Bigeye tuna are distributed throughout the Atlantic Ocean between 50ºN and 45ºS, but not in the Mediterranean Sea. This species swims at deeper depths than other tropical tuna species and exhibits extensive vertical movements. Similar to the results obtained in other oceans, pop-up tagging and sonic tracking studies conducted on adult fish in the Atlantic have revealed that they exhibit clear diurnal patterns: they are found much deeper during the daytime than at night. In the eastern tropical Pacific, this diurnal pattern is exhibited equally by juveniles and adults. In the western Pacific these daily patterns have been associated with feeding and are synchronized with depth changes in the deep scattering layer. Spawning takes place in tropical waters when the environment is favorable. From nursery areas in tropical waters, juvenile fish tend to diffuse into temperate waters as they grow larger. Catch information from surface gears indicate that the Gulf of Guinea is a major nursery ground for this species. Dietary habits of bigeye tuna are varied and prey organisms like fish, mollusks, and crustaceans are found in their stomach contents. Bigeye tuna exhibit relatively fast growth: about 105 cm fork length at age three, 140 cm at age five and 163 cm at age seven. Recently, however, reports from other oceans suggest that growth rates of juvenile bigeye are lower than those estimated in the Atlantic. bigeye tuna over 200 cm are relatively rare. Bigeye tuna become mature after they reach 100 cm at between 3 and 4 years old. Young fish form schools mixed with other tunas such as yellowfin tuna and skipjack. These schools are often associated with drifting objects, whale sharks and sea mounts. This association weakens as bigeye tuna grow larger. Natural mortality rates for juvenile fish, estimated from tagging data, are similar to those applied for other oceans. Various pieces of evidence, such as a lack of identified genetic heterogeneity, the time-area distribution of fish and movements of tagged fish, suggest an Atlantic-wide single stock for this species, which is currently accepted by the Committee. However, the possibility of other scenarios, such as north and south stocks, should not be disregarded.

BET-2. Fisheries indicators

The stock has been exploited by three major gears (longline, baitboat and purse seine fisheries) and by many countries throughout its range of distribution and ICCAT has detailed data on the fishery for this stock since the 1950s. Scientific sampling at landing ports for purse seine vessels of the EU and associated fleets have been conducted since 1980 to estimate bigeye tuna catches (**BET-Figure 1, BET-Table 1**). The size of fish caught varies among fisheries: medium to large for the longline fishery, small to large for the directed baitboat fishery, and small for other baitboat and for purse seine fisheries.

The major baitboat fisheries are located in Ghana, Senegal, the Canary Islands, Madeira and the Azores. The tropical purse seine fleets operate in the Gulf of Guinea in the East Atlantic and off Venezuela in the West Atlantic. In the eastern Atlantic, these fleets are comprised of vessels flying flags of Ghana, EU-France, EU-Spain and others which are mostly managed by EU companies. In the western Atlantic the Venezuelan fleet dominates the purse seine catch of bigeye tuna. While bigeye tuna is now a primary target species for most of the longline and some baitboat fisheries, this species has always been of secondary importance for the other surface fisheries. In the surface fishery, unlike yellowfin tuna, bigeye tuna are mostly caught while fishing on floating objects such as logs or man-made fish aggregating devices (FADs). During 2010-2012, landings in weight of bigeye tuna caught by the longline fleets represent 53%, purse seine fleets represent 32% and baitboat fleets represent 14% of the total bigeye tuna catch (**BET-Table 1**).

The total annual Task I catch (**BET-Table 1**, **BET-Figure 2**) increased up to the mid-1970s reaching 60,000 t and fluctuated over the next 15 years. In 1991, catch surpassed 95,000 t and continued to increase, reaching a historic high of about 133,000 t in 1994. Reported and estimated catch has been declining since then and fell below 100,000 t in 2001. This gradual decline in catch has continued, although with some fluctuations from year to year. The preliminary estimate for 2013 is 63,066 t.

After the historic high catch in 1994, all major fisheries exhibited a decline of catch while the relative share by each fishery in total catch remained relatively constant. These reductions in catch are related to declines in fishing fleet size (longline) as well as decline in CPUE (longline and baitboat). The number of active purse seiners declined by more than half from 1994 until 2006, but then increased since 2007 as some vessels returned from the Indian Ocean to the Atlantic. The number of European and associated purse seiners operating in 2009-2012 was similar to the number operating in 2003-2004 (**SKJ-Figure 9**).

IUU longline catches were estimated from Japanese import statistics but the estimates are considered uncertain. These estimates indicate a peak in unreported catches of 25,000 t in 1998 and a quick reduction thereafter. The Committee expressed concern that historical catches from illegal, unreported and unregulated (IUU) longliners that fly flags of convenience from the Atlantic might have been poorly estimated. The magnitude of this problem has not yet been quantified, because available statistical data collection mechanisms are insufficient to provide alternative means to calculate unreported catch.

Species composition and catch at size from the Ghanaian fleet of baitboats and purse seiners, has been thoroughly reviewed. This review has led to new estimates of Task I and Task II catch and effort and size for these fleets for the period 1973-2012. This revision has shown that catches of bigeye tuna by Ghanaian fleets were significantly lower than it was previously estimated by an average of 2,500 tons over the period 1996-2005 but greater for the period 2006-2012. Estimates for 2006-2012 are under review and are considered provisional.

Significant catches of small bigeye tuna continue to be channeled to local West African markets, predominantly in Abidjan, and sold as "*faux poissons*" in ways that make their monitoring and official reporting challenging. Monitoring of such catches has recently progressed through a coordinated approach that allows ICCAT to properly account for these catches and thus increase the quality of the basic catch and size data available for assessments.

Mean average weight of bigeye tuna decreased prior to 1998 but has been relatively stable, at around 10 kg during the last decade (**BET-Figure 3**). This weight, however, is quite different according to the fishing gear, around 62 kg for longliners, 7 kg for baitboats, and 4 kg for purse seiners. In the last ten years all longline fleets have shown increases in mean weight of bigeye tuna caught, with the average longline-caught fish increasing from 40 kg to 60 kg between 1999 and 2010. During the same period purse seine-caught bigeye tuna had weights between 3 kg and 4 kg. Bigeye tuna caught in free schools are more than two times heavier than those caught around FADs. This difference in weight between these two fishing modes is even more pronounced since 2006. Since FAD catches began being identified separately in 1991 by EU and associated purse seine fleets, the majority (75%-80%) of bigeye tuna are caught in sets associated with FADs. Similarly baitboat-caught bigeye tuna weighted between 6 and 10 kg over the same period, showing greater inter-annual variability in fish weight than longline or purse seine caught fish.

BET-3. State of the stock

The 2010 stock assessment was conducted using similar assessment models to those used in 2007 (Anon. 2008b) but with updated data and a few new relative abundance indices and data. In general, data availability has continued to improve, notably with the addition of relative abundance indices for an increasing number of fleets. There are still missing data on detailed fishing and fish size from certain fleets. In addition, there are a number of data gaps on the activities of IUU fleets (e.g., size, location and total catch). All these problems forced the committee to assume catch-at-size for an important part of the overall catch.

Three types of indices of abundance were used in the assessment. A number of indices were directly developed by national scientists for selected fleets for which data was available at greater spatial and or temporal resolution to that available in the ICCAT databases. These indices represented data for seven different fleets, all of them longline fleets, except for one baitboat fleet (**BET-Figure 4**). Other indices were estimated by the Committee from data available within the ICCAT databases. These two types of indices were used for age-structured assessment models. Finally, a series of combined indices (**BET-Figure 6**) were calculated by the committee by synthesizing the information existing in individual indices for the seven fleets mentioned above. The later were used to fit production models.

Consistent with previous assessments of Atlantic bigeye tuna, the results from non-equilibrium production models are used to provide the basic characterization of the status of the resource. Results were sensitive to the combined abundance index trends assumed. As the relative likelihoods of each trend could not be estimated, results were developed from the joint distribution of model run results using each of three alternative combined indices. The plausible range of MSY estimated from the joint distribution using three types of abundance indices was between 78,700 and 101,600 tons (80% confidence limits) with a median MSY of 92,000 t. In addition, these estimates reflect the current relative mixture of fisheries that capture small or large bigeye tuna; MSY can change considerably with changes in the relative fishing effort exerted by surface and longline fisheries.

Historical estimates show large declines in biomass and increases in fishing mortality, especially in the mid 1990s when fishing mortality exceeded F_{MSY} for several years. In the last five or six years there have been possible increases in biomass and declines in fishing mortality (**BET-Figure 7**). The biomass at the beginning of 2010 was estimated to be at between 0.72 and 1.34 (80% confidence limits) of the biomass at MSY, with a median value of 1.01 and the 2009 fishing mortality rate was estimated to be between 0.65-1.55 (80% confidence limits) with a median of 0.95. The replacement yield for the year 2011 was estimated to be about MSY.

The Committee notes, as it did in previous assessments, that there is considerable uncertainty in the assessment of stock status and productivity for bigeye tuna. There are many sources of uncertainty including which method represents best the dynamics of the stock, which method is supported more by the available data, which relative abundance indices are appropriate to be used in the assessment, and what precision is associated with the measurement/calculation of each of the model inputs. In general, data availability has improved since 2007 but there is still a lack of information regarding detailed fishing effort and catch-at-size data from certain fleets. This, combined with the lack of detailed historical information on catch and fishing activities of IUU fleets (e.g., size, location and total catch), forces the Committee to make many assumptions about the catch-at-size for an important part of the overall catch. In order to represent this uncertainty the Committee decided to combine sensitivity runs from a range of method/data combinations. There are differences in the estimates of management benchmarks, including the estimates of the current biomass and fishing mortality, depending on both the method used as well as the input data used (**BET-Figure 8**).

Over the recent period, 2003-2013, neither the catch (**BET Figure 2**), nor the average fish size (**BET Figure 3**), nor the two updated relative abundance indices (**BET Figure 5**) have a clearly increasing or decreasing pattern**,** therefore there is no clear evidence that stock status has substantially changed since it was last evaluated in 2010.

BET-4. Outlook

The outlook for Atlantic bigeye tuna, considering the quantified uncertainty in the 2010 assessment, is presented in **BET-Table 2** and **BET-Figure 9**, which provide a characterization of the prospects of the stock achieving or being maintained at levels consistent with the Convention Objective, over time, for different levels of future constant catch. It is noteworthy that the modeled probabilities of the stock being maintained at levels consistent with the Convention Objective over the next five years are about 60% for a future constant catch of 85,000 t. Higher odds of rebuilding to and maintaining the stock at levels that could produce MSY are associated with lower catches and lower odds of success with higher catches than such constant catch (**BET-Figure 10**). It needs to be noted that projections made by the Committee assume that future constant catches represent the total removals from the stock, and not just the TAC. ICCAT established a TAC of 85,000 t for 2010 onwards through Rec. 09-01], and [Rec. 11-01]. Note, that because this TAC does not affect all countries that can land bigeye tuna, in theory the total catch removed from the stock could exceed 85,000 t. Furthermore, any future changes in selectivity due to changes in the ratios of relative mortality exerted by the different fleets - such as an increase in the relative mortality of small fish - will change and add to the uncertainty of these projections.

BET-5. Effect of current regulations

During the period 2005-2008 an overall TAC for major countries was set at 90,000 t. The TAC was later lowered [Rec. 09-01 and later modified by Rec. 11-01] to 85,000 t. Estimates of reported catch for 2005-2013 (**BET-Table 1**) have been always lower than 85,000 t with the exception of 2011. Note, however, that catches for 2006-2012 are still under revision.

Concern over the catch of small bigeye tuna partially led to the establishment of spatial closures to surface fishing gear in the Gulf of Guinea [Recs. 04-01,08-01 and 11-01] The Committee examined trends in average bigeye tuna weight as a broad indicator of the effects of such closures. Although there have been significant changes in the average size of bigeye tuna caught since 2004 by certain fleets, such as increases in average size of fish caught by purse seiners operating in free schools and by longliners, it cannot be quantified whether changes are the result of spatial closures. The Committee also analyzed the ICCAT conventional tag database for evidence of an effect of spatial closures. Again, this analysis failed to provide any conclusive evidence in support of the hypothesis that spatial closures led to a reduction in the fishing mortality of juvenile bigeye tuna. The Committee notes that the closure implemented in Rec. 11-01 may be more effective than those implemented before by Rec. 04-01 and Rec 08-01.

BET-6. Management recommendations

Projections indicate that catches reaching 85,000 t or less will promote stock growth and further increase the future chances that the stock will be at a level that is consistent with the convention objectives. The Commission should be aware that if major countries were to take the entire catch limit set under Recommendation 11-01 and other countries were to maintain recent catch levels, then the total catch could well exceed 100,000 t. The Committee recommends that the Commission sets a TAC at a level that would provide a high probability of maintaining at or rebuilding to stock levels consistent with the Convention objectives. In considering the uncertainty in assessment results, the Committee believes that a future total catch of 85,000 t or less would provide such high probability.

The assessment and subsequent management recommendations are conditional on the reported and estimated history of catch for bigeye tuna in the Atlantic. The Committee reiterates its concern that unreported and/or misidentified bigeye tuna catches, from the Atlantic continue to make the assessment of stock status more uncertain than if catches were more comprehensively reported by all CPCs. There is a need to expand current statistical data collection mechanisms to fully investigate any evidence of significant catches that have been unreported.

ATLANTIC BIGEYE TUNA SUMMARY	
Maximum Sustainable Yield	78,700-101,600 t (median 92,000 t) [1,2]
Current (2013) Yield	63,066 t [3]
Replacement Yield (2011)	64,900 – 94,000 (median 86,000 t) [1,2]
Relative Biomass (B_{2009}/B_{MSY})	0.72-1.34 (median 1.01) [1,2]
Relative Fishing Mortality F_{2009}/F_{MSY}	0.65-1.55 (median 0.95)[1,2]
Conservation & management measures in effect:	[Rec. 11-01] − Total allowable catch for 2012-2015 is set at 85,000 t for Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities. − Limits on numbers of fishing vessels less than the average of 1991 and 1992. − Specific limits of number of longline boats; China (45), Chinese Taipei (75), Philippines (11), Korea (14), EU (269) and Japan (245). − Specific limits of number of purse seine boats; Panama (3), EU (34) and Ghana (13). − No fishing with natural or artificial floating objects during January or February in the area encompassed by the African coast, 10º S, 5ºE and 5ºW.

[1] Production model (Logistic) results represent median and 80% confidence limits based on catch data for (1950-2009) and the joint distribution of bootstraps using each of three alternative combined indices.
[2] 80% confidence limits, MSY and replacement yield rounded to 100 t.
[3] Reports for 2013 reflect most recent data but should be considered provisional.

BET-Table 1. Estimated catches (t) of bigeye tuna (*Thunnus obesus*) by area, gear and flag.

		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL	A+M	78463	84938	96338	99391	112828	134071	127293	120614	109843	107388	121184	103339	91548	75791	87573	90301	67319	64636	72867	67423	84365	84528	88196	78456	63066
Landings	Bait boat	12672	18280	17750	16248	16467	20361	25576	18300	21276	18999	22301	12365	14540	8523	11450	20812	13058	13686	12703	9061	14496	10000	15294	12099	7730
	Longline	58389	56537	61556	62403	62871	78934	74852	74930	68310	71856	76527	71193	55265	46438	54466	48396	38035	34182	46232	41063	43985	42925	38211	38679	31727
	Other surf.	644	293	437	607	652	980	567	357	536	434	1377	1226	1628	1138	1340	1301	717	553	448	225	273	461	977	678	740
	Purse seine	6759	9828	16595	20133	32838	33797	26297	27027	19721	16098	20979	18554	20116	19692	20317	19792	15509	16214	13484	17074	25612	31142	33714	26998	22868
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Landings	Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	476	75	0	0	0	452	410	320	4069	1
	Argentina	17	78	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Barbados	0	0	0	0	0	0	0	0	24	17	18	18	6	11	16	19	27	18	14	14	7	12	7	15	11
	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	60	70	234	249	1218	1242	1336
	Benin	8	10	10	7	8	9	9	9	30	13	11	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Brazil	512	591	350	790	1256	601	1935	1707	1237	644	2024	2768	2659	2582	2455	1496	1081	1479	1593	958	1189	1151	1799	1400	820
	Cambodia	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Canada	31	10	26	67	124	111	148	144	166	120	263	327	241	279	182	143	187	196	144	130	111	103	137	166	197
	Cape Verde	100	52	151	105	85	209	66	116	10	1	1	2	0	1	1	1	1093	1407	1248	446	553	554	1037	713	2204
	China PR	0	0	0	0	70	428	476	520	427	1503	7347	6564	7210	5840	7890	6555	6200	7200	7399	5686	4973	5489	3720	3231	2371
	Chinese Taipei	940	5755	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	18483	21563	17717	11984	2965	12116	10418	13252	13189	13732	10805	10316
	Congo	14	15	12	12	14	9	9	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Cuba	87	62	34	56	36	7	7	5	0	0	0	0	0	16	16	0	0	0	0	0	0	0	0	0	
	Curaçao	0	0	0	0	0	0	0	1893	2890	2919	3428	2359	2803	1879	2758	3343	0	416	252	1721	2348	2688	3441	2890	1964
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	790	576	47	507	635
	Dominica	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	
	EU.España	8263	10355	14705	14656	16782	22096	17849	15393	12513	7110	13739	11250	10133	10572	11120	8365	7762	7542	6724	7684	12216	11483	13316	11012	10166
	EU.France	3261	5023	5581	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293	3940	2926	3038	3063	1655	1177	2463	3450	3901	3948	3278
	EU.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	33	0	0	0	0	0	0	0	
	EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EU.Portugal	5295	6233	5718	5796	5616	3099	9662	5810	5437	6334	3314	1498	1605	2590	1655	3204	4146	5071	5505	3422	5605	3682	6920	6128	4088
	EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	32	0	0	0	
	FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	28	6	0	2	3	0	2	0	0	0
	Faroe Islands	0	0	0	0	0	0	0	0	0	0	11	8	0	0	0	0	0	0	0	0	0	0	0	0	
	Gabon	0	0	0	0	1	87	10	0	0	0	184	150	121	0	0	0	0	0	0	0	0	0	0	0	
	Ghana	2158	5031	4090	2866	3577	4738	5517	4751	10165	10155	10416	5269	9214	5611	8646	17744	8860	8139	6531	7963	12778	15123	14769	8974	2786
	Grenada	0	0	65	25	20	10	10	0	1	0	0	0	0	0	0	0	0	0	10	31	0	0	0	0	
	Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	998	949	836	998	913	1011	282	262	163
	Guinea Ecuatorial	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	50	0	58	0	
	Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	328	322	1516	1429
	Honduras	0	0	0	44	0	0	61	28	59	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Iceland	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Japan	39540	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24605	18087	15306	19572	18509	14026	15735	17993	16684	16395	15205	12306	15390	13414
	Korea Rep.	7896	2690	802	866	377	386	423	1250	796	163	124	43	1	87	143	629	770	2067	2136	2599	2134	2646	2762	1908	1151
	Liberia	206	16	13	42	65	53	57	57	57	57	57	57	57	57	57	0	0	0	0	0	0	0	0	0	
	Libya	0	0	0	508	1085	500	400	400	400	400	400	400	31	593	593	0	0	4	0	0	0	0	0	0	
	Maroc	0	0	0	0	0	0	0	0	0	0	700	770	857	913	889	929	519	887	700	802	795	276	300	300	308
	Mexico	0	0	0	0	1	4	0	2	6	8	6	2	2	7	4	5	4	3	3	1	1	3	1	1	2
	Mixed flags (FR+ES)	388	421	1071	910	1256	1132	942	403	574	573	725	1022	605	278	739	787	0	0	0	0	0	0	0	0	
	NEI (ETRO)	93	959	1221	2138	4594	5034	5137	5839	2746	1685	4011	2285	3027	2248	2504	1387	294	81	0	0	0	0	0	0	
	NEI (Flag related)	4650	5856	8982	6151	4378	8964	10697	11862	16569	24896	24060	15092	8470	531	0	0	0	0	0	0	0	0	0	0	
	NEI (UK.OT)	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Namibia	0	0	0	0	0	715	29	7	46	16	423	589	640	274	215	177	307	283	41	146	108	181	289	376	135
	Nigeria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	
	Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	3157	5258	7446	9991	10138	13234	9927	4777	2098	1252	580	952	89	63	0	1521	2310	2415	2922	2263	2405	3047	3462	1694	2774
	Philippines	0	0	0	0	0	0	0	0	0	1154	2113	975	377	837	855	1854	1743	1816	2368	1874	1880	1399	1267	532	1323
	Russian Federation	0	0	0	0	0	0	0	13	38	4	8	91	0	0	0	0	1	1	26	73	43	0	0	0	
	S. Tomé e Príncipe	8	6	3	4	4	3	6	4	5	6	5	4	4	4	4	11	6	4	0	92	94	97	0	0	
	Senegal	0	0	15	5	9	126	237	138	258	730	1473	1131	1308	565	474	561	721	1267	805	926	1042	858	239	230	646
	Seychelles	0	0	0	0	0	0	0	0	0	0	0	58	0	162	0	0	0	0	0	0	0	0	0	0	
	Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	0	0	0	0	0	0	1088	0	
	South Africa	367	296	72	43	88	79	27	7	10	53	55	249	239	341	113	270	221	84	171	226	159	145	153	47	435
	St. Vincent and Grenadines	0	0	0	1	3	0	0	4	2	2	1	1216	506	15	103	18	0	114	567	171	292	396	38	25	15
	Sta. Lucia	0	0	0	1	0	0	0	0	0	0	0	0	1	2	2	0	2	0	0	0	0	0	0	0	
	Togo	12	12	6	2	86	23	6	33	33	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Trinidad and Tobago	19	57	263	0	3	29	27	37	36	24	19	5	11	30	6	5	9	12	27	69	56	40	33	33	37
	U.S.A.	847	623	975	813	1090	1402	1209	882	1138	929	1263	574	1085	601	482	416	484	991	527	508	515	571	722	867	880
	U.S.S.R.	424	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	UK.Sta Helena	1	3	3	10	6	6	10	10	12	17	6	8	5	5	0	0	0	25	18	28	17	11	190	51	19
	UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	Uruguay	55	38	20	56	48	37	80	124	69	59	28	25	51	67	59	40	62	83	22	27	201	23	15	2	30
	Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	109	52	132	91	34	42	39	23	35
	Venezuela	115	161	476	270	809	457	457	189	274	222	140	221	708	629	516	1060	243	261	318	122	229	85	264	98	94
Discards	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

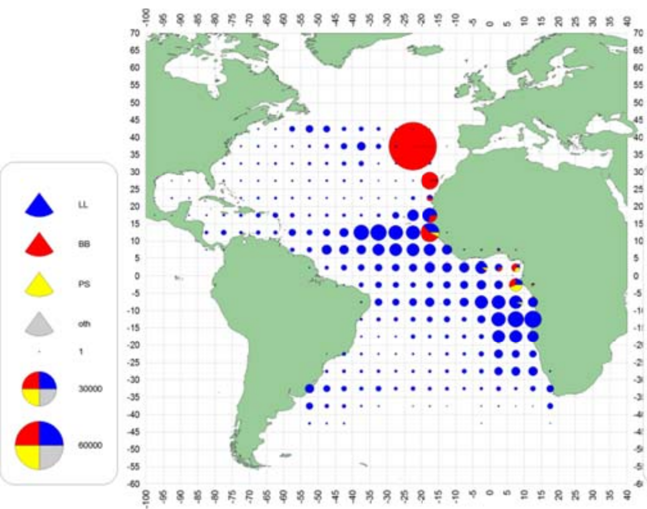
The total Ghanaian catches of the table, between 2006 and 2012, are preliminary scientific estimations and do not correspond to the official catches (t) reported by Ghana (BET total [2006 to 2012]: 9141, 13267, 9269, 10554, 6769, 4440, 2914).

Angola & Sierra Leone official catches were not accepted by the WG because of the inconsistencies found when compared with historical data.

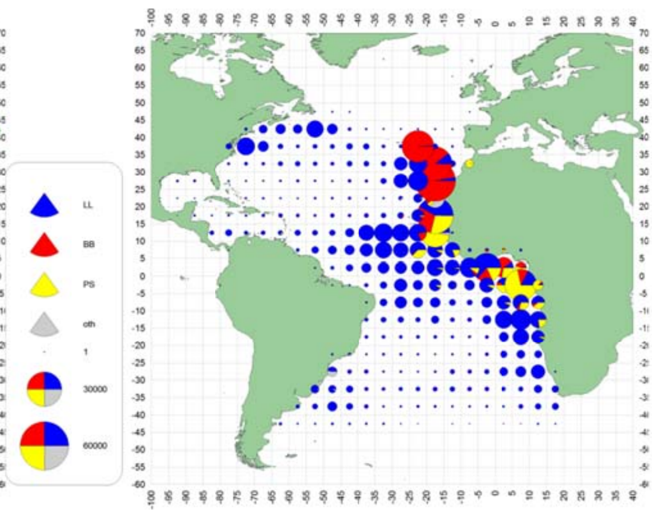
Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

BET-Table 2. Estimated probabilities of the Atlantic bigeye tuna stock being above B_{MSY} and below F_{MSY} in a given year for TAC level ('000 t), based upon the 2010 assessment outcomes.

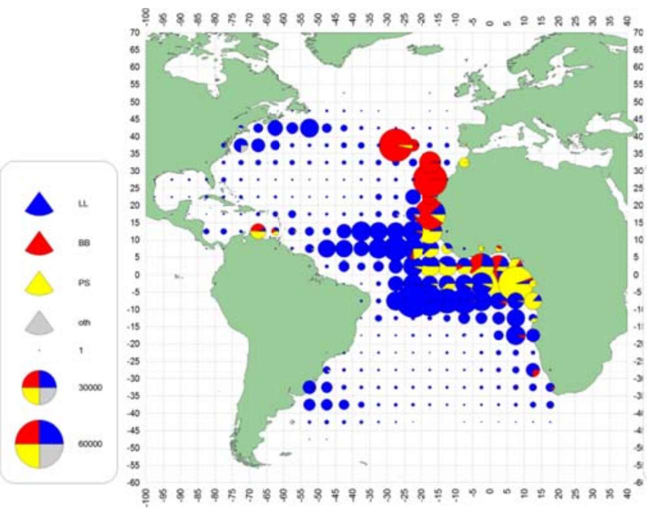
	Year									
TAC	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
60	54%	63%	71%	75%	79%	82%	84%	85%	86%	87%
70	54%	61%	67%	71%	74%	76%	77%	79%	80%	81%
80	54%	58%	62%	66%	68%	70%	71%	72%	73%	74%
90	54%	57%	58%	60%	61%	62%	62%	63%	63%	64%
100	53%	54%	54%	54%	54%	54%	54%	54%	55%	55%
110	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%



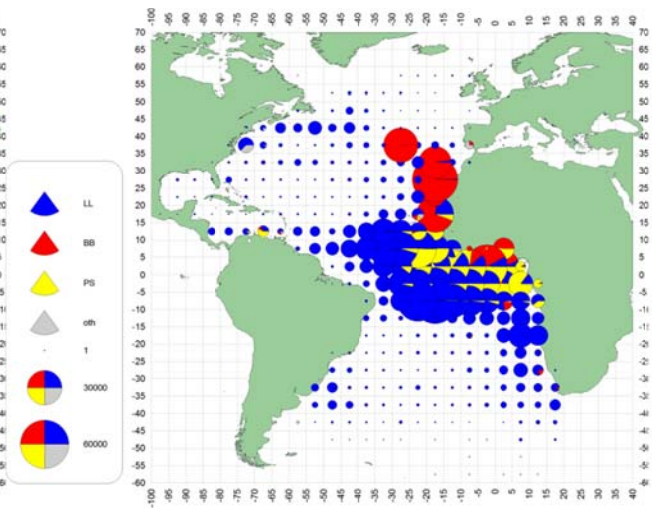
a. BET(1960-69)



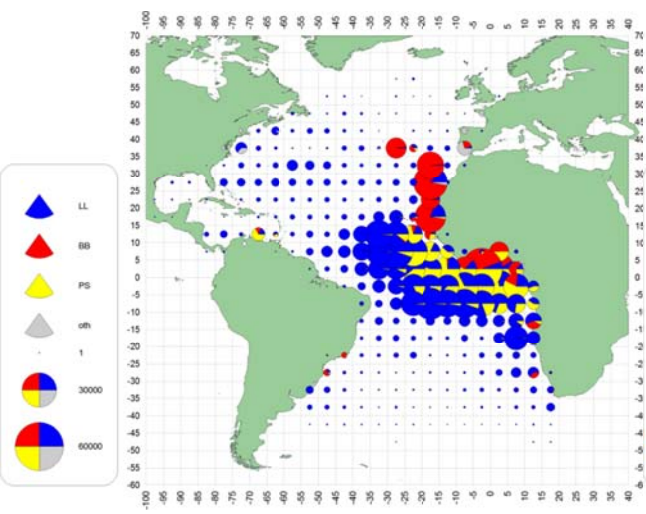
b. BET(1970-79)



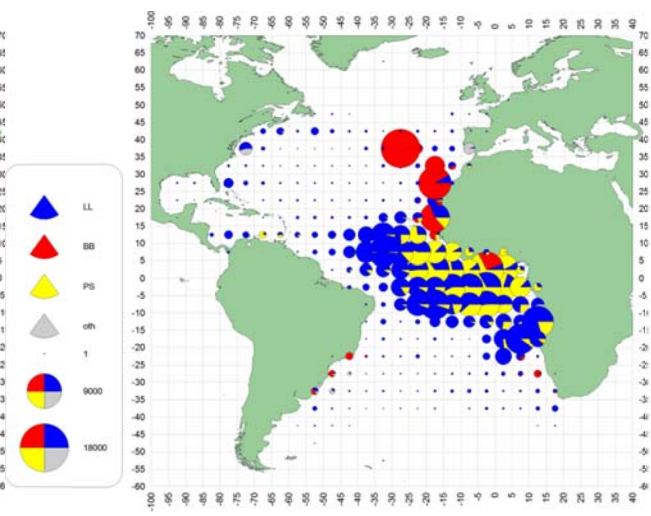
c. BET(1980-89)



d. BET(1990-99)

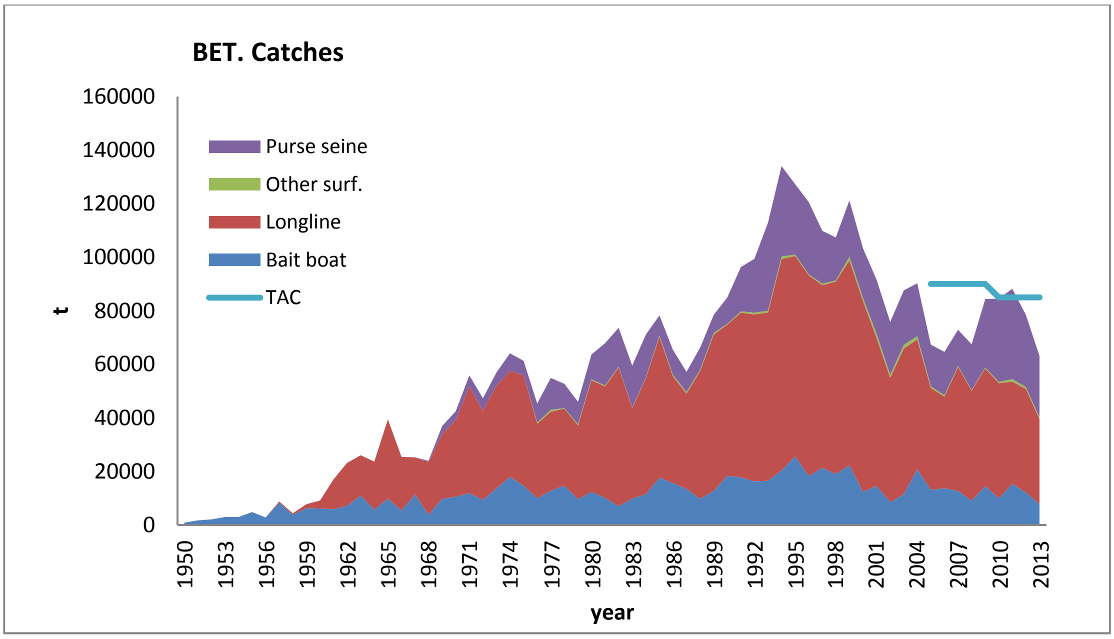


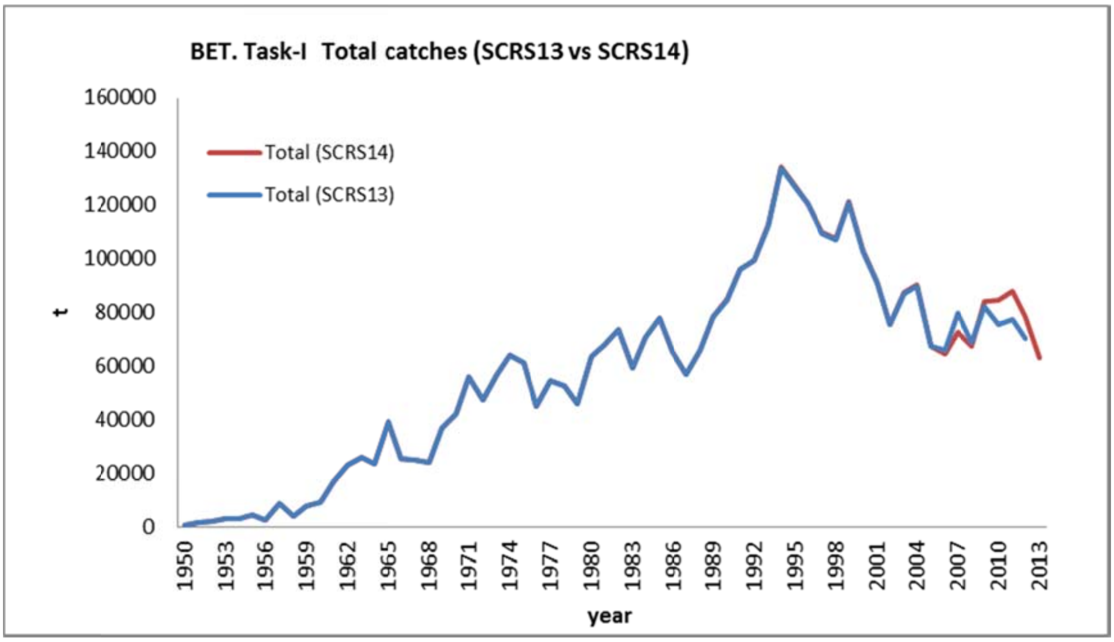
e. BET (2000-09)



f. BET(2010-12)

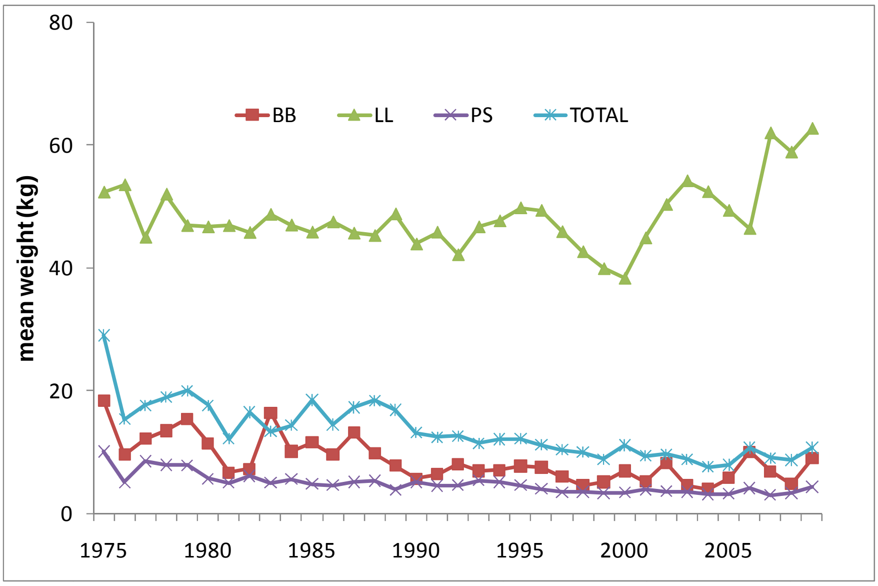
BET-Figure 1 [a-f]. Geographical distribution of the bigeye tuna catch by major gears and decade. The maps (a-e) are scaled to the maximum catch observed during 1960-2009. Map (f) is scaled to the maximum catch observed from 2010-2012.



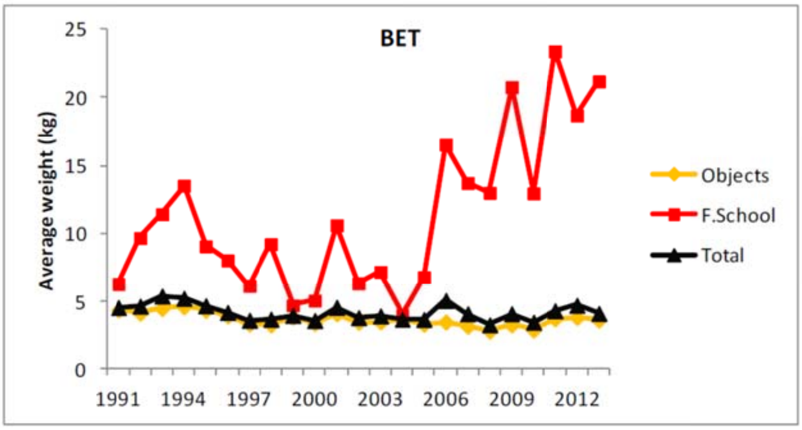


BET-Figure 2. Bigeye estimated and reported catches for all the Atlantic stock (t). The value for 2013 represents preliminary estimates because some countries have yet to provide data for this year.

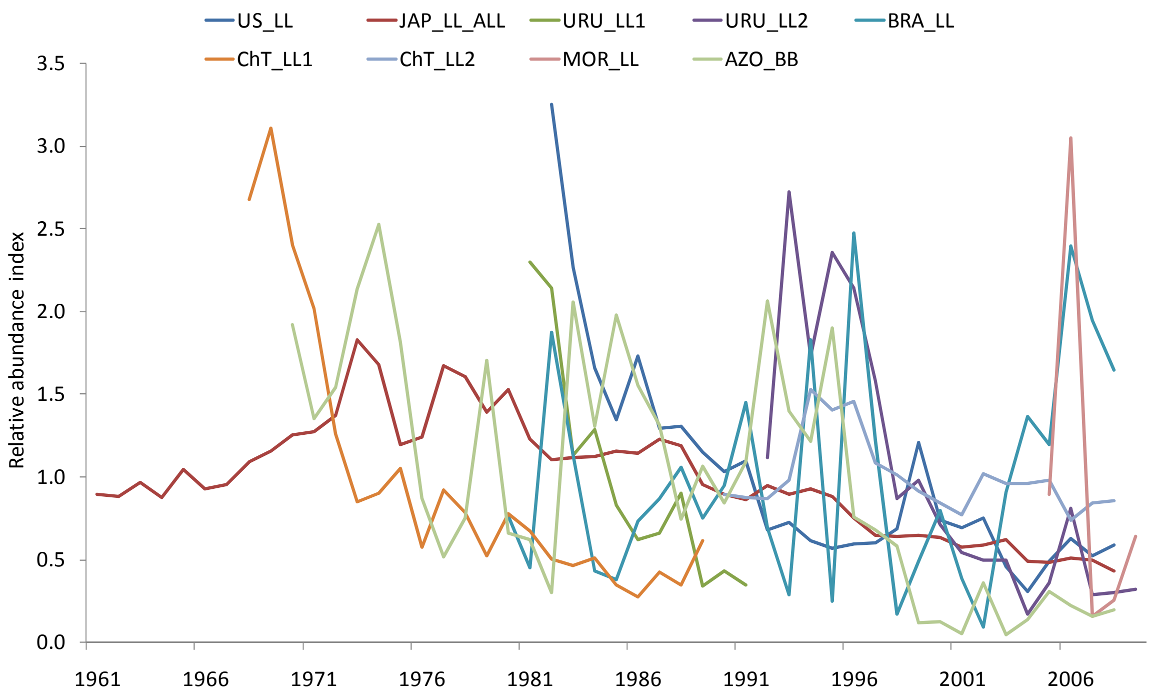
a)



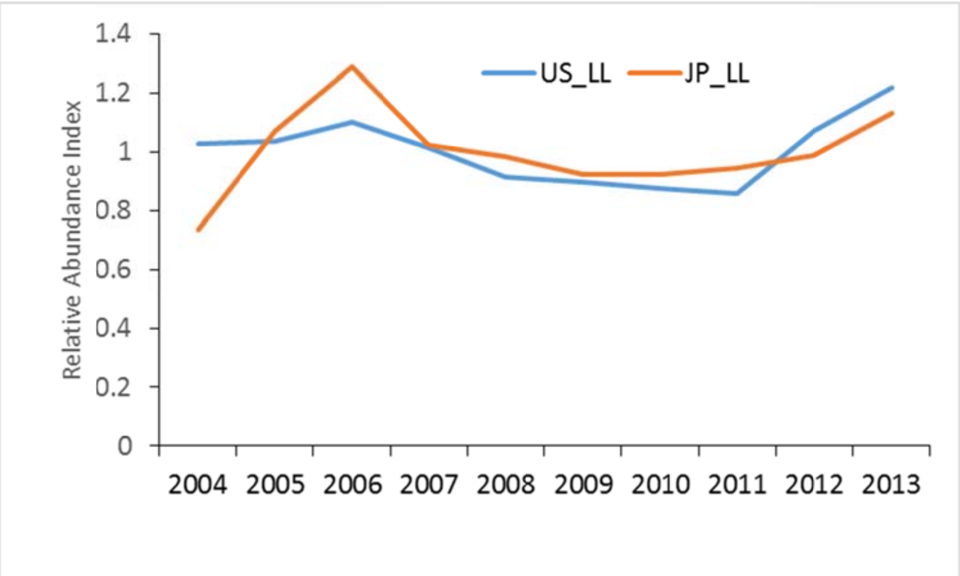
b)



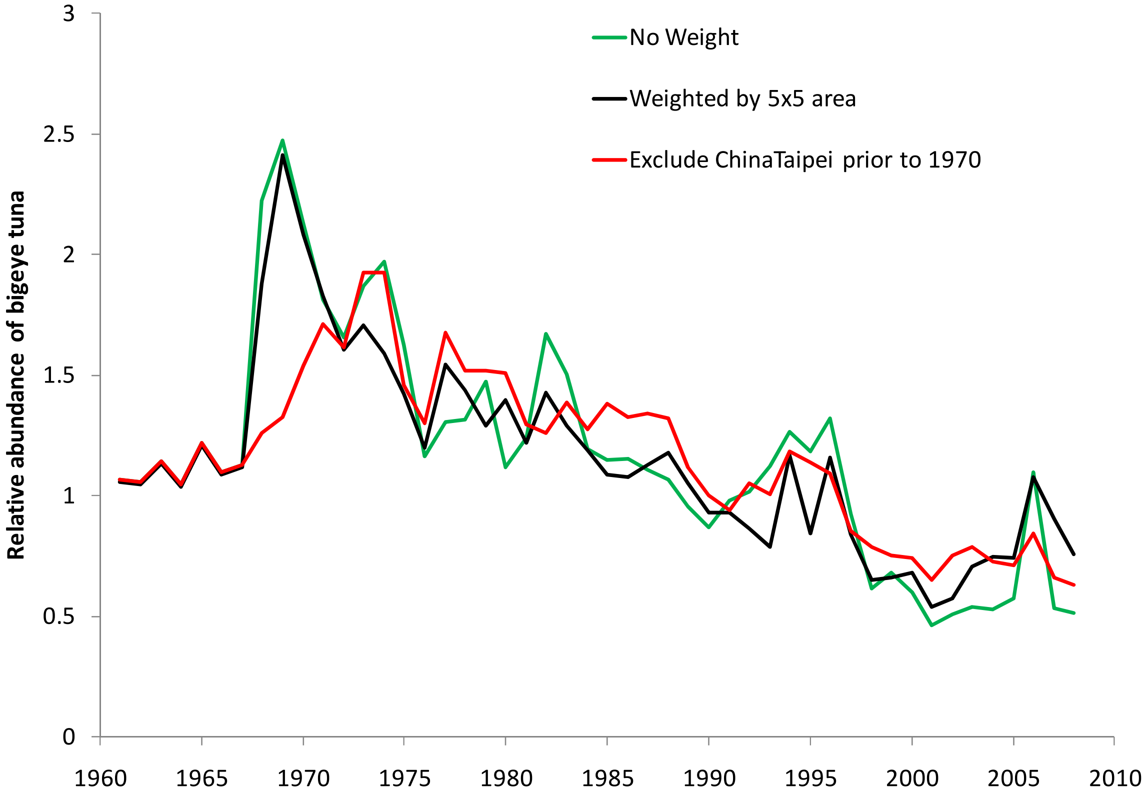
BET-Figure 3. Trend of mean weight for bigeye based on the catch-at-size data a) 1975-2009 by major fisheries (BB=Baitboats, LL=Longlines, PS=Purse seine) and b) 1991-2013 for European purse seiners and separated between free schools (F School) and FAD associated schools (Objects).



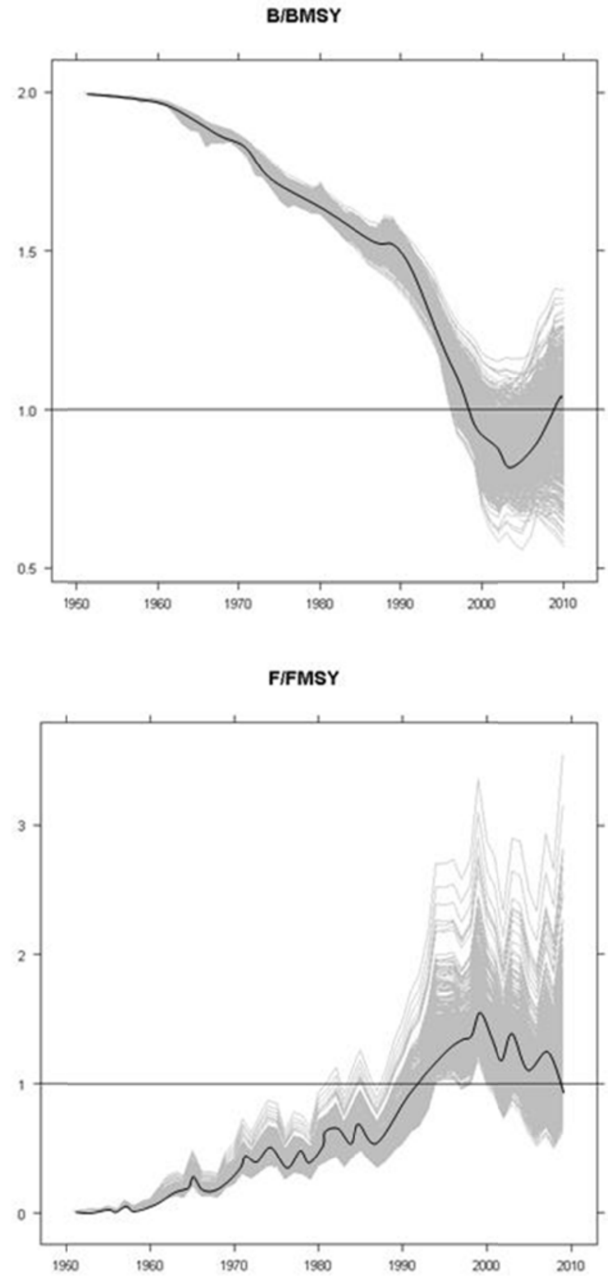
BET-Figure 4. Relative abundance indices for bigeye tuna available during last assessment. AZO_BB Azores Baitboat, BRA_LL, Brazil longline, ChT_LL1, Chinese Taipei longline 1968-1989, ChT_LL2 Chinese Taipei longline 1990-2008, JAP_LL Japanese longline, MOR_LL Morocco longline, URU_LL1 Uruguay longline 1981-1991, URU_LL2 Uruguay longline 1992-2008, US_LL USA longline.



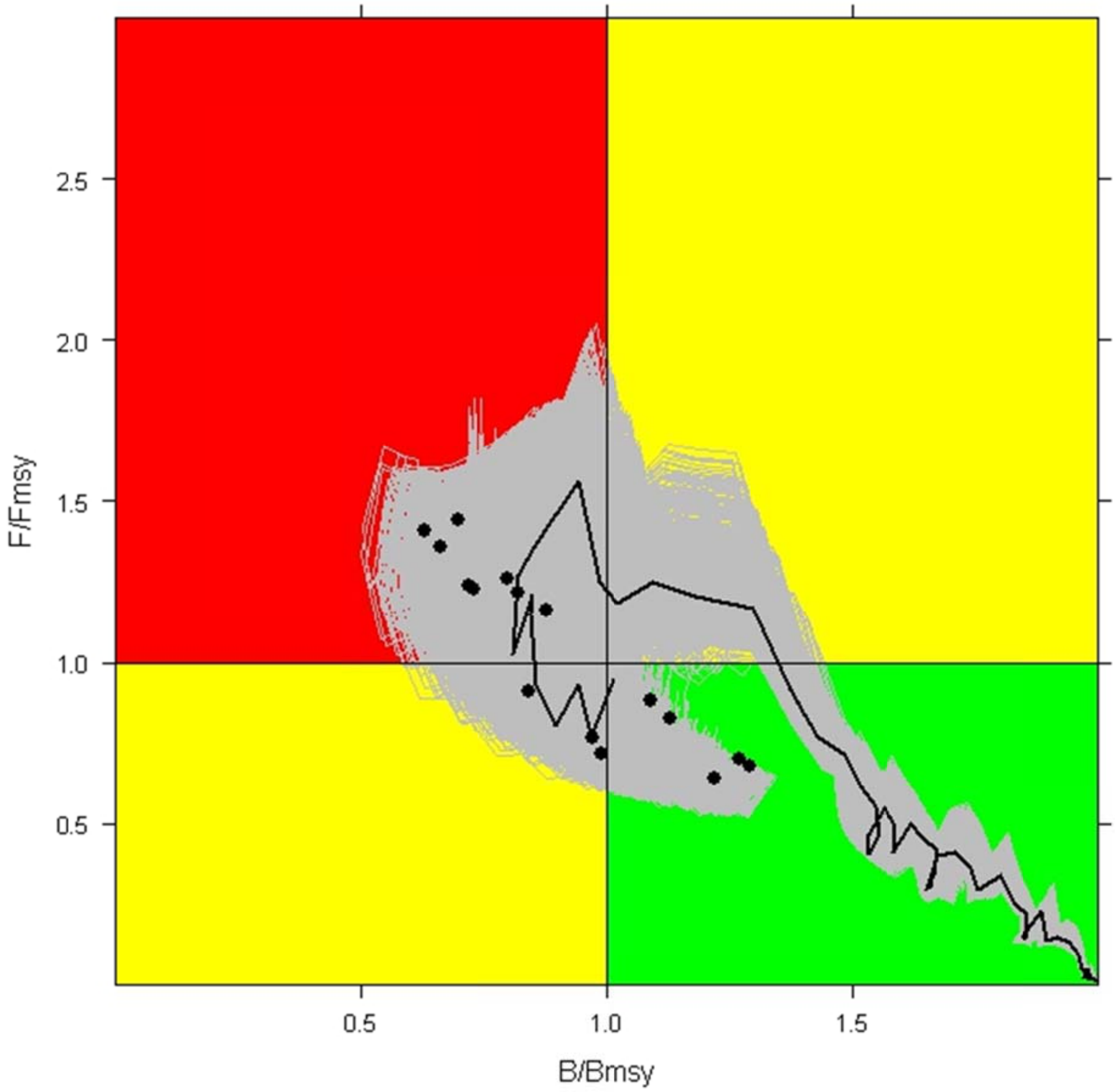
BET-Figure 5. Available relative abundance indices based on cpue in numbers of bigeye tuna by 1000 hooks for the most recent period 2004-2013. JP_LL Japanese longline, US_LL USA longline. Indices displayed are scaled to the mean of each index.



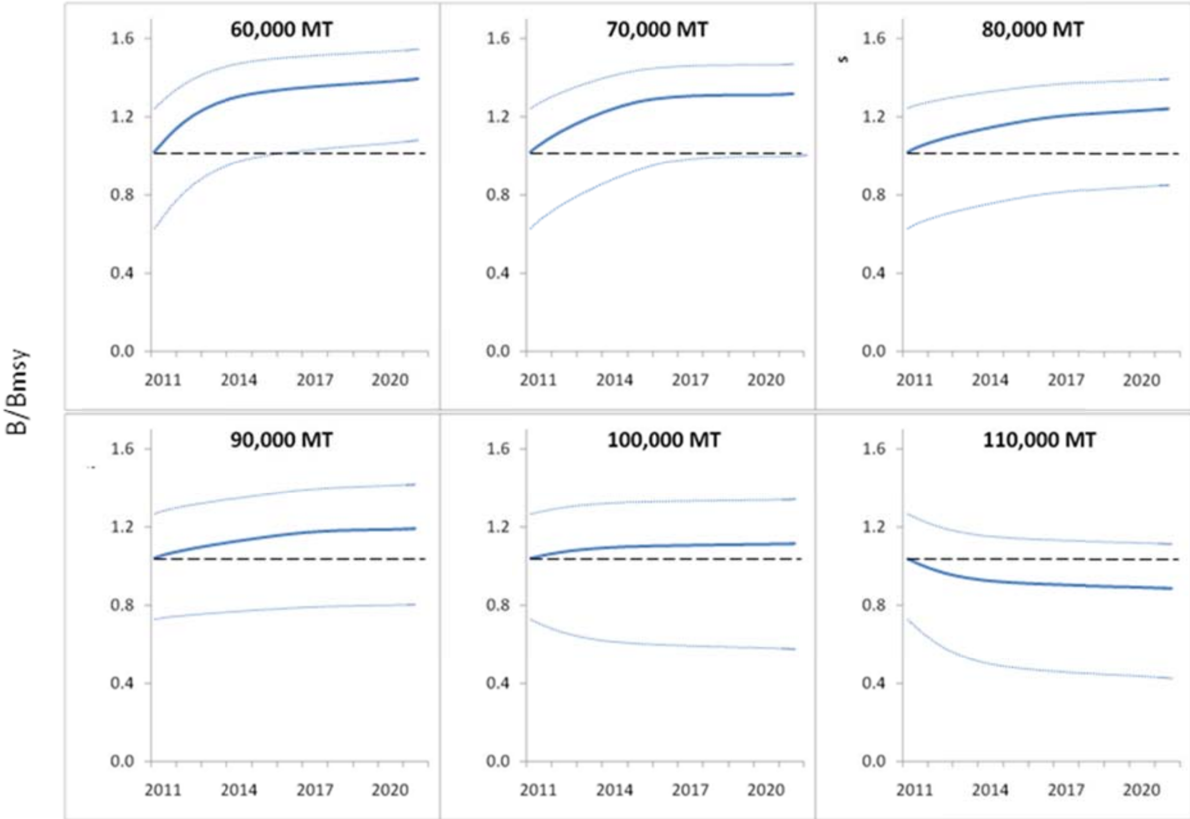
BET-Figure 6. Three alternative combined indices selected for the bigeye tuna assessment with logistic non-equilibrium production models.



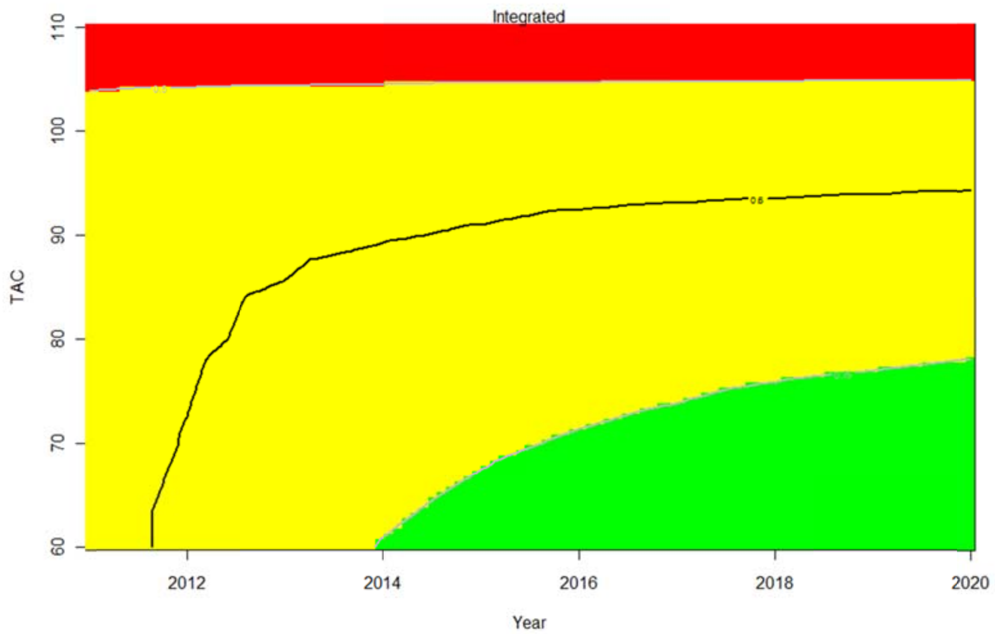
BET-Figure 7. Trajectories of B/B_{MSY} and F/F_{MSY} estimated from the logistic production model. Lines represent the 80% percentile of bootstrap results and thicker line the median.



BET-Figure 8. Kobe plot from combined examinations of assessment models. Shaded lines shown represent the 80% confidence limits for the historical trajectory (1950-2009) and solid line represents the median estimated from the logistic production model. Points depict uncertainty in current status not considered by the bootstrapping of the logistic production model (estimates of F_{2009}/F_{MSY} and B_{2009}/B_{MSY} for each of the sensitivity trials from the other models considered in the assessment).



BET-Figure 9. Biomass projections (B/B_{MSY}) for bigeye tuna for 2011-2021. Each panel corresponds to a different level of future constant catch from 60,000 to 110,000 t. Thick lines represent median of all combined runs and thinner lines the 10 and 90 percentiles.



BET-Figure 10. Kobe matrix plot showing probabilities of the stock being above B_{MSY} and fishing at levels below F_{MSY} in a given year for a future constant catch (TAC). Projections were calculated from results of the combination of the three logistic production model runs used as the basis of the assessment. The colors represent modeled probabilities: red, <50%, yellow, 50-75% and green, >75%. The 60% probability isopleth is also shown as a black line.

8.3 SKJ – SKIPJACK TUNA

Stock assessments for East and West Atlantic skipjack were conducted in 2014 (Anon. 2014) using catch data available to 2013. The last assessment of skipjack stocks was only conducted in 2008 (Anon. 2009a). Consequently, this report covers the most recent information on the state of the stocks on this species.

SKJ-1 Biology

Skipjack tuna is a gregarious species that is found in schools in the tropical and subtropical waters of the three oceans (**SKJ-Figure 1**). Skipjack is the predominant species aggregated to FADs where it is caught in association with juvenile yellowfin tuna, bigeye tuna and with other species of epipelagic fauna. Skipjack reproductive potential is considered to be high because it reaches sexual maturity around one year and it spawns opportunistically in warm waters above 25ºC throughout the year and in large areas of the ocean. Moreover, the analysis of East Atlantic tagging data has confirmed that the growth of skipjack was quicker in sub-tropical waters than in equatorial waters where it produces most of its spawn. These growth differences depending on latitude must be taken into account if the assessments are carried out on separate stocks between sub-tropical and tropical areas. It is also possible that the growth does not follow the conventional Von Bertalanffy model but rather a two-stanza model. Based on the relationships between life history characteristics and natural mortality, a natural mortality vector decreasing with size has been estimated (**SKJ-Figure 2**). The natural mortality values estimated by this approach are greater than those used to date for East Atlantic skipjack. Lower values have been obtained by another approach which has been applied for the western stock, whose catches are however composed of larger sized individuals than in the eastern stock.

The increasing use of fish aggregation devices (FADs) since the early 1990s, have changed the species composition of free schools. It is noted that, in fact, the free schools of mixed species were considerably more common prior to the introduction of FADs. Furthermore, the association with FADs may also have an impact on the biology (growth rate, plumpness of the fish) and on the ecology (distances, movement orientation) of skipjack and yellowfin ("ecological trap" concept).

SKJ-2. Fishery indicators

Following the historic record in 2012 (258,300 t), the total catches of skipjack throughout the Altantic Ocean (including catches of "faux poisson" landed in Côte d'Ivoire) remain high at 221,600 t (**SKJ-Table 1, SKJ-Figure 3**). This represents a very sharp rise compared to the average catches of the five years prior to 2010 (157,600 t). It is possible, however, that the catches of a segment of the Ghanaian purse seine fleet, transshipped at sea on carriers, have escaped the fishery statistics collection process before 2011. In addition, following the expert missions carried out in Ghana which have shown the existence of bias in the sampling protocol which aims to correct the multi-species compositions of the catches reported in the logbooks, Ghanaian Task I and II statistics have been reviewed in several stages (1973-2005). The last review for the period 2006-2012 shows that the skipjack catches reported by Ghana were underestimated by around 28%, which gives an average of 12,000 t/year. Therefore, all of these historical data have consequently been corrected.

The numerous changes that have occurred in the skipjack fishery since the early 1990s (e.g. the progressive use of FADs and the latitudinal expansion and the westward extension of the fishing area) have brought about an increase in skipjack catchability and in the proportion of biomass exploited. Currently, the major fisheries are the purse seine fisheries, particularly those of EU-Spain, Ghana, Curaçao, Belize, Panama, EU-France, Guinea and Cape Verde, followed by the baitboat fisheries of Ghana, EU-Spain, EU-Portugal and Senegal. The preliminary estimates of catches made in 2013 in the East Atlantic amounted to 203,500 t, which is an increase of about 54% as compared to the average of 2005-2009 (**SKJ-Figure 4**). It should be noted that there has been a sharp increase in the skipjack catches by the European purse seiners, probably due to the high selling price of this species since 2011 (**SKJ-Figure 5**). This increase in catches is accompanied by changes in fishing strategies since the proportion of skipjack catches using floating objects has continued to increase. This is the result to some extent of the sharp reduction in seasonal fishing by European purse seiners on free schools after 2006 off the coast of Senegal and of the emergence as from 2012 of atypical fishing off FADs – since it involves single-species schools composed of large individuals – between August and November off the coast of Mauritania (**SKJ-Figure 1**). These changes in fishing strategy can take place differently in the purse seine fleets, including in fleets that operated similarly in the past (**SKJ-Figure 6**) and are therefore difficult to integrate into stock assessment models.

The unreported catches of some purse seiners were estimated by comparing the monitored landings in West African ports and cannery data to the catches reported to ICCAT. Estimates of the unreported catches of these purse seiners have increased since 2006 and may have exceeded 20,000 tons for the three main species of tropical tunas. The Committee expressed the need for the countries and the industry concerned in the region to cooperate to estimate and report these catches accurately to ICCAT. Recent progress in the transmission and review of data submitted to the ICCAT Secretariat has enabled the Committee to partially include these catches and the associated sizes in the skipjack assessment. The magnitudes of these estimates of IUU catch, however, are likely to influence the assessments and the perception of stock status.

The average rate of discards of skipjack on FADs by European purse seiners operating in the eastern Atlantic has been estimated based on onboard observer programmes implemented in 2001 to be 42 kg per t of skipjack landed. Furthermore, the amount of small skipjack (average size 37 cm FL) landed in the local market of Abidjan in Côte d'Ivoire as "faux-poisson" has been estimated at 235 kg per t of skipjack landed (i.e. an average of 6,641 t/year between 1988 and 2007 for the European or associated purse seiners, **SKJ-Figure 7**). However, the latest estimates indicate values close to 10,500 t/year between 2005 and 2013 for all purse seiners operating in the eastern Atlantic (skipjack representing around 30% of the total "faux-poisson"). The Committee regularly incorporates these estimates into the reported historical catches for the EU purse seiners since 1982, as well as in the catch-at-size matrix.

In the West Atlantic, the major fishery is the Brazilian baitboat fishery, followed by the Venezuelan purse seine fleet. The preliminary estimates of catches in 2013 made in the West Atlantic amounted to 18,000 t (against the historic record of 40,000 t in 1984). This sharp decrease in 2013 compared to the large catches reported by Brazilian baitboats in 2012 is due to incomplete reporting by Brazil in 2013 (**SKJ-Figure 8**). As the fishing effort of this fleet has not increased, these variations could be the result of changes in catchability at local level of this fishery.

It is difficult to discriminate a fishing effort for free schools (composed of large yellowfin tunas) for FAD fishing (targeting skipjack) in the East Atlantic because the fishing strategies can change from one year to the next and in addition, the sea time devoted to activities on FADs and the assistance provided by supply vessels are difficult to quantify. The Committee recognizes that the use of data series on the yearly progression of the sale prices of tropical species by commercial category enables identification of the years when skipjack is most targeted by the purse seiners (which seems to be the case in the past few years, **SKJ-Figure 6**). Nominal purse seine effort, expressed in terms of carrying capacity, has decreased regularly since the mid 1990s up to 2006. However, after this date, several European Union purse seiners have transferred their effort to the East Atlantic, due to piracy in the Indian Ocean, and a fleet of new purse seiners have started operating from Tema (Ghana), whose catches are probably underestimated. All this has contributed to the growth in carrying capacity of the purse seiners, which is gradually nearing the level observed in the early 1990s (**SKJ-Figure 9**). The number of purse seiners follows this trend but seems to have remained steady since 2010; the nominal effort of baitboats has remained stable for over 20 years.

It is recognised that the increase in fishing power linked to the introduction of technological innovation on board the vessels as well as to the development of fishing using floating objects has resulted in an increase in the efficiency of the various fleets, since the early 1980s. In order to take into account the effect of the technological changes in skipjack catchability, an annual yearly growth of 3% is generally assumed as the working hypothesis, although an analysis carried out fixing the MSY and K at the values estimated in the previous stock assessment would suggest an increase in catchability between 1 and 13% per year. Moreover, the estimates on growth in bigeye catchability, whose juveniles are also captured using FADs, would indeed indicate a value of 2.5% per year before 1991 and 6 to 8% thereafter. However, it is not known whether these estimates only reflect technological changes, or the availability of fish as well, resulting from the expansion of the surface area exploited over the years, reaching its historic high in 2013 and which corresponds to the expansion of the fishery towards the West Central Atlantic or more recently to the level of the North and South latitudes (**SKJ-Figure 10**).

The increase in total mortality (Z) between the early 1980s and the late 1990s, estimated using different methods, such as the tag-recovery model, the catch curves by size and the average size observed in the yearly catches, is consistent with an increase in catchability. The steady decrease in average weight up to 2011 (**SKJ-Figure 11**) is also consistent with the fact that the purse seine fleet has increased pressure on juvenile tunas. This trend has reversed since 2012 and at the same time a broadening of the range of sizes caught is observed (**SKJ-Figure 12**). Generally, except the East Pacific, it has been noted that the average skipjack weight observed in the East Atlantic (close to 2 kg) was much lower than the estimates provided for the other oceans (close to 3 kg).

With respect to the West Atlantic, the fishing effort of the Brazilian baitboats, which constitute the main skipjack fishery in this region, seems to have stabilised over the past 20 years. No marked trend regarding the structure of catches by size has been observed (**SKJ-Figure 13**).

SKJ-3. State of the stocks

In all the oceans, the traditional stock assessment models are difficult to apply to skipjack because of their particular biological and fishery characteristics (on the one hand, continuous spawning, spatial variation in growth and on the other, discrimination of effort for free schools and FADs, transition between these two fishing methods which are difficult to quantify). In order to overcome these difficulties, several assessment methods, conventional and non-conventional (based solely on catches, or on development of average size) have been applied to the two stocks of Atlantic skipjack. Several fishery indicators have also been analysed in order to track the development of the state of the stock over time.

Based on the large geographic distances between the fishing areas and current knowledge on small-scale migrations of skipjack in the Atlantic (**SKJ-Figure 1** and **SKJ-Figure 14**), the Committee has also analysed the possibility of using smaller stock units. While recognising the validity of this approach, the Committee does not currently have evidence, such as a sufficient amount of tag-recovery data covering the entire tropical ocean, in order to validate smaller stock units. Consequently, the Committee has decided to maintain the working hypothesis which favours two different units of eastern and western stocks but on an experimental basis to assess a sub-unit in each of the two stocks. The use of smaller areas has however been recommended to monitor the development over time of fishery indicators.

Eastern stock

The Committee has analysed two standardized fishery indices from the EU-purse seine fishery: an index which accounts for skipjack caught in free schools off the coast of Senegal up to 2006 and the second index which characterises fish captured off FADs and in free schools in the equatorial area (**SKJ-Figure 15**). The increase in CPUE of the European purse seiners in the late 1990s is partly the consequence of the increase in the catches of positive sets under FADS, in particular for Spanish vessels since 2011 (**SKJ-Figure 16**). In addition, the introduction of the price of skipjack (price adjusted for inflation) into the standardisation of the CPUE has not improved the fit. Furthermore, the regular increase in the skipjack yields of the baitboats based in Senegal may only be the result of an increase in catchability linked to the adoption of the so-called “baitboat associated school” fishing towards the mid 1980s (**SKJ Figure 15**). No marked trend has been observed for the Canary Islands baitboats, nor for the peripheral fishery of the Azorean baitboat fishery. Although the Committee has only considered a single stock for the East Atlantic, due to the very low apparent exchange rates between the sectors (based on available information, only 0.9% of tagged fish on both sides of the latitude 10ºN have exceeded this limit), a decrease in abundance for a local segment of the stock would probably have little repercussion on abundance in other areas (refer to notion of stock viscosity).

Regardless of the model used: 2 surplus biomass production models (one non-equilibrium conventional model, and one Bayesian model), a model based only on catch and a mortality estimation model based on the average sizes of fish captured, the Committee was not in a position to provide a reliable estimate of the maximum sustainable yield and therefore nor provide advice on the state of the eastern stock. This applies in the Bayesian case, (1) after testing different working hypotheses on the a priori distribution of the input parameters of the surplus production model (i.e. the growth rate and the carrying capacity), and on the impact of the growth of the catchability coefficient on the CPUE of each fleet), and (2) after performing a retrospective analysis in the case of the catch-only based model. The absence of definition of a fishing effort associated with FADs for the purse seiners, the difficulty of taking into account changes in catchability, the lack of marked contrast in the datasets despite the historical development of the fishing pressure (**SKJ-Figure 9**) and the fact that the catches and the CPUEs have increased in parallel in recent years are constraints for effective use of the classic stock assessment methods. The Committee has also highlighted that it is difficult to estimate the MSY in conditions of continuous growth of catches without having reliable indicators on the response of the stock to these increases. These indicators may be improved CPUE series, fishing mortality estimates from tagging programmes or other indicators on the exploitation of this species.

Even if caution must be exercised when formulating a diagnosis on the state of the stock in the absence of quantification by an adequate approach, there is no evidence of a fall in yield, or in the average weight of individuals captured (**SKJ-Figure 11**). The estimated value of the MSY, according to the catch-only assessment model, has tended to increase in recent years but at a growth rate that is lower than that observed for the catches for the same period. However, according to this model, although it is unlikely that the eastern skipjack stock is overexploited, current catches could be at, even above, the MSY.

As in the past, it is difficult to know whether this hypothesis can be applied to all spatial components of this stock in the East Atlantic, due to the moderate exchange rates which seem to exist between the different sectors of this region. The Committee considers that the MSY should be higher than that estimated in the 2008 assessment in a different exploitation plot to the current one, but cannot express an opinion on the level of the new MSY and the sustainability of the current catches, nor on the repercussions of this exploitation plot on juveniles of the two other species of tropical tunas.

Taking into account the biological and fishery specificities of skipjack, the Committee has attempted to develop Harvest Control Rules based on the proportion of individuals whose sizes are larger than the reference sizes (e.g. size at sexual maturity, the size corresponding to the length which maximises the catches for a given cohort, etc.) The Committee recommends, however, that due to the multi-species nature of the tropical tuna fishery, the HCRs on skipjack take into account the consequences of targeting skipjack on the other two species of tropical tunas.

Western stock

The CPUEs in the West were those of the Brazilian baitboat which remain relatively stable, those of the Venezuelan purse seiner, the US pelagic longline and a laval index (**SKJ-Figure 17**). In addition, the average weight of skipjack caught in the West Atlantic is higher than in the East (3 to 4.5 kg compared to 2 to 2.5 kg), at least for the Brazilian baitboat fishery.

The model based on catches and the non-equilibrium surplus biomass production model have estimated respectively the MSY at 30,000 t - 32,000 t (which remains close to the previous estimates in the order of 34,000 t). The fishing mortality vector estimated by a method based on the development of average size of individuals captured over time (mainly from Brazilian catches) shows a profiles which is very close to that estimated by the non-equilibrium surplus biomass model (**SKJ-Figure 18**).

It should be emphasised that all these analyses rest on the assumption of a single western stock from the US coast to Brazil and correspond to the current geographic coverage of this fishery.

For the western Atlantic stock, in light of the information provided by the trajectory of B/B_{MSY} and F/F_{MSY} ratios (**SKJ-Figure 19**), it is unlikely that the current catch is larger than the replacement yield.

SKJ-4. Effect of current regulations

There is currently no specific regulation in place for skipjack tuna. Several time/area regulatory measures on banning fishing on FADs [Rec. 98-01] and [Rec. 99-01] or on complete closure to surface fleets [Rec. 04-01] have however been implemented in the East Atlantic but the intended aim was to protect yellowfin and bigeye tuna juveniles.

The new Recommendation [Rec. 11-01] which replaces that concerned with the complete closure of the surface fishery [Rec. 04-01] and establishes a new moratorium on FAD fishing in the area that extends from the African coast to 10ºS and 5ºW latitude to 5ºE longitude during the months of January and February, entered into force in 2013. Due to the shift by the European fleet outside the regulated area and the decrease in activity of the Ghanaian purse seiners during the moratorium period, a slight fall in catches of bigeye juveniles has been observed but no significant change has been observed for skipjack and yellowfin tuna.

SKJ-5. Management recommendations

Despite the absence of evidence that the eastern stock is overexploited, but considering (1) the lack of quantitative findings for the eastern stock assessment, and (2) pending the submission of additional data (including on FADs and on the Grand Tropical Tuna Tagging Programme recommended by the Committee), which are necessary to improve the stock assessment, the Committee recommends that the catch and effort levels do not exceed the level of catch in recent years. In addition, the Commission should be aware that increasing harvests and fishing effort for skipjack could lead to involuntary consequences for other species that are caught in combination with skipjack in certain fisheries. For the West Atlantic, the Committee has not formulated any management recommendation, and has only indicated that the catches should not be allowed to exceed the MSY.

Despite recent progress, the Committee has expressed its concern regarding uncertainties which the under-reporting of skipjack catches may have on the perception of the state of the stocks.

ATLANTIC SKIPJACK SUMMARY TABLE

	East Atlantic	West Atlantic
Maximum Sustainable Yield (MSY)	Probably higher than previous estimates (143,000-170,000)	Around 30,000-32,000 t
Current yield (2013[1])	203,500 t	18,000 t*
Current Replacement Yield	Unknown	Somewhat below 32,000 t
Relative Biomass (B_{2013}/B_{MSY})	Likely >1	Probably close to 1.3
Mortality due to fishing (F_{2013}/F_{MSY})	Likely <1	Probably close to 0.7
Management measures in force	Rec. 11-01[(2)]	None

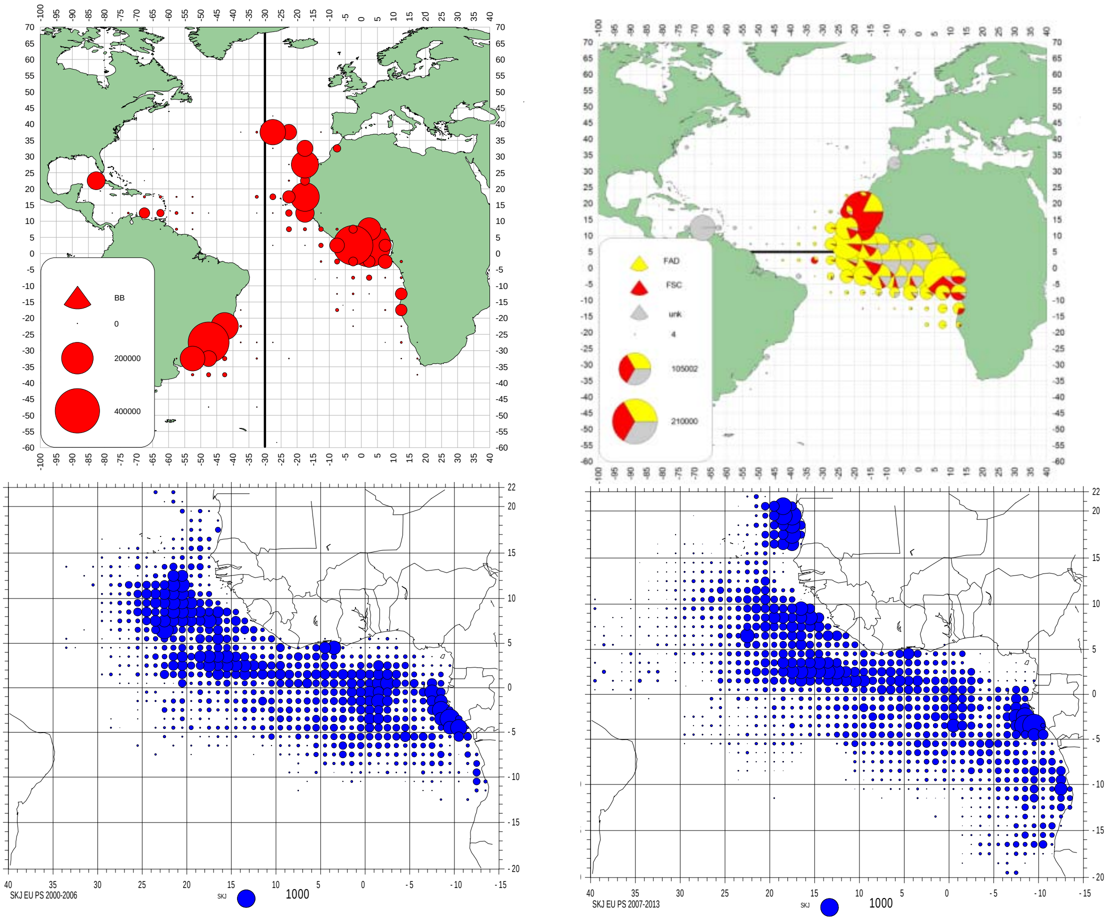
[1] Reports of catches for 2013 should be considered provisional, particularly for the West Atlantic.
[2] This new moratorium on FADs entered into force in January 2013 and replaces Rec. 04-01.
* Preliminary estimate due to incomplete reporting by Brazil.

SKJ-Table 1. Estimated catches (t) of skipjack tuna (*Katsuwonus pelamis*) by area, gear and flag (as of 2014-09-29). The last column (2013*) shows Task 1 catches for 2013 as used on the SKJ stock assessment (as of June/2014).

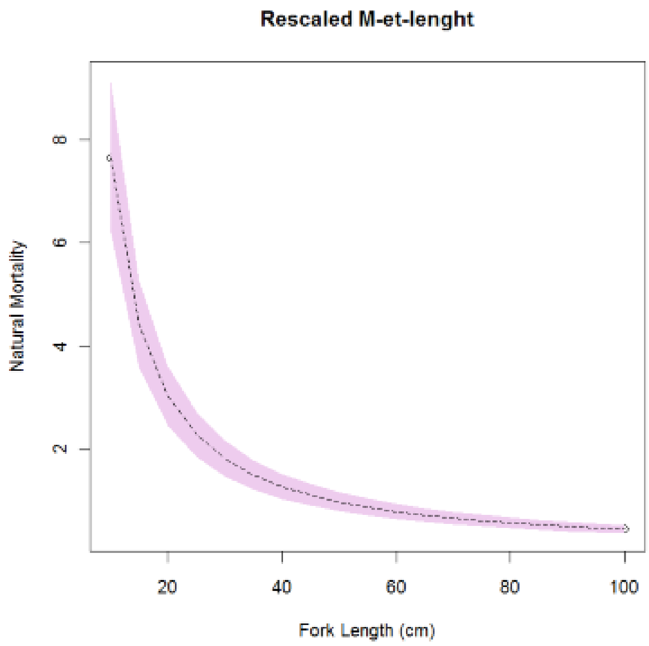
			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013*
TOTAL			119327	142483	217016	165556	201764	184378	168889	156054	145702	158221	177125	153034	166347	123033	154497	179904	169006	154458	148251	144866	171284	198332	236461	258300	221628	249845
	ATE		92945	116373	183612	135401	168541	154429	146987	128484	113986	128958	149717	123750	134819	101397	129617	152281	140362	127985	122704	122777	145504	175292	204065	225381	203452	222739
	ATW		26382	26110	33404	30155	33221	29949	21860	27562	31712	29087	27356	29193	31451	21600	24749	27461	28517	26453	25443	22022	25774	23000	32383	32846	17996	27086
	MED		0	0	0	0	2	0	43	9	4	176	53	90	77	37	132	161	127	20	104	67	5	40	13	73	181	20
Landings	ATE	Bait boat	41000	36922	41611	35660	31656	37817	33691	35872	37314	46784	44762	33909	56689	31076	34445	54602	48185	44370	35418	36339	33319	41105	39764	47122	29328	36427
		Longline	9	0	5	3	2	10	3	7	47	85	42	48	53	56	66	47	71	201	405	172	58	42	30	32	19	13
		Other surf.	1643	1357	2067	1602	1223	501	445	501	304	923	417	2423	764	681	551	1085	2334	5253	3389	3770	6527	5071	5816	6679	7094	5035
		Purse seine	50293	78094	139929	98136	135660	116101	112848	92104	76320	81166	104496	87369	77313	69584	94555	96547	89771	78162	83492	82496	105599	129075	158455	171548	167011	181264
	ATW	Bait boat	23292	22246	23972	20852	19697	22645	17744	23741	26797	24724	23881	25641	25142	18737	21990	24082	26028	23749	22865	20617	22770	19923	29468	30693	12074	24359
		Longline	25	23	33	29	20	16	34	19	12	21	58	22	60	349	95	206	207	286	52	49	20	30	41	96	650	0
		Other surf.	600	600	872	764	710	1577	2023	452	556	516	481	467	951	398	367	404	316	372	1317	455	950	1104	1014	475	326	1122
		Purse seine	2466	3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116	2296	2769	1967	2045	1209	901	2035	1943	1859	1582	4946	1604
	MED	Bait boat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	3	17	21	12	3	23	27	0	4	5	37	113	9
		Other surf.	0	0	0	0	2	0	43	9	4	176	53	90	77	32	12	40	17	17	44	24	4	27	7	29	59	2
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	2	103	101	99	0	38	16	1	8	1	7	9	9
Discards	ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		0
	ATW	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Landings	ATE	Angola	85	69	66	41	13	7	3	15	52	2	32	14	14	14	14	10	0	0	0	0	50	636	44	91	514	
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1373	2714	7429	15554	2180	6173
		Benin	7	2	2	2	2	2	2	2	7	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0		
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Cape Verde	971	806	1333	864	860	1007	1314	470	591	684	962	789	794	398	343	1097	7737	4999	5778	5038	5560	5155	7883	5535	9019	8710
		Cayman Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		China PR	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Chinese Taipei	3	0	5	3	2	10	3	5	47	73	39	41	24	23	26	16	10	9	14	19	6	11	15	13	13	13
		Congo	11	12	9	9	10	7	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Cuba	331	86	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Curaçao	0	0	0	0	0	0	0	7096	8444	8553	9932	10008	13370	5427	10092	8708	0	3042	1587	6436	9143	9179	11939	12779	17792	17792
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	1173	259	292	143	559	1259	1565	1817	2328	2840	2840	5968	10923	8063	6748
		EU.Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.España	35300	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25456	44837	38725	28881	22715	24045	36270	38715	42624	58743	67968	67828	67828
		EU.Estonia	0	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.France	15211	17099	33271	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16615	19899	21879	15768	7380	4374	4723	8909	15484	14545	14785	16704	16635
		EU.Germany	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	0	0	8	6	0	0		
		EU.Latvia	0	0	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Lithuania	0	0	221	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Portugal	7725	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958	4315	8504	4735	11158	8995	6057	1084	12974	4143	2794	3619	3619
		Gabon	0	0	0	0	1	11	51	26	0	59	76	21	101	0	0	0	0	0	0	0	0	0	0	0		
		Ghana	22751	24251	25052	18967	20225	21258	18607	24205	26364	41840	52024	34980	55475	37570	32977	46030	54209	50111	46638	41791	56303	63325	61382	65776	46257	63494
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6389	4959	5546	6319	4036	2951	2829	3631	4907	5186
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1224	1224	1010	0		
		Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1500	1473	7942	5758	5758
		Japan	2243	2566	4792	2378	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	4	5	
		Korea Rep.	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		
		Maroc	295	1197	254	559	310	248	4981	675	4509	2481	848	1198	268	280	523	807	1893	3779	1570	1291	2575	2317	2147	2265	2042	2042
		Mixed flags (FR+ES)	3033	3292	8384	7120	9829	8857	7370	3155	4496	4486	5675	7996	4731	2176	5784	6155	0	0	0	0	0	0	0	0		
		NEI (ETRO)	2263	10869	11335	12409	20291	17418	16235	16211	6161	6748	8893	7127	8122	8550	9688	11137	2873	629	0	0	0	0	0	0		
		Namibia	0	0	0	0	0	2	15	0	1	0	0	0	8	0	0	0	0	0	0	0	71	2	2	15	1	
		Nigeria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	12	4		
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Panama	0	0	8312	8719	13027	12978	14853	5855	1300	572	1308	1559	281	342	0	7126	11490	13468	18821	8253	8518	9590	12509	10927	14558	14558
		Rumania	59	142	349	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Russian Federation	0	0	1175	1110	540	1471	1450	381	1146	2086	1426	374	0	0	0	0	0	392	1130	313	260	0	20	0		
		S. Tomé e Príncipe	196	204	201	178	212	190	180	187	178	169	181	179	179	179	179	117	166	143	0	229	235	241	0	0		
		Senegal	47	134	652	260	95	59	18	163	455	1963	1631	1506	1271	1053	733	1333	4874	3534	2278	3661	4573	2447	4823	4339	4183	4183
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6770	0		
		South Africa	96	17	15	7	6	4	4	1	6	2	1	7	1	1	2	2	1	0	0	4	4	2	6	8	2	

		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0		
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		U.S.S.R.	1915	3635	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		UK.Sta Helena	397	171	24	16	65	55	115	86	294	298	13	64	205	63	63	63	63	88	110	45	15	25	371	29	7	
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	ATW	Argentina	111	106	272	123	50	1	0	1	0	2	0	1	0	0	0	30	0	0	0	0	3	12	0	0		
		Barbados	9	11	14	5	6	6	6	5	5	10	3	3	0	0	0	0	0	0	0	0	0	0	1	2	0	
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4040	
		Brazil	20750	20130	20548	18535	17771	20588	16560	22528	26564	23789	23188	25164	24146	18338	20416	23037	26388	23270	24191	20846	23307	20590	30563	30872	12102	25062
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Chinese Taipei	19	0	32	26	9	7	2	10	1	2	1	0	1	16	14	27	28	29	2	8	0	2	1	0	0	
		Colombia	0	0	0	0	2074	789	1583	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Cuba	1449	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0	624	545	514	536	0	0	0	0	0	0		
		Curaçao	40	40	40	40	45	40	35	30	30	30	30	30	0	0	0	0	0	0	0	0	0	0	0	0		
		Dominica	0	60	38	41	24	43	33	33	33	33	85	86	45	55	51	30	20	28	32	45	25	0	13	0	4	
		Dominican Republic	117	110	156	135	143	257	146	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.España	0	0	1592	1120	397	0	0	0	0	0	1	1	0	0	0	0	0	0	5	11	0	0	0	0	0	
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	10	0		
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	9	0	0	23	0		
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	4	1	0	3	3	5	21	11	0	6	0	8	0		
		Grenada	11	23	25	30	25	11	12	11	15	23	23	23	15	14	16	21	22	15	26	20	0	0	0	0		
		Jamaica	0	0	0	0	0	0	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Mexico	14	4	9	8	1	1	0	2	3	6	51	13	54	71	75	9	7	10	7	8	9	7	9	8	5	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	
		St. Vincent and Grenadines	28	29	27	20	66	56	53	37	42	57	37	68	97	357	92	251	251	355	90	83	54	46	50	0	0	
		Sta. Lucia	38	37	51	39	53	86	72	38	100	263	153	216	151	106	132	137	159	120	89	168	0	153	143	109	171	171
		Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	552	
		Trinidad and Tobago	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.A.	73	304	858	560	367	99	82	85	84	106	152	44	70	88	79	103	30	61	66	67	119	54	87	112	117	75
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	
		Venezuela	3723	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	2890	6870	2554	3247	3270	1093	2008	921	757	2250	2119	1473	1742	1002	1778
	MED	Algerie	0	0	0	0	0	0	0	0	0	171	43	89	77	0	0	0	0	0	0	0	0	0	0	0		
		EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	26	10	15	44	12	0	5	7	56	161	
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	8	2	0		
		EU.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	99	99	0	0	0	0	0	0	0		
		EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	4	29	34	17	0	0	0	0	0	0	0		
		Maroc	0	0	0	0	2	0	43	9	4	5	10	1	0	1	1	2	1	5	22	18	5	26	4	2	3	3
		Syria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	36	0	0	0	15	17	17
Discards	ATE	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
	ATW	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

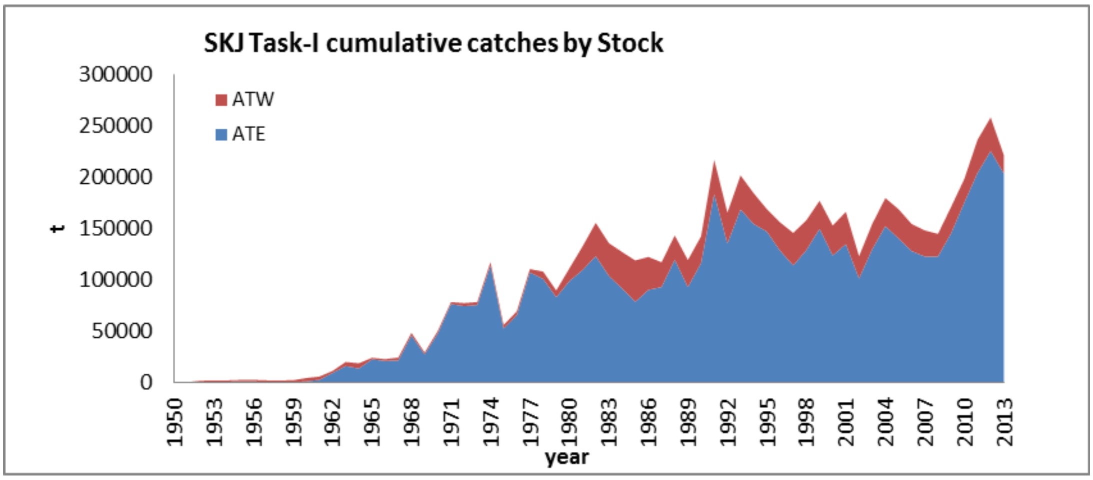
Angola and Sierra Leone official catches were not accepted by the WG because of the inconsistencies found when compared with historical data.
Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.



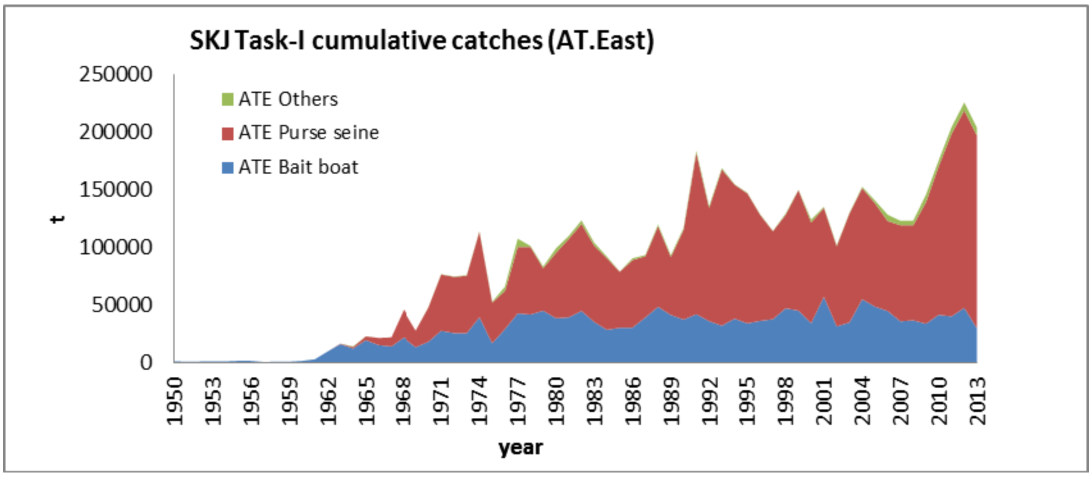
SKJ-Figure 1. Distribution of skipjack catches in the Atlantic for baitboat (upper left panel) between 1950 and 2013 and for purse seiners (upper right panel) by fishing mode (free schools vs. FADs) between 1991 and 2013. Skipjack catches made by European and associated purse seiners (about 75% of the total catches) between 2000 and 2006 (lower left panel) and between 2007 and 2013 (lower right panel) showing the withdrawal from the Senegal fishing zone on free schools, due to non-renewal of the fishing agreements in 2006, and the appearance of a fishing area under FADs in 2012 North of 15oN latitude.



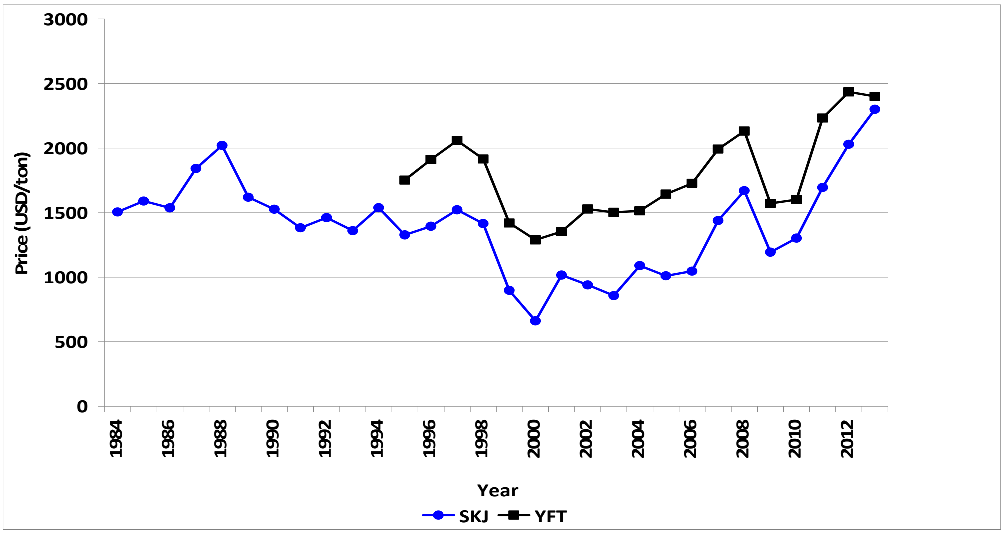
SKJ-Figure 2. Estimates of natural mortality by size of Atlantic skipjack calculated by empirical relationships between mortality and some biological parameters (which show different values from those traditionally used in the East.



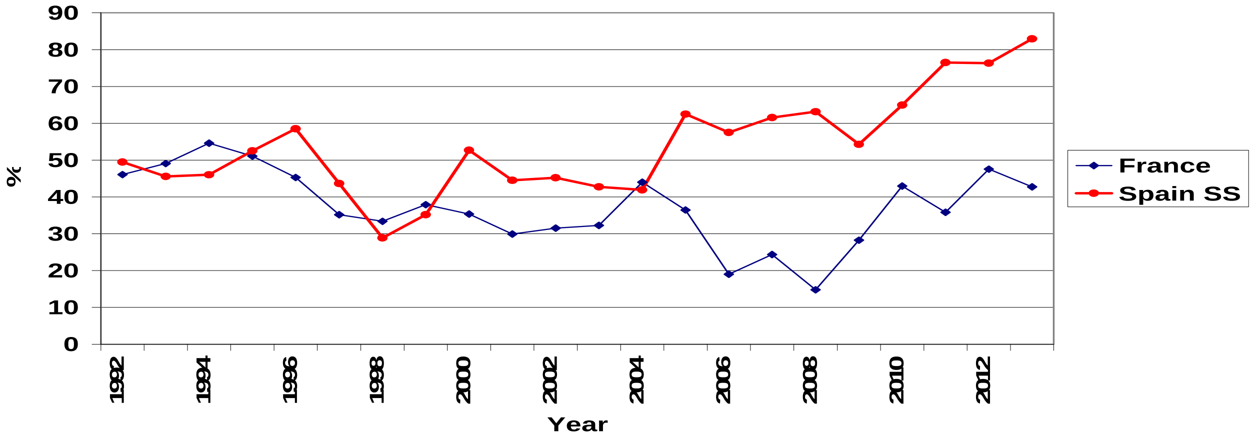
SKJ-Figure 3. Total skipjack catches (t) in the Atlantic and by stock (East and West) between 1950 and 2013. Skipjack estimates in the *faux poissons* landed in Côte d'Ivoire were included in the skipjack trade catches in the eastern Atlantic. It is possible that skipjack catches taken in the eastern Atlantic in recent years were not reported or were under-estimated in the logbook correction of species composition based on multi-species sampling carried out at the ports. The 2013 figure is still preliminary, in particular for the East Atlantic.



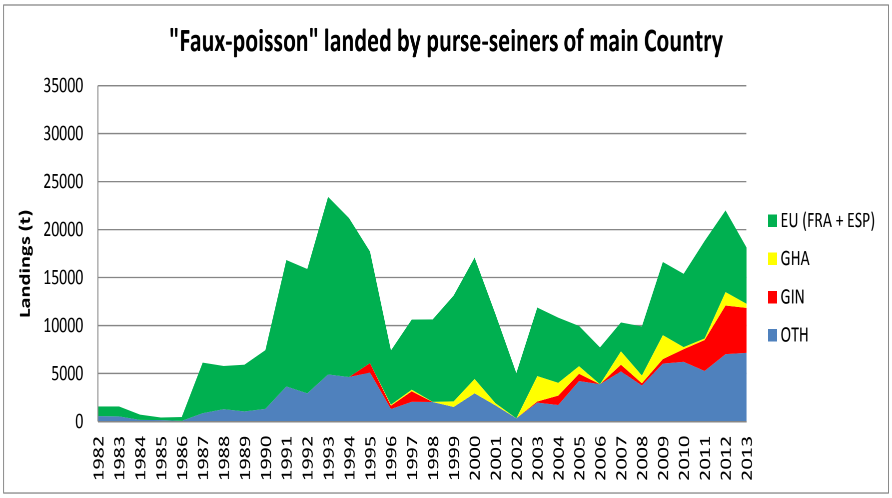
SKJ-Figure 4. Cumulative skipjack catches in the eastern Atlantic, by gear (1950-2013), after correction of Ghana's data by species (1996-2012).



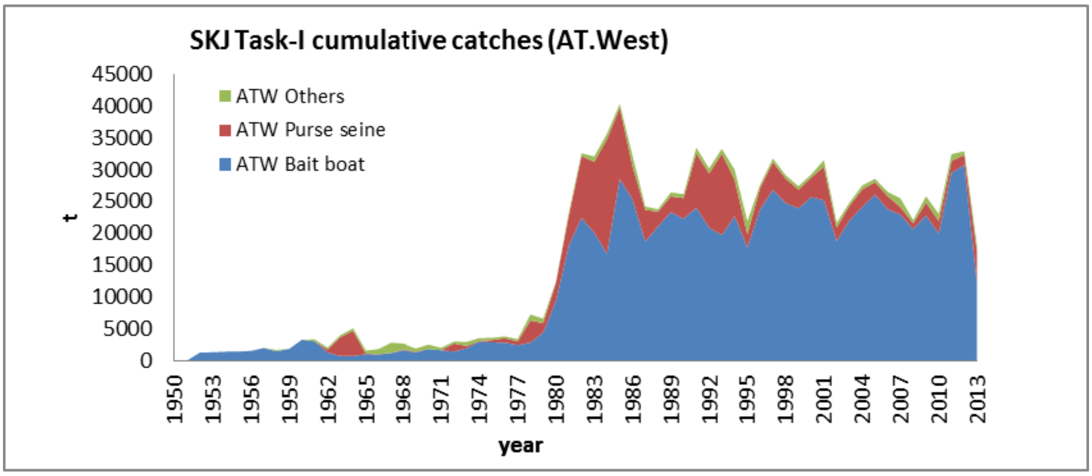
SKJ-Figure 5. Average prices of skipjack and yellowfin in U.S. dollars (adjusted for inflation and converted into the value of the 2013 $US) in the Bangkok market.



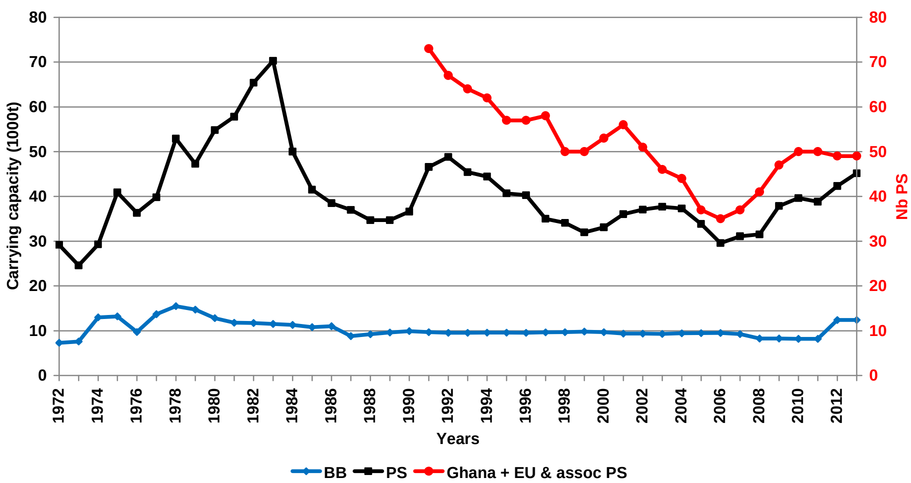
SKJ-Figure 6. Changes in the proportion of skipjack catches made by French and Spanish purse seiners under FADs (1991-2013). The increase in the percentage of catches under FADs coincides with the shift from the Senegal area, known for its seasonal fishing on free schools (see **Figure 1**), and with the increase of skipjack prices.



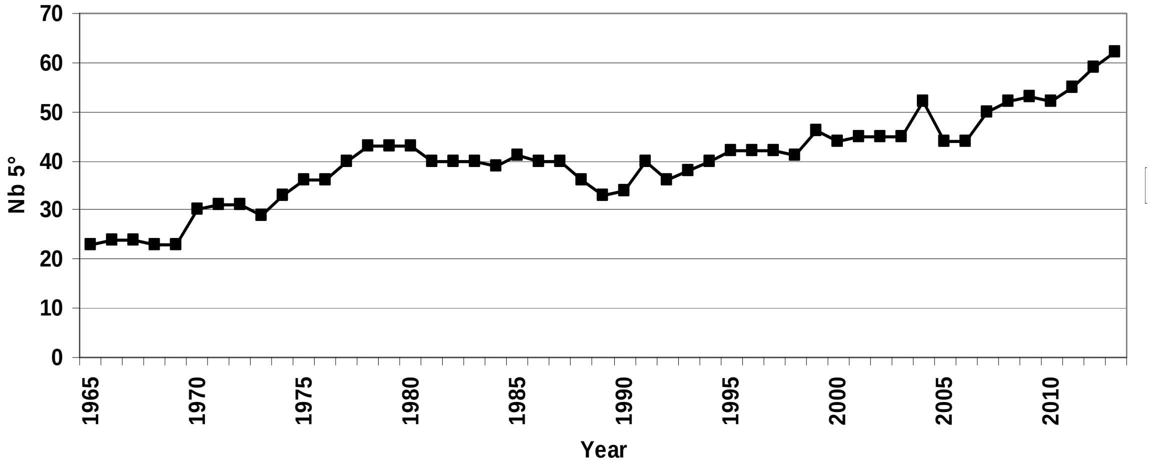
SKJ-Figure 7. Cumulative estimated landings of *faux poissons* (1981-2013) for the European or associated purse seiners for the three major species of tropical tunas in the local market of Abidjan (Côte d'Ivoire).



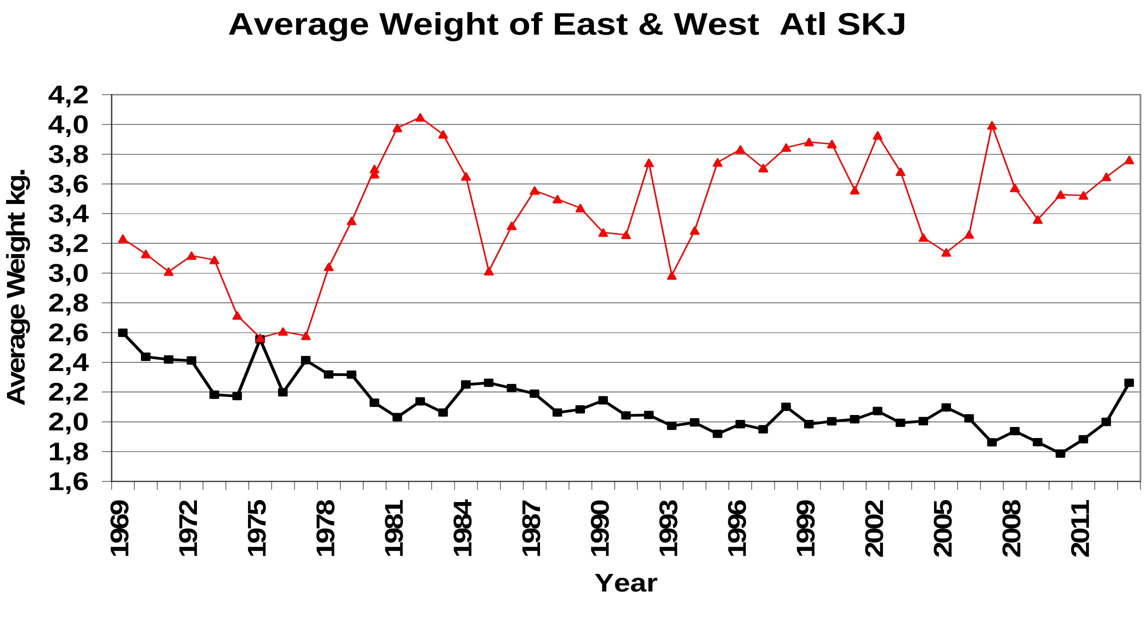
SKJ-Figure 8. Cumulative skipjack catches in the western Atlantic, by gear (1950-2013). The values for 2013 are preliminary.



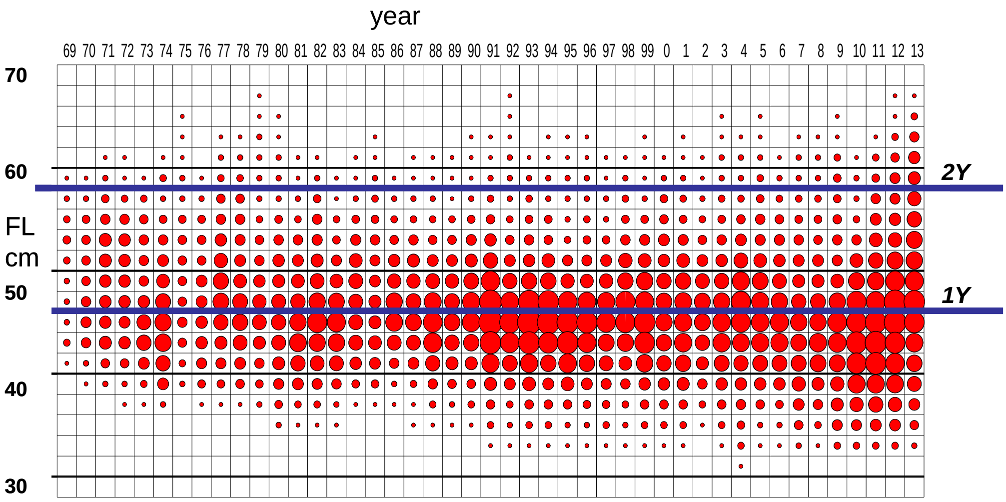
SKJ-Figure 9. Changes over time in the carrying capacity, corrected by the annual percentage of time at sea, (left axis) for the overall purse seiners and baitboats operating in the eastern Atlantic (1971-2013) and in number of boats for the European purse seiners, associated and Ghanaian fleets (right axis). It is possible that the carrying capacity for some segments of the purse seine fleet was underestimated during recent years.



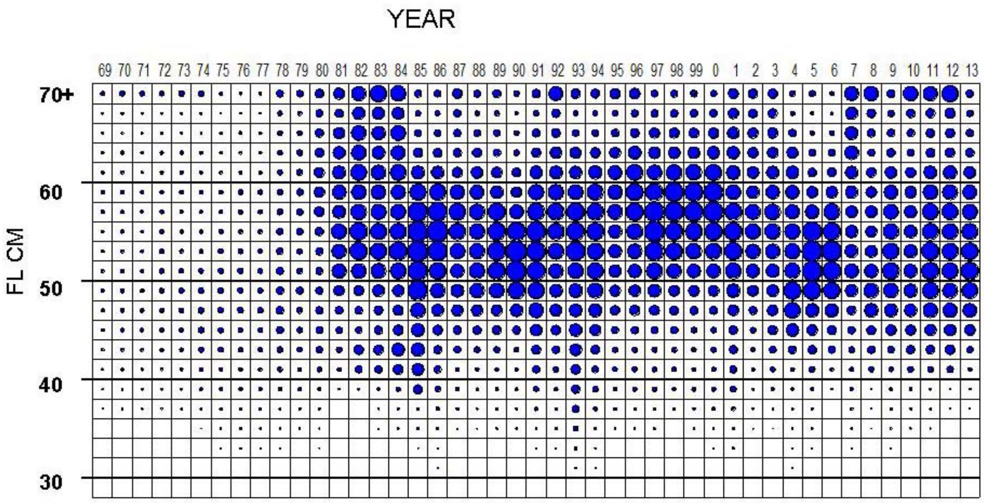
SKJ-Figure 10. Number of 5°x5° squares with annual skipjack catches above 10 t for the European and associated purse seiners operating in the eastern Atlantic (1969-2013). The great increase observed in 1991 could be due to a modification of the species composition correction procedure of the catches implemented at this date (skipjack catches could have been attributed to squares which were not included until then). On the other hand, the recent increase in the area searched successfully corresponds to the extension of the fishery towards the western central Atlantic and off Mauritania and Angola.



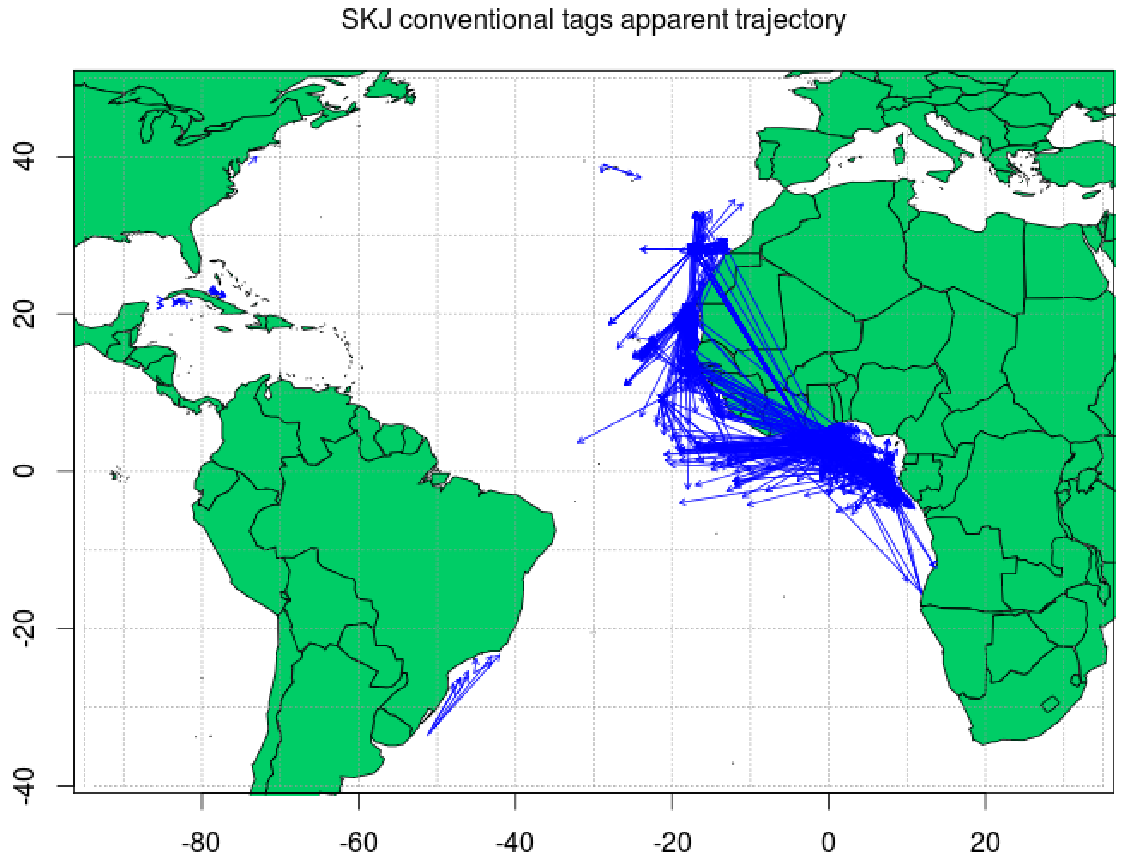
SKJ-Figure 11. Changes in the average weight of skipjack in the eastern (black) and western Atlantic (red).



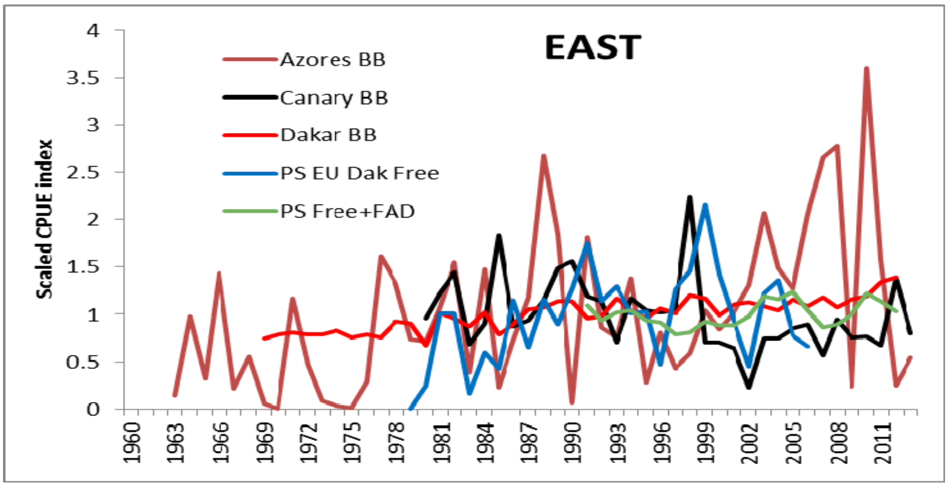
SKJ-Figure 12. Annual catch (in weight) by skipjack size class in the eastern Atlantic and approximate size limits of ages 1 and 2 (blue). The size at first sexual maturity (50%) is estimated at 42 cm.



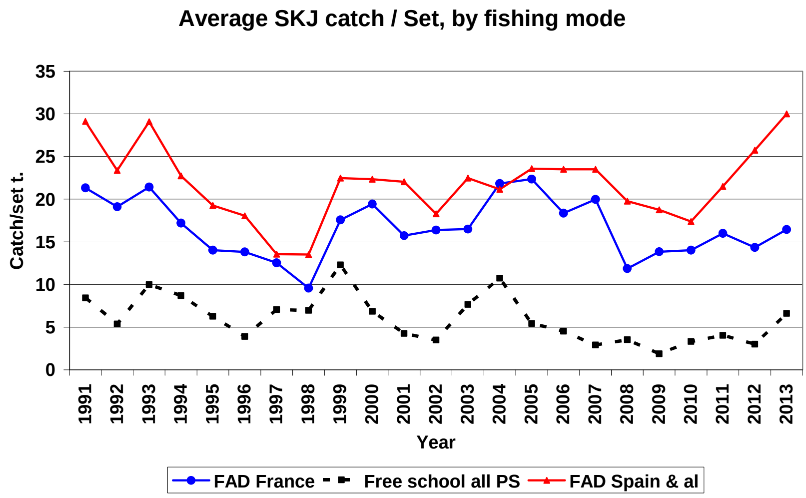
SKJ-Figure 13. Annual catch (in weight) by skipjack size class in the western Atlantic.



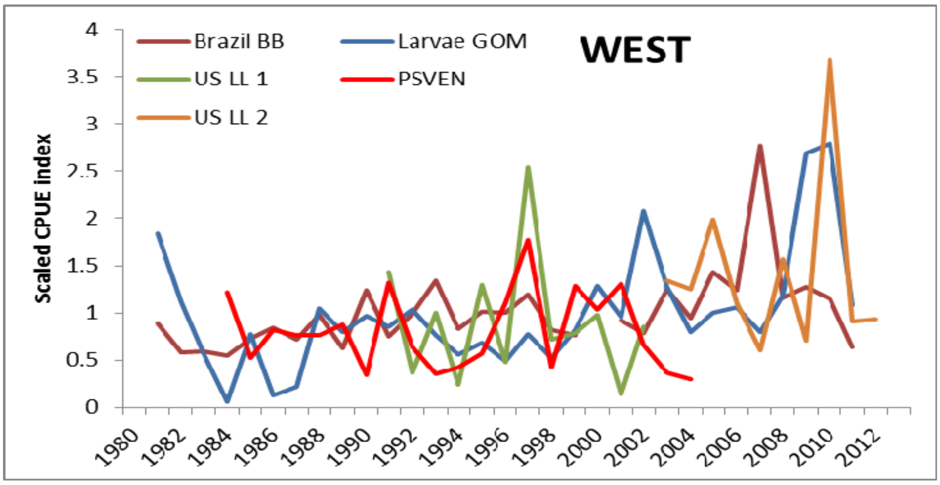
SKJ Figure 14. Apparent movements (straight line distance between the tagging location and that of recovery) calculated from conventional tagging.



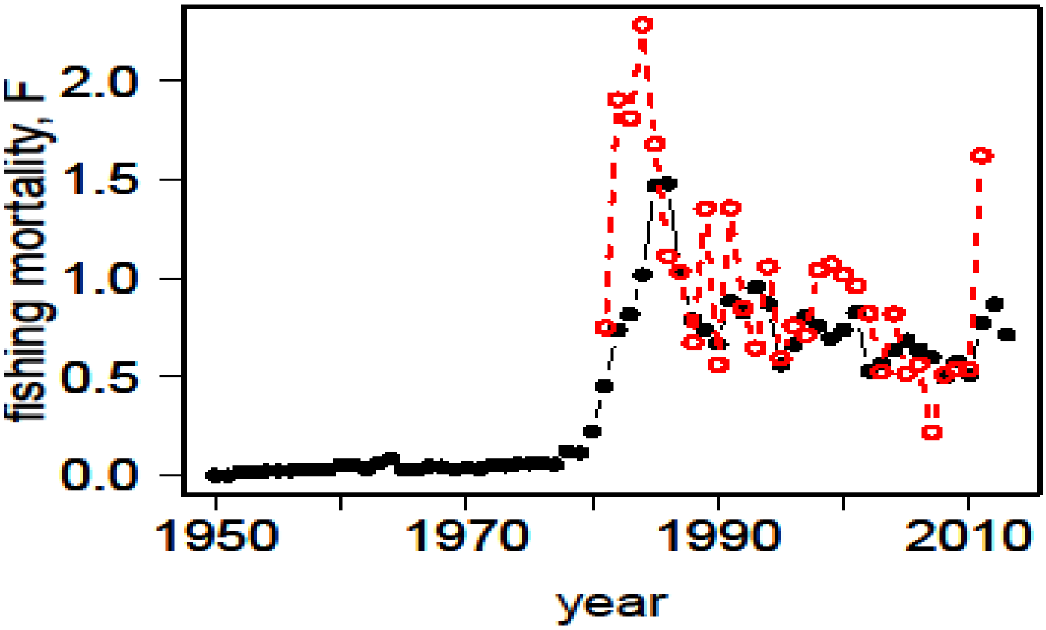
SKJ-Figure 15. Relative abundance indices for the eastern skipjack stock. Each index has been adjusted to its own average level given that to resolve problems regarding scaling, the indices for purse seine have been adjusted to the same level as the Azorean baitboat series.



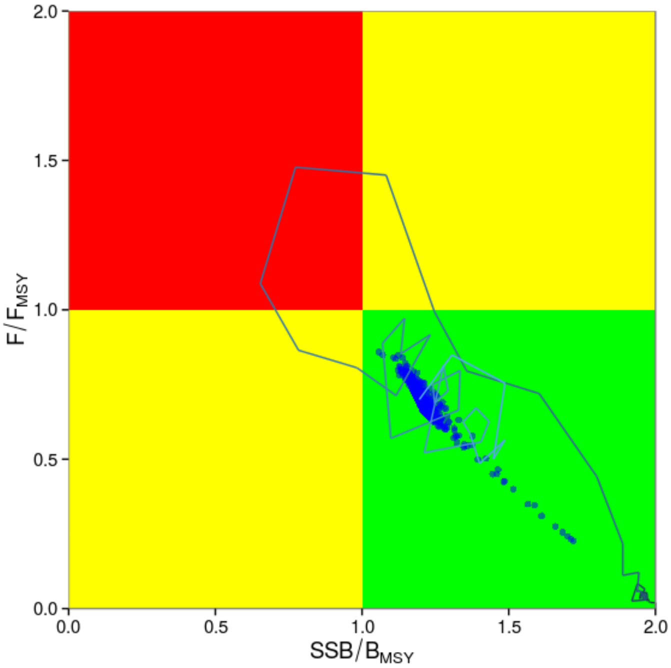
SKJ-Figure 16. Catches by set (t) of eastern Atlantic skipjack and on FADs (France and Spain + associated fleets) and on free schools (all purse seiners).



SKJ-Figure 17. Relative abundance indices for the eastern skipjack stock. Each index has been adjusted to its own average level given that to resolve problems regarding scaling, the indices for purse seiners and longliners have been adjusted to the level of the larvae index of the Gulf of Mexico.



SKJ-Figure 18. Comparison of coefficient mortality estimates of skipjack fishing in the western Atlantic obtained from a surplus production model (ASPIC black line and solid circles) and by the model based on the average size of fish caught (so called *Then Hoenig-Gedamke* in red and empty circles).



SKJ-Figure 19. Western skipjack stock status: trajectories of B/B_{MSY} and F/F_{MSY} from the ASPIC surplus production model (Schaefer type).

8.4 ALB – ALBACORE

The status of the North and South Atlantic albacore stocks is based on the most recent analyses conducted in June 2013 by means of applying statistical modelling to the available data up to 2011. Complete information on the assessment can be found in the Report of the 2013 ICCAT Albacore Stock Assessment Session (SCRS/2013/016).

The status of the Mediterranean albacore stock is based on the 2011 assessment using available data up to 2010. Complete information is found in the Report of the 2011 ICCAT South Atlantic and Mediterranean Albacore Stock Assessment Session (Anon. 2012b).

ALB-1. Biology

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

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

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

More information on albacore biology and ecology is published in the *ICCAT Manual*.

ALB-2. Description of fisheries or fishery indicators

North Atlantic

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

Total reported landings, steadily increased since 1930 to peak above 60,000t in the early 1960s, declining afterwards, largely due to a reduction of fishing effort by the traditional surface (troll and baitboat) and longline fisheries (**ALB-Table 1**; **ALB-Figure 2a**). Some stabilization was observed in the 1990s, mainly due to increased effort and catch by new surface fisheries (driftnet and mid-water pair pelagic trawl), with a maximum catch in 2006 at 36,989 t and, since then, a decreasing trend of catch is observed in the North Atlantic.

The total catch in 2013 was 20,948 t, and the average catch in the last five years has remained about 20,000 t, the lowest recorded in the time series since 1950. During these years, the surface fisheries contributed to approximately 80% of the total catch (**ALB-Table 1)**. The reported catch in 2013 for EU-France, EU-Ireland and EU-Spain was below the average of the last five years.

Longline catch contributed to approximately 20% of the total catch during the last five years. During the last decades, both Chinese Taipei and Japan have reduced their fishing effort directed to albacore. In the case of Japan, albacore was taken mainly as by-catch. Still, the catch reported in 2013 for Japan and Chinese Taipei was above the last 5 year average.

The trend in mean weight for northern albacore remained stable between 1975 and 2011, ranging between 7 and 11 kg. The mean weight for surface fleets (baitboat and troll) showed a stable trend with an average of 7 kg (range: 4-10), and for longline fleets it showed no clear trend with an average of 19 kg, but some important fluctuations between 15 and 26 kg since the 1990 (**ALB-Figure 3a)**.

South Atlantic

The recent total annual South Atlantic albacore landings were largely attributed to four fisheries, namely the surface baitboat fleets of South Africa and Namibia, and the longline fleets of Brazil and Chinese Taipei (**ALB-Table 1**; **ALB-Figure 2b**). The surface fleets are entirely albacore directed and mainly catch sub-adult fish (70 cm to 90 cm FL). These surface fisheries operate seasonally, from October to May, when albacore are available in coastal waters. Brazilian longliners target albacore during the first and fourth quarters of the year, when an important concentration of adult fish (>90 cm) is observed off the northeast coast off Brazil, between 5ºS and 20ºS, being likely related to favorable environmental conditions for spawning, particularly of sea surface temperature. The longline Chinese Taipei fleet operates over a larger area and throughout the year, and consists of vessels that target albacore and vessels that take albacore as by-catch, in bigeye directed fishing operations. On average, the longline vessels catch larger albacore (60 cm to 120 cm FL) than the surface fleets.

Albacore landings increased sharply since the mid-1950s to reach values oscillating around 25,000 t between mid-1960s and the 1980s, 35,000 t until the last decade were they oscillated around 20,000 t. Total reported albacore landings for 2013 were 19,148 t, lower than the last five year average. The Chinese Taipei catch in 2013 was significantly below the last five year average. In fact, the Chinese Taipei catch in the last years has decreased compared to historical catches, mainly due to a decrease in fishing effort targeting albacore. Chinese Taipei longliners (including boats flagged in Belize and St. Vincent and the Grenadines) stopped fishing for Brazil in 2003, which resulted in albacore only being caught as by-catch in tropical tuna-directed longline fisheries. The 2013 catch for Brazil is higher than catches in the recent past. However, albacore is only caught as by-catch in Brazilian tropical tuna-directed longline and baitboat fisheries. The significantly higher average catch of about 4,287 t during the period 2000-2003 was obtained by the Brazilian longline fleet when albacore was a target species.

In 2013, the estimated South African and Namibian catch (mainly baitboat), was below the average of the last five years. During the last decades, Japan took albacore as by-catch using longline gear, but recently Japan is again targeting albacore and increased the fishing effort in waters off South Africa and Namibia (20-40˚S). Thus, catches during the last five years double those in the last few decades.

The trend in mean weight from 1975 to 2011 is shown in **ALB-Figure 3b** Surface fleets showed a stable trend from 1981 onwards with an average of 13 kg and a maximum and minimum average weight of 17 kg and 10 kg, respectively. Longline fleets showed a relatively stable trend for the mean weight around 17 kg until 1996 where the average weight increased to about 20 kg, oscillating between 16 and 26 kg.

Mediterranean

The catch series was revisited and compared to additional sources of information. This allowed identifying some catches that were not included in the ICCAT database, which requires further revisions. In 2013, the reported landings were 1,675 t, substantially below those in the last decade (**ALB-Table 1** and **ALB-Figure 2c**). The majority of the catch came from longline fisheries. EU-Italy is the main producer of Mediterranean albacore, with around 65% of the catch during the last 10 years. In 2013 the Italian catch was substantially lower than the last five year average.

ALB-3. State of stocks

North Atlantic

A thorough revision of North Atlantic Task I and Task II data was conducted and catch rate analyses were improved and updated with new information for the northern albacore fisheries. The base case assessment during the 2013 assessment session was based on similar methods and assumptions as in the previous assessment conducted in 2009 (Anon. 2010c). However, this time, a wider range of assessment methods were considered in sensitivity runs, including some that do not assume that catch-at-age is perfectly known. The approach provided the opportunity to evaluate a range of biological assumptions and hypothesis about how the fisheries operated over time and their impact on the population. The results of these efforts are reflected in the following summaries of stock status that analyzed data through 2011.

The CPUE trends for the various surface fleets, based upon the most recent available data showed somewhat different patterns from each other. This was also the case for the different longline fleets (**ALB-Figure 4**). The Spanish troll CPUE series showed a rather flat trend compared to the Spanish baitboat CPUE series that showed a more upward trend in the last three decades. For the longline fleets, the general trend in CPUE indices is a decline over time up until the mid 80ies, with varying rates, with some stability afterwards and a slight increase in the last few years. Comparatively, the Japanese CPUE showed steeper declines at the beginning of the series and the Chinese Taipei CPUE showed steeper increasing trends during the last years. Given the variability associated with these catch rate estimates, definitive conclusions about recent trends could not be reached just by examining the CPUE trends alone.

The data sets used for the analyses from 1930 to 2011 were compiled and screened during the April 2013 data preparatory meeting. The basic input data, catch, effort and catch-at-size were revised due to updates in the ICCAT Task I (**ALB-Table 1**) and Task II database, and the indices to be used in assessments were specified. The definition of the fisheries was also revised and 12 fishery units were agreed for the base case Multifan-CL assessment (compared to 10 fishery units used in the previous assessment). In general, the base case included similar but not exactly the same model specifications and datasets used in 2009. Decisions on the final specifications of the base case model were guided by first principles (e.g. knowledge of the fisheries) and diagnostics (e.g. goodness of fit of the model to the data).

There is substantial uncertainty on current stock status, since different models and assumptions provide a wide range of B/B_{MSY} and F/F_{MSY} estimates (**ALB-Figure 5**). However, most of them agreed on the view that spawning stock biomass decreased since the 1930s and started to recover since the mid-1990s (**ALB-Figure 6**). Most of the model formulations, as well as the base case, concluded that currently the stock is not undergoing overfishing but the spawning stock biomass is overfished. According to the base case assessment which considers catch and effort since the 1930s and size frequency since 1959, the spawning stock size has declined and in 2011 was about one third of the peak levels estimated for the late-1940s. Estimates of recruitment to the fishery, although variable, have shown generally higher levels in the 1960s and earlier periods with a declining trend thereafter (**ALB-Figure 7**).

The assessment indicated that the stock has remained overfished with SSB below SSB_{MSY} since the mid-1980s but has improved since the lowest levels around 30% in the late 1990s, and current SSB_{2011} is approximately 94% of SSB at MSY (**ALB-Figure 8**). Corresponding fishing mortality rates have been above F_{MSY} between the mid-1960s and the mid 2000's. Peak relative fishing mortality levels in the order of 2.5 were observed in the mid 90ies and remained below 1 afterwards, current F_{2011}/F_{MSY} ratio being 0.72 (**ALB-Figure 8**). According to the base case assessment, the probability of the stock being overfished and overfishing (red) is 0,2%, of being neither overfished nor overfishing (green) is 27.4%, and of being overfished or overfishing but not both (yellow) is 72.4% (**ALB-Figure 9**).

South Atlantic

In 2013, a stock assessment of South Atlantic albacore was conducted including catch, effort and size data up until 2011, and considering similar methods as in the previous assessment.

The southern standardized CPUE trends are mainly for longline fisheries, which harvest mostly adult albacore. The longest time series (those of Japan and Chinese Taipei), showed a strong declining trend in the early part of the time series, and less steep decline over the past decade. However, the Uruguayan longline CPUE series showed significant decreases since the 1980s (**ALB-Figure 10**).

In the 2013 assessment, the same eight scenarios as in 2011 were considered, but after screening during the data preparatory meeting, less CPUE series were input in the models. Stock status results varied significantly among scenarios (**ALB-Figure 11a, b**). Two different production model forms were considered, each with four scenarios. One showed more optimistic results than the other. However, the Committee lacked enough objective information to identify the most plausible scenarios. Considering the whole range of scenarios, the median MSY value was 25,228 t (ranging between 19,109 t and 28,360 t), the median estimate of current B/B_{MSY} was 0.92 (ranging between 0.71 and 1.26) and the median estimate of current F/F_{MSY} was 1.04 (ranging between 0.38 and 1.32). The wide confidence intervals reflect the large uncertainty around the estimates of stock status. Considering all scenarios, there is 57% probability for the stock to be both overfished and experiencing overfishing, 13% probability for the stock to be either overfished or experiencing overfishing but not both, and 30% probability that biomass is above and fishing mortality is below the Convention objectives (**ALB-Figure 11c**).

Mediterranean

In 2011, the first stock assessment for Mediterranean albacore was conducted, using data up until 2010. The methods used were adapted to the "data poor" category of this stock. The more data-demanding methods applied, such as a production model, gave unrealistic results.

Some CPUE series for Mediterranean fisheries became available (**ALB-Figure 12**). However, these series were discontinuous and highly variable, with no clear trend over the last couple of decades. Since they are mostly very short, and there is little overlap between time series, they may or may not accurately characterize biomass dynamics in Mediterranean albacore.

The results of the 2011 assessment, based on the limited information available and in simple analyses, point to a relatively stable pattern for albacore biomass in the recent past. Recent fishing mortality levels appear to have been reduced from those of the early 2000s, which were likely in excess of F_{MSY}, and might now be at about or lower that level (**ALB-Figure 13**).

ALB-4. Outlook

North Atlantic

The stock projected under different scenarios indicates that if catch in the future were on average similar to those observed over the recent five years (about 20,000 t) or around the current TAC (28,000 t), the biomass would continue to increase from its level of 2012 (**ALB-Table 2**). Considering the Commission's decision framework in Rec. [11-13] (**ALB-Figure 14**), and noting that the Commission requested SCRS to identify a limit reference point for northern Albacore (Rec [11-04]), the outlook for stock status under the Commission's decision guidelines was projected making use of Harvest Control Rule (HCR, **ALB-Figure 15**) options (**ALB-Table 3**) consistent with the policies identified in Rec [11-13], using an interim biomass limit of $0.4B_{MSY}$ that should be further tested, together with other candidate reference points, using the MSE framework. Projections were constructed in this way to inform the Commission's choice of 'high probability' and 'short period' (**ALB-Figure 14**), considering the uncertainty in stock status evaluations that could be quantified and assuming that the indicated strategy could be perfectly implemented.

ALB-Table 4 provides the results of the HCR evaluations and indicate the projected probability of being 'Green' within the time-frame indicated. Expected catch along different timeframes are also shown, allowing the Commission to choose appropriate probability and time frames and weigh tradeoffs with expected catch.

South Atlantic

The projection results differ between the base case scenarios. Since there is not objective information with which to select which scenario is most plausible, the group considered the entire range of scenarios, thus characterizing the range of possible responses to the distinct catch levels projected, as done in 2011. Projections at a level consistent with the 2013 TAC (24,000 t) showed that probabilities of being in the green area of the Kobe plot would be higher than 50% only after 2020. Similar probabilities could be achieved earlier with lower TAC values. Likewise, lower TAC values would provide higher probabilities of being in the green area by 2020 (**ALB-Table 5**). However, larger TACs would not provide larger than 50% probability in the timeframe analyzed.

Projections at $F_{MSY,}$ without considering implementation errors, suggested that the stock biomass would not rebuild with a probability higher than 50% before 2026. Similar probabilities (higher than 50%) of rebuilding could be obtained from 2017 when projected at 0.95*F_{RMS}.

Mediterranean

Due to the fact that the management advice for the Mediterranean stock was based on catch curve analysis and due to the limited quantitative information available to the SCRS, projections for this stock were not conducted. As a result, future stock status in response to management actions could not be simulated. The outlook for this stock is thus unknown.

ALB-5. Effect of current regulations

North Atlantic

In 2013, the Commission established a TAC for 2014-2016 of 28,000 t [Rec. 13-05], but included several provisions that allow the catch to exceed this level.

Furthermore, a 1998 recommendation that limits fishing capacity to the average of 1993-1995, remains in force.

The Committee noted that, since the establishment of the TAC in the year 2001, catch remained substantially below the TAC in all but two years (**ALB-Figure 2**). This might have accelerated rebuilding over the last decade.

South Atlantic

In 2013 the Commission established a new TAC of 24,000 t for 2014-2016 [Rec. 13-06]. The Committee noted that, since 2004, reported catches remained below 24,000 t, except in 2006, 2011 and 2012, where reported catches were slightly above this value (**ALB-Table 1**).

Mediterranean

There are no ICCAT regulations directly aimed at managing the Mediterranean albacore stock.

ALB-6. Management recommendations

North Atlantic

Projections at the current TAC level (28,000 t) indicate that the stock would rebuild by 2019 with 53% probability, which would meet the objective of the albacore recovery plan (Rec. 13-05). The recovery of the stock with similar probabilities would be faster (by 2016) if the catches remain at the level of recent catches (around 20,000 t). Higher probabilities of rebuilding would require longer timeframes. For instance, 75% probability of rebuilding would be achieved by 2019 with a constant catch of 20,000 t, and by 2027 with a constant catch of 28,000t. Catches above 34,000 t would not rebuild the stock with at least 50% probability in the projected timeframes (**ALB-Table 2**).

These projections were complemented by a set of projections under alternative provisional HCRs that could serve the Commission to decide on desired timeframes and probabilities for recovering the north Atlantic stock and which are consistent with the decision framework of Rec [11-13] in that there is a high probability of F<FMSY in as short a time as possible. A range of time-frames and probability levels for achieving the Commission's goals established in Rec [11-13] are provided in **ALB-Table 4**. Longer time frames provide more options for HCR parameters that project higher probabilities of being 'Green'. The HCR projections indicate, for example, should the Commission wish to have a 'high probability' of 75% within a 10 year time-frame, then the HCR with a Biomass Threshold at BMSY paired with a Target F of .9FMSY would provide the highest expected 10 year cumulative catch amongst options and the average catch expected from 2014-2016 would be approximately 26,260 t. Should the Commission consider a 'high probability' of 60% sufficient within a five year time-frame, then the HCR with a Biomass Threshold at BMSY paired with a Target F of .9FMSY would also meet that objective and provide the highest expected cumulative catch amongst options that would provide at least 60% probability within five years and the average catch from 2014-2016 would remain approximately 26,260 t. Unlike the constant catch projections, the HCR projections imply increasing catch as the population biomass increases resulting in higher cumulative catch over time to achieve equivalent conservation objectives of a constant catch policy. This can be evaluated by comparing **ALB-Tables 2** and **4**. Consideration of implementation and other uncertainties in these projections would likely change the probability level estimates.

South Atlantic

Results indicate that, most probably, the South Atlantic albacore stock is around the spawning biomass and the fishing mortality that can sustain the maximum sustainable levels. However, there is considerable uncertainty about the current stock status, as well as on the effect of alternative catch limits on the rebuilding probabilities of the southern stock.

Projections at a level consistent with the 2013 TAC (24,000 t) showed that probabilities of being in the green area would exceed 50% only after 2020. Similar probabilities could be achieved earlier with lower TAC values.

With catches around 20,000 t, probabilities of 50% would be exceeded by 2015, and probabilities of 60% would be exceeded by 2018. Lower catches (as in 2013) would increase the probability of recovery in those timeframes. And likewise, increases would reduce rebuilding probabilities and extend the timeframes. Catches over the current TAC (24,000 t) will not permit the rebuilding of the stock with at least 50% probability over the projection timeframe (**ALB-Table 5**).

Mediterranean

The available information on Mediterranean albacore stock status indicates a relatively stable pattern for albacore biomass over the recent past. Unfortunately, very little quantitative information is available to SCRS for use in conducting a robust quantitative characterization on biomass status relative to Convention objectives. While additional data to address this issue might exist at CPC levels, our ability to provide quantitative management advice will be seriously impeded until such data become available either through recovery of historical data or institution of adequate fishery monitoring data collection programs. Recent fishing mortality levels appear to have been reduced from those of the early 2000s, which were likely in excess of F_{MSY}, and might now be at about or lower than that level. However, there is considerable uncertainty about this and for this reason, the Commission should institute management measures designed to limit increases in catch and effort directed at Mediterranean albacore.

ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY

	North Atlantic	**South Atlantic**	**Mediterranean**
Maximum Sustainable Yield	31,680 t	25,228 t (19,109-28,360)[1]	Unknown
Current (2014) TAC	28,000 t	24,000 t	None
Current (2013) Yield	20,948 t	19,148 t	1,675 t
Yield in last year of assessment (2011)	20,044 t	24,117 t	
Yield in last year of assessment (2010)			2,124 t
SSB_{MSY}	81,110 t		
B_{MSY}		216,807 t (88,380-595,953) [1]	
F_{MSY}	0.1486	0.176 (0.063-0,481) [1]	
SSB_{cur}/SSB_{MSY} [2]	0.94 (0.74-1.14) [2]		Not estimated
SSB_{cur}/Blim	2.4[3]		
B_{2012}/B_{MSY} [1]		0.92 (0.71-1.26)[1]	
F_{cur}/F_{MSY} [2]	0.72 (0.55-0.89) [2]		<=1 [4]
F_{2011}/F_{MSY} [1]		1.04 (0.38-1.32)[1]	
Stock Status	Overfished: YES	Overfished: YES	?
	Overfishing: NO	Overfishing: YES	NO
Management measures in effect:	[Rec. 98-08]: Limit number of vessels to 1993-1995 average. [Rec. 13-05] TAC of 28,000 t for 2014-2016.	[Rec. 13-06]: TAC of 24,000 t for 2014-2016	None

[1] Median range and 80% CI calculated for the whole range of the 8 base cases.
[2] Average for the last three years, with base case 95% confidence interval.
[3] The proposed interim Blim is 0.4.
[4] Estimated with length converted catch curve analysis, taking M as a proxy for F_{MSY}.

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

			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL			63342	67491	56326	69615	73086	71812	67517	60379	59585	59039	67063	70088	69919	60095	61466	53378	57728	67407	48841	42320	41661	40857	48828	52825	41772
	ATN		32071	36881	27931	30851	38135	35163	38377	28803	29023	25746	34551	33124	26253	22741	25567	25960	35318	36989	21991	20483	15380	19509	20044	25680	20948
	ATS		27212	28714	26016	36562	32813	35300	27552	28426	28022	30595	27656	31387	38796	31746	28002	22543	18882	24453	20283	18867	22260	19225	24124	25060	19148
	MED		4060	1896	2379	2202	2138	1349	1587	3150	2541	2698	4856	5577	4870	5608	7897	4874	3529	5965	6567	2970	4021	2124	4660	2086	1675
Landings	ATN	Bait boat	15374	18624	8968	12436	15646	11967	16411	11338	9821	7562	8780	11072	6103	6638	7840	8128	10458	14273	8496	7931	4994	6026	5530	8816	4830
		Longline	2239	2683	5315	3152	7093	7309	4859	4641	4051	4035	6710	7321	7372	6180	7699	6917	6911	5223	3237	2647	2619	3913	3666	3759	6325
		Other surf.	1652	3865	3999	5173	7279	7506	3555	3337	4378	6846	6817	5971	2828	422	551	697	624	625	525	274	427	324	412	352	358
		Purse seine	12	1	222	139	229	292	278	263	26	91	56	191	264	118	211	348	99	188	198	70	89	74	5	167	7
		Trawl	2240	1033	469	2603	1779	2131	3049	2571	2877	1318	5343	3547	5374	5376	3846	2369	7001	6385	3429	4321	2811	2026	6852	6678	3468
		Troll	10554	10675	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4007	5419	7501	10224	10296	6105	5239	4440	7146	3578	5909	5867
	ATS	Bait boat	7393	5981	3454	6490	7379	8947	7091	6960	8110	10353	6709	6873	10355	9712	6973	7475	5084	5876	3375	4350	7926	3748	5938	6710	5223
		Longline	19407	21590	22008	27162	23947	24806	20040	21000	19547	19799	20640	24398	28039	21671	20626	14735	12977	17740	15087	13218	12113	13471	16445	17846	13832
		Other surf.	411	1139	137	393	39	483	10	209	127	0	73	58	377	323	82	299	288	395	1762	1219	2066	1651	1538	66	2
		Purse seine	0	4	416	2517	1448	1064	412	257	117	434	183	58	25	39	309	16	534	442	58	81	155	355	203	437	91
		Trawl	0	0	0	0	0	0	0	0	120	9	52	0	0	0	12	18	0	0	0	0	0	0	0	0	
	MED	Bait boat	0	83	499	171	231	81	163	205	0	33	96	88	77	29	0	0	0	0	0	0	0	0	0	0	
		Longline	165	624	524	442	410	350	87	391	348	194	416	2796	2597	3704	4248	2335	1997	3026	4119	2694	1582	1719	2356	1998	1558
		Other surf.	3879	1098	1198	1533	879	766	1031	2435	1991	2426	4271	2693	2196	1757	3171	2187	1215	2723	1401	250	2414	404	2245	8	25
		Purse seine	16	91	110	6	559	23	0	0	0	0	0	0	0	1	478	353	317	214	1046	24	26	0	34	68	86
		Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Troll	0	0	48	50	59	129	306	119	202	45	73	0	0	117	0	0	0	1	0	1	0	1	0	6	
Discards	ATN	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93
	ATS	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MED	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	6	7
Landings	ATN	Barbados	0	0	0	0	0	0	0	0	1	1	1	0	2	5	8	10	13	9	7	7	4	6	4	20	22
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	26	39	416	351	155	230
		Brazil	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	22	6	5	1	9	32	12	24	31	23	38	122	51	113	56	27	52	27	25	33	11	14	28	34	32
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	0	
		China PR	0	0	0	0	0	14	8	20	0	0	21	16	57	196	155	32	112	202	59	24	27	142	101	21	81
		Chinese Taipei	1294	3005	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4330	4557	4278	2540	2357	1297	1107	863	1587	1367	1180	2394
		Cuba	1	2	0	0	0	0	0	0	0	0	0	0	0	1	322	435	424	527	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	53	39	146	
		Dominican Republic	0	0	0	0	0	0	0	0	323	121	73	95	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.España	25424	25792	17233	18175	18380	16998	20197	16324	17295	13285	15363	16000	9177	8952	12530	15379	20447	24538	14582	12725	9617	12961	8357	13719	10502
		EU.France	4050	3625	4123	6924	6293	5934	5304	4694	4618	3711	6888	5718	6006	4345	3456	2448	7266	6585	3179	3009	1122	1298	3348	3361	1241
		EU.Ireland	0	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100	755	175	306	521	596	1517	1997	788	3597	3575	2231
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	
		EU.Portugal	169	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953	553	513	556	119	184	614	108	202	1046	1231	421
		EU.United Kingdom	0	0	0	59	499	613	196	49	33	117	343	15	0	0	0	0	6	19	30	50	67	118	57	50	133
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	7	2	0	3	0	0	0	0	0	0
		Grenada	0	0	0	0	0	0	2	1	6	7	6	12	21	23	46	25	29	19	20	15	18	18	18	0	
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	764	737	691	466	485	505	386	466	414	446	425	688	1126	711	680	893	1336	781	288	402	288	525	336	400	1804
		Korea Rep.	53	34	1	0	8	0	2	2	1	0	0	0	0	0	0	0	59	45	12	59	82	110	60	200	184
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	55	81	120	178	98	96	99	130	0	0	0	**0**
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		NEI (Flag related)	0	0	11	19	13	10	8	11	3	8	12	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	29	60	117	73	11	5	0	0	0	0	0	0	0	0	96	298	113	45	154	103	0	227
		Philippines	0	0	0	0	0	0	0	0	0	151	4	0	0	0	0	0	9	0	8	19	54	0	0	83	**0**
		Sierra Leone	10	0	0	0	0	0	0	0	0	0	0	0	91	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	2	0	0	0	0	0	1	704	1370	300	1555	89	802	76	263	130	135	177	329	305	286
		Sta. Lucia	0	0	0	1	1	0	1	1	0	0	0	1	3	2	10	0	2	2	2	2	0	130	2	3	2
		Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	249	216
		Trinidad and Tobago	0	4	0	247	0	0	0	0	2	1	1	2	11	9	12	12	9	12	18	32	17	17	23	47	67
		U.S.A.	243	357	479	438	509	741	545	472	577	829	315	406	322	480	444	646	488	400	532	257	189	315	422	418	599
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	0	0	0	0	0	0	0	0	1	0	2	2	2	0	0	1	1	0	0	0	0	0	1	0	0
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414	507	235	95	20	140	187	196	172	
		Venezuela	41	94	302	193	246	282	279	315	75	107	91	299	348	162	346	457	175	321	375	222	398	288	247	312	181
	ATS	Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	
		Argentina	354	151	60	306	0	2	0	0	120	9	52	0	0	0	12	18	0	0	0	0	0	130	43	0	
		Belize	0	0	0	0	0	0	2	0	0	0	8	2	0	0	0	0	0	54	32	31	213	303	365	171	87

		Brazil	435	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228	2647	522	556	361	535	487	202	271	1269	1857	1743
		Cambodia	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	46	24	0	0	0	0	0	
		China PR	0	0	0	0	0	0	0	0	0	0	39	89	26	30	26	112	95	100	35	25	89	97	80	61	65
		Chinese Taipei	18386	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351	13288	10730	12293	13146	9966	8678	10975	13032	12812	8519
		Cuba	1	2	17	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Curaçao	0	0	0	0	0	0	0	0	9	192	0	2	0	0	0	0	0	0	0	0	21	4	4	24	**0**
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	43	45	50	
		EU.España	0	0	280	1943	783	831	457	184	256	193	1027	288	573	836	376	81	285	367	758	933	1061	294	314	351	381
		EU.France	0	0	50	449	564	129	82	190	38	40	13	23	11	18	63	16	478	347	12	50	60	109	53	161	73
		EU.Portugal	557	732	81	184	483	1185	655	494	256	124	232	486	41	433	415	9	43	8	13	49	254	84	44	11	1
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		Ghana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	14	25	0	0	
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	56	0	0	15
		Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	74	**0**
		Honduras	0	0	0	29	0	0	2	0	7	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	450	587	654	583	467	651	389	435	424	418	601	554	341	231	322	509	312	316	238	1370	921	973	1194	2903	3145
		Korea Rep.	54	19	31	5	20	3	3	18	4	7	14	18	1	0	5	37	42	66	56	88	374	130	70	89	33
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (ETRO)	0	4	8	122	68	55	63	41	5	27	0	0	10	14	53	0	7	0	0	0	0	0	0	0	
		NEI (Flag related)	0	0	149	262	146	123	102	169	47	42	38	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	1111	950	982	1199	1429	1162	2418	3419	2962	3152	3328	2344	5100	1196	1958	4936	1320	3791	2420	848
		Panama	0	0	240	482	318	458	228	380	53	60	14	0	0	0	0	0	17	0	87	5	6	1	0	12	3
		Philippines	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	52	0	13	79	45	95	96	203	415
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		South Africa	6890	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507	3469	4502	3198	3735	3797	3468	5043	4147	3380	3553	3510
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	2116	4292	44	0	0	0	65	160	71	51	31	94	92	97
		U.S.A.	0	0	0	0	0	0	0	1	5	1	1	1	2	8	2	1	0	0	0	0	0	0	0	0	0
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	1	1	5	28	38	5	82	47	18	1	1	58	12	2	0	0	0	62	46	94	81	3	120	2	2
		Uruguay	83	55	34	31	28	16	49	75	56	110	90	90	135	111	108	120	32	93	34	53	97	24	37	12	209
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	684	1400	96	131	64	104	85	35	
	MED	EU.Croatia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	12	20
		EU.Cyprus	0	0	0	0	0	0	0	0	0	0	0	6	0	12	30	255	425	507	712	209	223	206	222	315	350
		EU.España	0	84	548	227	298	218	475	429	380	126	284	152	200	209	1	138	189	382	516	238	204	277	343	389	489
		EU.France	31	121	140	11	64	23	3	0	5	5	0	0	0	1	0	0	0	0	2	1	0	1	2	0	0
		EU.Greece	500	500	500	500	1	1	0	952	741	1152	2005	1786	1840	1352	950	773	623	402	448	191	116	125	165	165	93
		EU.Italy	3529	1191	1191	1464	1275	1107	1109	1769	1414	1414	2561	3630	2826	4032	6912	3671	2248	4584	4017	2104	2724	1109	2494	1117	615
		EU.Malta	0	0	0	0	0	0	0	0	1	1	6	4	4	2	5	10	15	18	1	5	1	2	5	19	29
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	**0**
		NEI (MED)	0	0	0	0	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Syria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	14	0	0	0	1	1
		Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	30	73	852	208	631	402	1396	62	71
		Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	ATN	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93
	ATS	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MED	EU.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	6	7

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

ALB-Table 2. North Atlantic albacore estimated probabilities (in %) that the fishing mortality is below F_{MSY} (a), spawning stock biomass is above SSB_{MSY} (b) and both (c). Projections for constant catch levels are shown.

(a) Probability F<Fmsy

TAC	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
20000	96	97	98	98	98	98	98	98	98	98	99	99	99	99	99	99	99	99
22000	93	94	95	96	96	97	97	97	97	97	97	98	98	98	98	98	98	98
24000	87	89	91	92	93	94	94	95	95	95	96	96	96	96	96	96	96	97
26000	79	82	84	86	87	89	90	90	91	91	92	92	93	93	93	93	94	94
28000	68	72	74	77	78	80	81	83	84	85	85	86	87	87	88	88	89	89
30000	57	61	63	66	68	70	72	73	75	76	77	78	78	79	80	81	81	82
32000	48	49	52	54	56	58	60	61	63	65	66	67	68	69	70	71	71	72
34000	39	40	42	44	45	47	49	51	52	53	54	55	56	57	57	58	59	59
36000	32	33	34	35	36	37	38	40	41	42	43	44	45	46	47	47	48	48
38000	24	25	26	27	28	29	30	31	32	33	33	34	35	35	36	36	37	38
40000	17	17	18	18	19	20	20	21	22	22	23	23	23	24	24	25	26	27

(b) Probability SSB>SSBmsy

TAC	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0	38	56	74	86	91	94	96	97	98	98	99	99	99	99	100	100	100	100
20000	29	38	45	54	63	69	75	79	83	85	87	89	90	92	93	93	94	95
22000	28	36	43	50	58	64	70	75	78	81	84	85	87	89	89	91	92	92
24000	27	35	40	46	53	59	64	69	73	76	79	81	83	84	86	87	88	89
26000	26	33	38	43	49	54	59	63	67	70	73	76	78	79	81	83	84	84
28000	25	31	36	39	44	49	53	57	61	63	66	69	71	73	75	76	77	79
30000	24	29	34	37	39	43	47	50	54	56	59	61	63	65	66	68	69	71
32000	23	27	31	34	36	39	41	43	47	49	51	53	55	57	58	59	61	62
34000	22	25	27	30	33	35	36	38	40	42	43	45	47	48	50	51	52	53
36000	22	23	24	26	28	30	32	33	34	35	36	37	38	39	40	41	41	42
38000	21	21	22	22	23	24	25	26	27	28	29	29	30	31	31	32	32	32
40000	21	20	19	19	19	19	19	19	19	20	20	20	20	20	21	21	21	21

(c) Probability of green status (SSB>SSBmsy and F<Fmsy)

TAC	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0	38	56	74	86	91	94	96	97	98	98	99	99	99	99	100	100	100	100
20000	29	38	45	54	63	69	75	79	83	85	87	89	90	92	93	93	94	95
22000	28	36	43	50	58	64	70	75	78	81	84	85	87	89	89	91	92	92
24000	27	35	40	46	53	59	64	69	73	76	79	81	83	84	86	87	88	89
26000	26	33	38	43	49	54	59	63	67	70	73	76	78	79	81	83	84	84
28000	25	31	36	39	44	49	53	57	61	63	66	69	71	73	75	76	77	79
30000	24	29	34	37	39	43	47	50	54	57	59	61	63	65	66	68	69	71
32000	23	27	31	34	36	39	41	44	47	49	51	53	55	57	58	59	61	62
34000	22	24	27	30	32	34	36	38	40	41	43	45	47	48	49	50	52	52
36000	21	22	23	25	27	29	31	32	33	34	35	36	38	39	40	40	41	42
38000	18	19	19	20	21	22	23	24	25	26	27	28	29	30	30	31	31	32
40000	16	16	16	16	16	16	17	17	17	18	18	18	18	19	19	19	19	20

Average catch over:	Cumulative Catch over:			
3 years	5 years	10 years	15 years	20 years
0	0	0	0	0
20,000	100,000	200,000	300,000	400,000
22,000	110,000	220,000	330,000	440,000
24,000	120,000	240,000	360,000	480,000
26,000	130,000	260,000	390,000	520,000
28,000	140,000	280,000	420,000	560,000
30,000	150,000	300,000	450,000	600,000
32,000	160,000	320,000	480,000	640,000
34,000	170,000	340,000	510,000	680,000
36,000	180,000	360,000	540,000	720,000
38,000	190,000	380,000	570,000	760,000
40,000	200,000	400,000	600,000	800,000

ALB-Table 3. Levels of Target F, and Biomass threshold levels in combination with an interim Biomass limit of $0.4B_{MSY}$ in HCR parameterization consistent with Rec [11-13] to inform the Commission in support of identifying 'high probability' and 'short period'.

FTarget: $.75F_{MSY}$, $.8F_{MSY}$, $.85F_{MSY}$, $.9F_{MSY}$, $.95F_{MSY}$, F_{MSY}

BThreshold: $.6B_{MSY}$, $.8B_{MSY}$, B_{MSY}

ALB-Table 4. North Atlantic albacore estimated probabilities (in %) that the fishing mortality is below F_{MSY} and spawning stock biomass is above SSB_{MSY} (green status). Projections conducted with different Harvent Control Rules (as combinations of Bthresh and Ftarget values, all assuming Blim=0.4SSB_{MSY}) are shown (see also **ALB-Figure 14 and ALB-Figure 15**).

	Kobe II Strategy matrix. Future probability of SSB>SSBMSY and F<FMSY for different combinations of Bthreshold and Ftarget values																		Average catch over		Cumulative catch over:		
Bthreshold	Ftarget	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	3 years	5 years	10 years	15 years	20 years
.6Bmsy	0.75Fmsy	29	32	36	49	54	57	61	65	68	70	73	75	77	78	80	81	82	84	26.969	139.100	293.575	454.716	620.434
.6Bmsy	0.8Fmsy	29	31	35	45	52	55	58	61	64	67	69	71	74	75	77	78	79	80	28.458	146.274	306.335	472.388	642.668
.6Bmsy	0.85Fmsy	29	31	33	42	47	52	55	57	59	62	64	67	69	71	72	74	76	77	29.911	153.211	318.349	488.666	662.774
.6Bmsy	0.9Fmsy	29	30	30	39	42	46	50	52	54	56	58	60	62	64	66	68	70	71	31.330	159.918	329.637	503.591	680.809
.6Bmsy	0.95Fmsy	29	29	20	36	37	39	42	44	48	50	51	52	54	55	56	58	60	61	32.715	166.398	340.221	517.205	696.835
.8Bmsy	0.75Fmsy	29	32	42	51	55	59	63	67	70	72	75	76	78	80	81	83	86	88	25.260	133.581	289.167	451.760	618.642
.8Bmsy	0.8Fmsy	29	32	41	50	53	56	59	62	66	69	71	73	75	77	78	80	81	83	26.655	140.496	301.820	469.532	641.152
.8Bmsy	0.85Fmsy	29	31	39	48	50	53	56	58	61	63	67	69	71	73	75	76	77	79	28.016	147.185	313.734	485.931	661.571
.8Bmsy	0.9Fmsy	29	30	35	46	48	50	51	54	56	58	60	62	64	67	69	70	72	73	29.346	153.654	324.930	500.996	679.954
.8Bmsy	0.95Fmsy	29	29	23	45	45	46	47	48	49	51	52	54	55	56	58	59	61	63	30.643	159.905	335.420	514.759	696.359
Bmsy	0.75Fmsy	29	35	47	58	62	68	72	75	78	80	82	84	87	90	92	94	95	96	22.639	123.151	277.783	441.651	610.569
Bmsy	0.8Fmsy	29	34	46	56	61	66	71	73	76	78	80	82	85	87	90	92	94	95	23.877	129.456	289.836	458.946	632.882
Bmsy	0.85Fmsy	29	33	45	55	59	63	69	71	74	77	78	80	82	84	87	89	91	93	25.083	135.543	301.142	474.839	653.068
Bmsy	0.9Fmsy	29	33	42	54	56	60	66	68	71	74	76	77	79	81	83	85	87	89	26.260	141.416	311.703	489.342	671.130
Bmsy	0.95Fmsy	29	32	32	52	54	57	62	64	67	70	72	73	76	77	78	80	81	83	27.407	147.079	321.520	502.449	687.030

ALB-Table 5. South Atlantic albacore estimated probabilities (in %) that the South Atlantic albacore stock fishing mortality is below F_{MSY} (a), biomass is above B_{MSY} (b) and both (c). Projections for constant F and constant catch levels are shown.

(a) Probability F<Frms

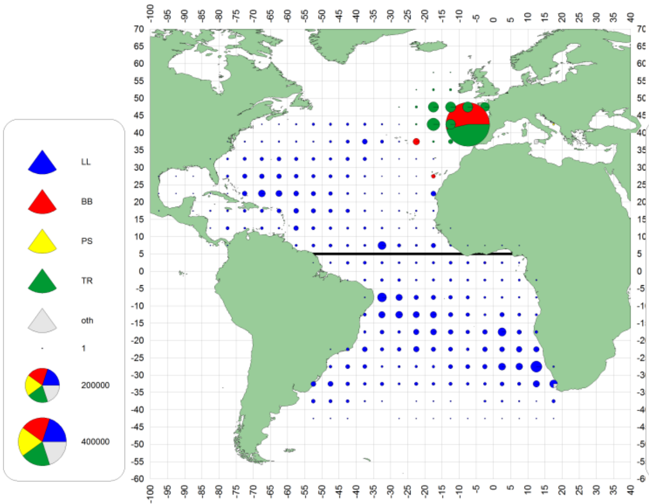
Harvest	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
14000	0.909	0.914	0.919	0.922	0.923	0.924	0.926	0.928	0.929	0.929	0.930	0.932	0.931
16000	0.857	0.863	0.871	0.874	0.878	0.882	0.887	0.892	0.895	0.897	0.899	0.901	0.902
18000	0.799	0.808	0.819	0.825	0.830	0.834	0.838	0.841	0.843	0.846	0.848	0.851	0.852
20000	0.680	0.698	0.708	0.719	0.728	0.740	0.746	0.753	0.759	0.765	0.772	0.776	0.781
22000	0.590	0.603	0.610	0.618	0.626	0.634	0.637	0.644	0.648	0.654	0.656	0.659	0.662
24000	0.506	0.511	0.519	0.526	0.530	0.534	0.537	0.540	0.541	0.542	0.545	0.547	0.550
26000	0.414	0.413	0.414	0.414	0.415	0.415	0.417	0.418	0.419	0.419	0.420	0.419	0.418
28000	0.339	0.332	0.325	0.322	0.316	0.311	0.306	0.304	0.301	0.299	0.292	0.287	0.284
30000	0.286	0.272	0.261	0.247	0.236	0.227	0.221	0.213	0.207	0.200	0.193	0.188	0.185
32000	0.240	0.220	0.206	0.192	0.182	0.175	0.170	0.166	0.161	0.157	0.154	0.149	0.148
34000	0.201	0.182	0.171	0.165	0.157	0.151	0.144	0.140	0.133	0.129	0.126	0.124	0.123

(b) Probability B>Brms

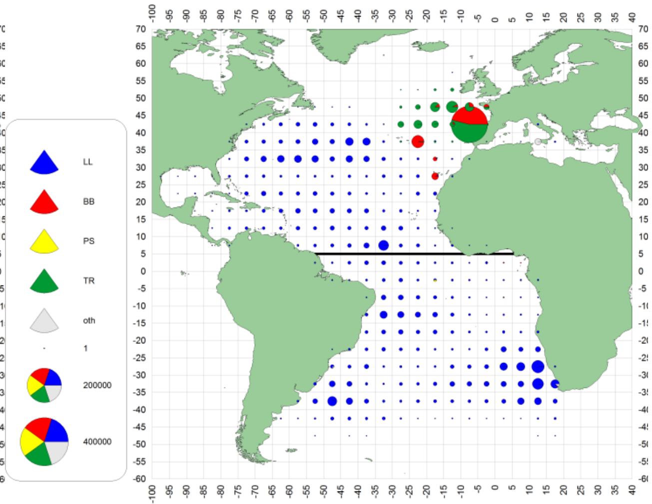
Harvest	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
0.75 Fmsy	0.470	0.539	0.598	0.637	0.678	0.700	0.728	0.753	0.778	0.809	0.824	0.841	0.851
0.8 Fmsy	0.465	0.526	0.576	0.610	0.641	0.675	0.693	0.717	0.735	0.755	0.782	0.796	0.810
0.85 Fmsy	0.464	0.510	0.547	0.584	0.609	0.634	0.658	0.676	0.696	0.712	0.723	0.738	0.757
0.9 Fmsy	0.459	0.490	0.522	0.548	0.570	0.592	0.610	0.625	0.642	0.658	0.671	0.681	0.694
0.95 Fmsy	0.457	0.475	0.493	0.513	0.526	0.542	0.557	0.568	0.581	0.591	0.600	0.609	0.618
1.0 Fmsy	0.451	0.459	0.464	0.471	0.475	0.480	0.482	0.487	0.490	0.493	0.496	0.499	0.500
14000	0.477	0.581	0.643	0.696	0.734	0.762	0.790	0.815	0.836	0.848	0.855	0.864	0.872
16000	0.472	0.562	0.615	0.660	0.700	0.724	0.750	0.767	0.788	0.802	0.822	0.833	0.840
18000	0.471	0.541	0.590	0.623	0.650	0.678	0.703	0.719	0.737	0.750	0.763	0.775	0.787
20000	0.465	0.519	0.564	0.592	0.610	0.627	0.644	0.658	0.671	0.680	0.688	0.696	0.709
22000	0.463	0.495	0.529	0.549	0.570	0.583	0.591	0.599	0.606	0.615	0.623	0.628	0.635
24000	0.460	0.475	0.488	0.501	0.511	0.522	0.524	0.534	0.538	0.542	0.544	0.548	0.551
26000	0.455	0.453	0.451	0.449	0.449	0.444	0.443	0.443	0.439	0.436	0.437	0.437	0.438
28000	0.454	0.432	0.412	0.398	0.384	0.372	0.361	0.352	0.347	0.337	0.327	0.321	0.316
30000	0.447	0.409	0.373	0.350	0.326	0.308	0.285	0.269	0.253	0.242	0.231	0.226	0.218
32000	0.445	0.386	0.342	0.307	0.265	0.239	0.221	0.209	0.201	0.193	0.187	0.182	0.176
34000	0.442	0.368	0.308	0.257	0.224	0.205	0.191	0.182	0.175	0.169	0.160	0.155	0.151

(c) Probability of green status (B>Brms y F<Frms).

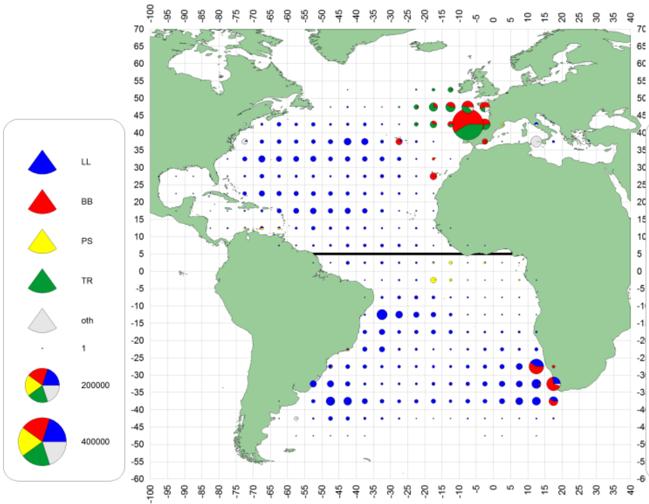
Harvest	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
0.75 Fmsy	0.469	0.538	0.597	0.637	0.677	0.699	0.728	0.753	0.778	0.809	0.824	0.841	0.851
0.8 Fmsy	0.465	0.525	0.575	0.610	0.641	0.675	0.693	0.717	0.735	0.755	0.782	0.796	0.810
0.85 Fmsy	0.464	0.509	0.547	0.583	0.609	0.634	0.658	0.676	0.696	0.712	0.723	0.738	0.757
0.9 Fmsy	0.458	0.489	0.522	0.547	0.570	0.592	0.610	0.625	0.642	0.658	0.671	0.681	0.694
0.95 Fmsy	0.456	0.474	0.492	0.513	0.526	0.541	0.557	0.568	0.581	0.591	0.600	0.609	0.618
1.0 Fmsy	0.160	0.169	0.174	0.181	0.186	0.190	0.193	0.197	0.201	0.203	0.207	0.209	0.211
14000	0.474	0.578	0.641	0.693	0.731	0.760	0.788	0.812	0.833	0.846	0.853	0.861	0.868
16000	0.468	0.557	0.610	0.656	0.695	0.720	0.746	0.763	0.785	0.798	0.819	0.829	0.837
18000	0.463	0.533	0.583	0.615	0.642	0.672	0.697	0.713	0.730	0.744	0.757	0.770	0.783
20000	0.454	0.508	0.553	0.581	0.601	0.618	0.635	0.650	0.663	0.673	0.682	0.692	0.704
22000	0.446	0.480	0.514	0.536	0.558	0.572	0.580	0.590	0.598	0.608	0.615	0.620	0.627
24000	0.428	0.445	0.459	0.475	0.484	0.496	0.503	0.513	0.517	0.521	0.526	0.529	0.532
26000	0.394	0.395	0.399	0.400	0.402	0.403	0.405	0.406	0.407	0.409	0.411	0.412	0.413
28000	0.336	0.329	0.324	0.321	0.315	0.309	0.305	0.302	0.300	0.298	0.291	0.285	0.283
30000	0.286	0.272	0.261	0.247	0.236	0.227	0.221	0.213	0.207	0.200	0.193	0.188	0.185
32000	0.240	0.220	0.206	0.192	0.182	0.175	0.170	0.166	0.161	0.157	0.154	0.149	0.148
34000	0.201	0.182	0.171	0.165	0.157	0.151	0.144	0.140	0.133	0.129	0.126	0.124	0.123



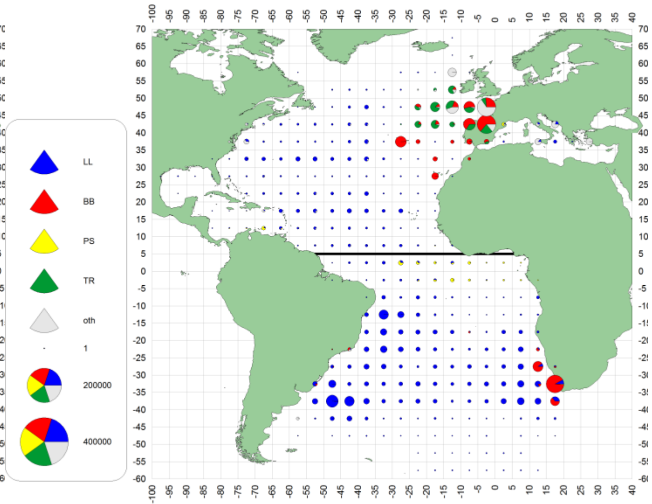
a. ALB(1960-69)



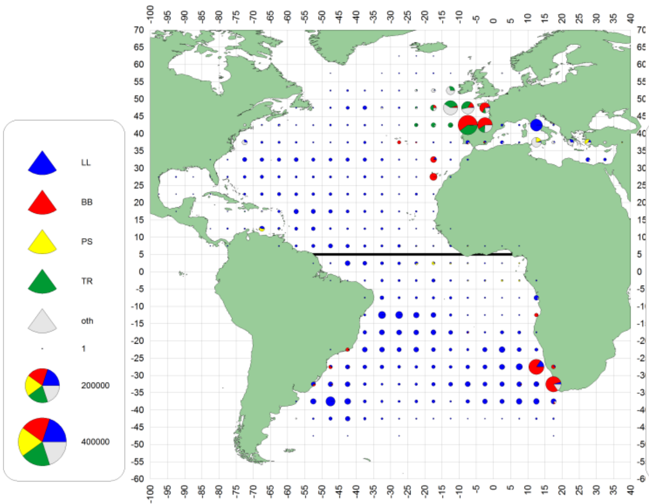
b. ALB(1970-79)



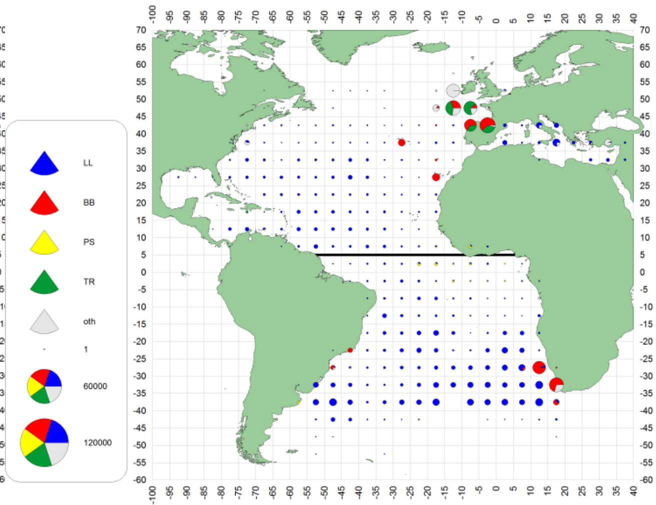
c. ALB(1980-89)



d. ALB(1990-99)



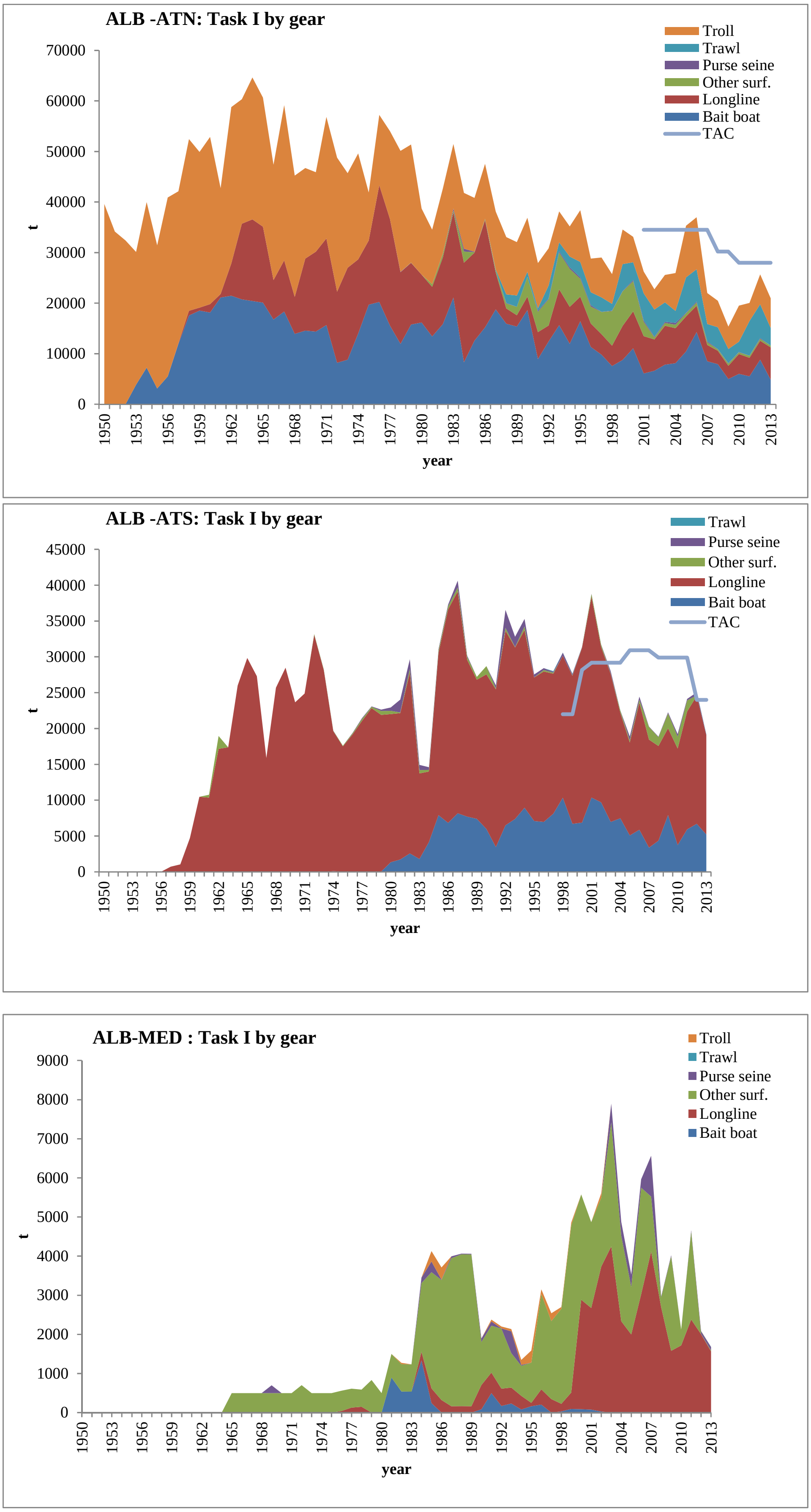
e. ALB (2000-09)



f. ALB(2010-12)

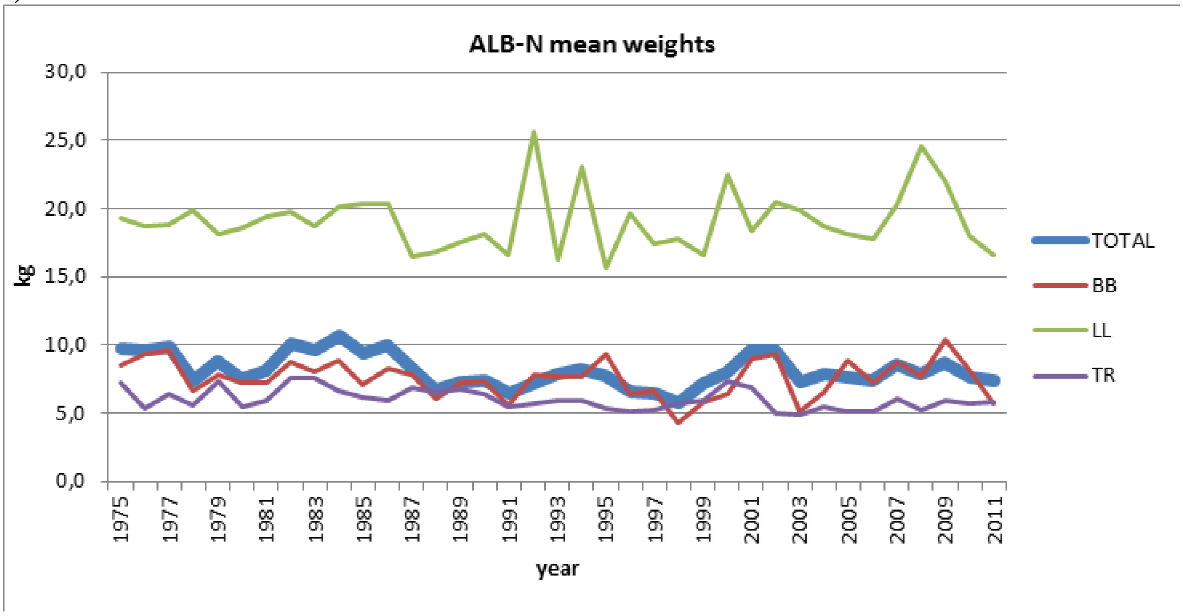
ALB-Figure 1. Geographic distribution of albacore accumulated catch by major gears and decade (1960-2012). Baitboat and troll catches prior to the 1990s, these catches were assigned to only one 5ºx5º stratum in the Bay of Biscay. The symbols for the 2010-2012 information (f) are scaled to the maximum catch observed during 2010-2012, whereas the remaining plots are scaled to the maximum catch observed from 1960 to 2009.

a) b) c)

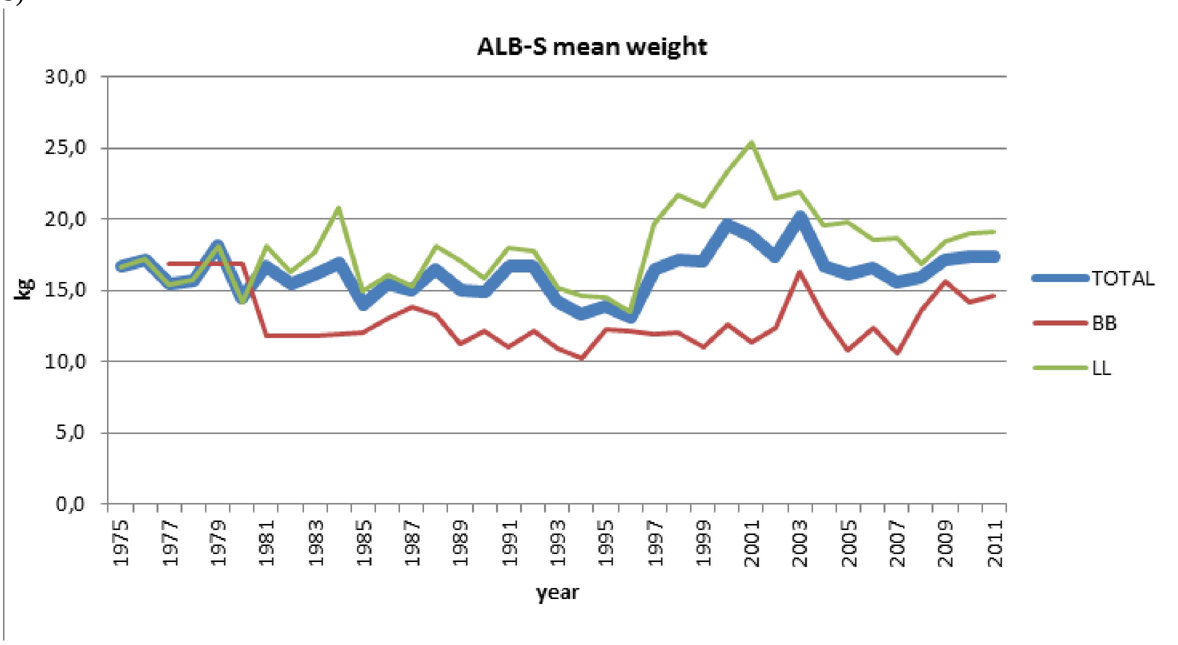


ALB-Figure 2a, b, c. Total albacore catches reported to ICCAT (Task I) by gear for the northern, southern Atlantic stocks including TAC, and the Mediterranean stock.

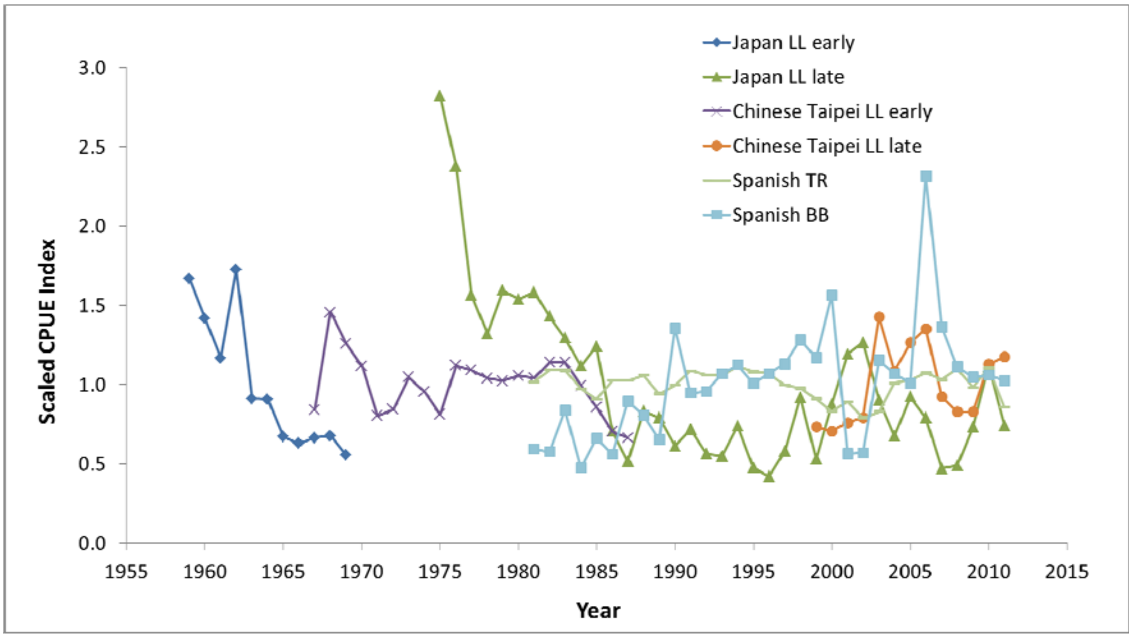
a)



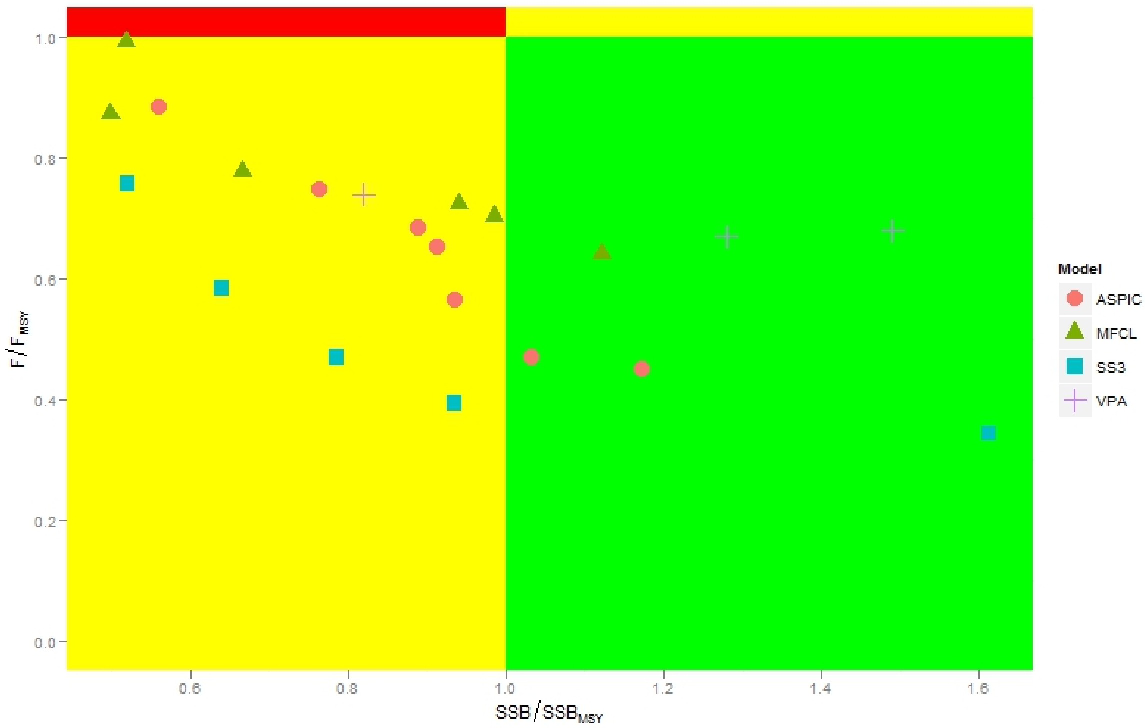
b)



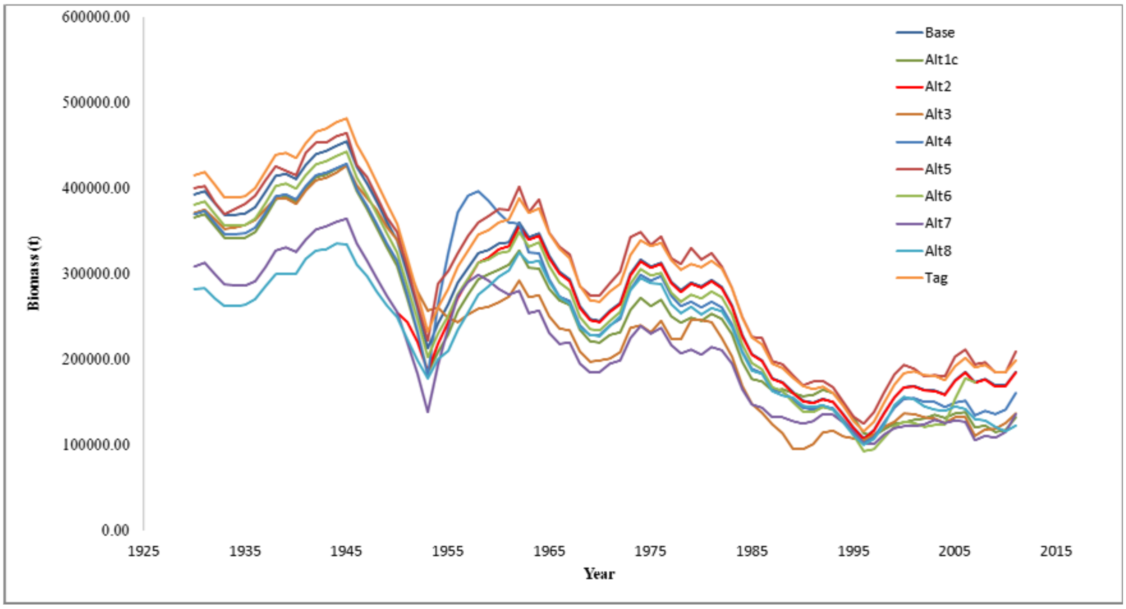
ALB-Figure 3a, b. North Atlantic and South Atlantic albacore. Mean weight trend by surface and longline fisheries in North Atlantic (a) and South Atlantic (b) stocks.



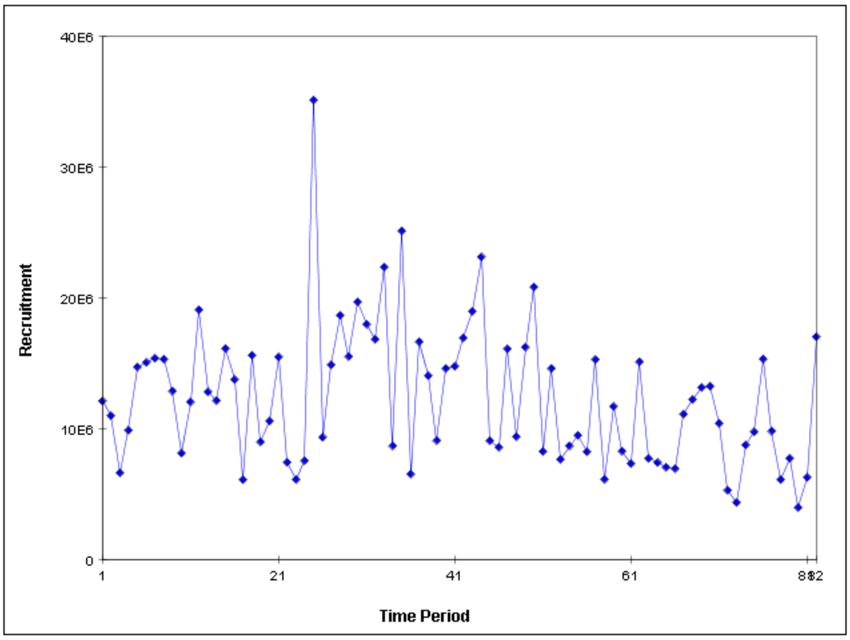
ALB-Figure 4. Standardized catch rate indices used in the 2013 northern albacore stock assessment from the surface fisheries, which take mostly juvenile fish, and from the longline fisheries, which take mostly adult fish.



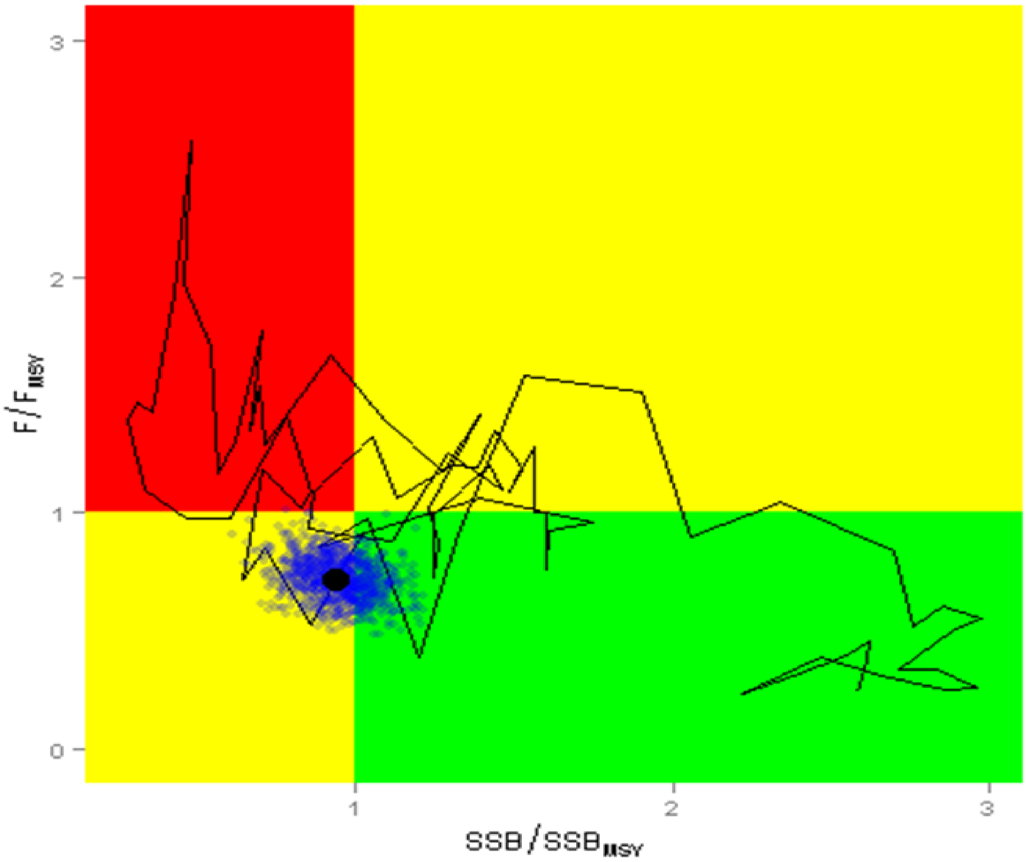
ALB-Figure 5. Stock status of Northern albacore tuna according to base case as well as different models and runs considered during the assessment.



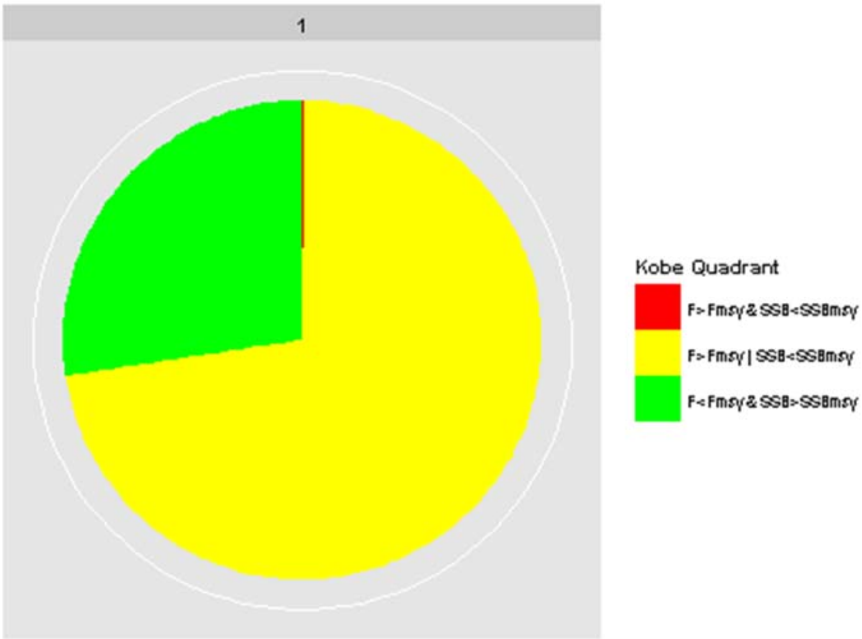
ALB-Figure 6. Estimates of northern Atlantic albacore spawning stock size between 1930-2011 according to the Multifan-CL Base Case and the different sensitivity runs considered in the assessment.



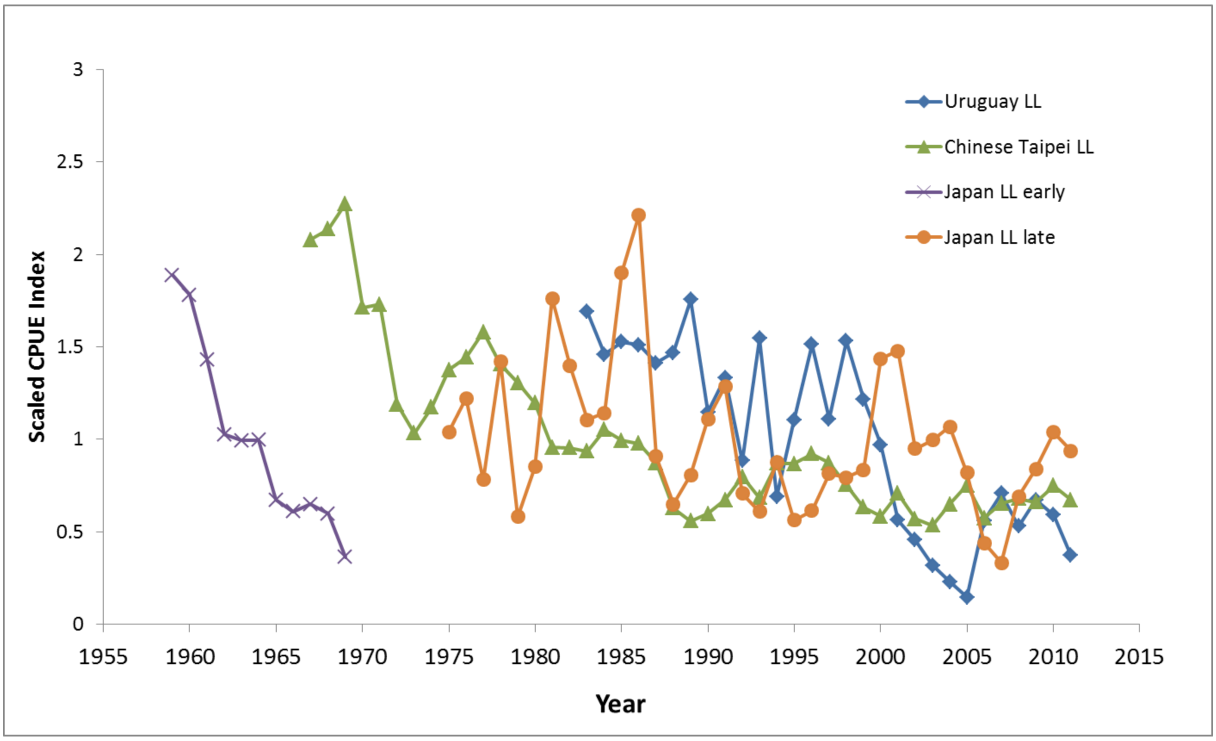
ALB-Figure 7. Estimates of northern Atlantic albacore recruitment (age 1) between 1930-2011 from Multifan-CL base case. Uncertainty in the estimates has not been characterized, but the uncertainty in recent recruitment levels is considered to be higher than in the past.



ALB-Figure 8. Joint trajectories of SSB/SSB_{MSY} and F/F_{MSY} over time and current stock status of northern albacore according to the estimated Multifan-CL Base Case. The black point represents the stock status in 2011, and the blue points represent the uncertainty on the current stock status.

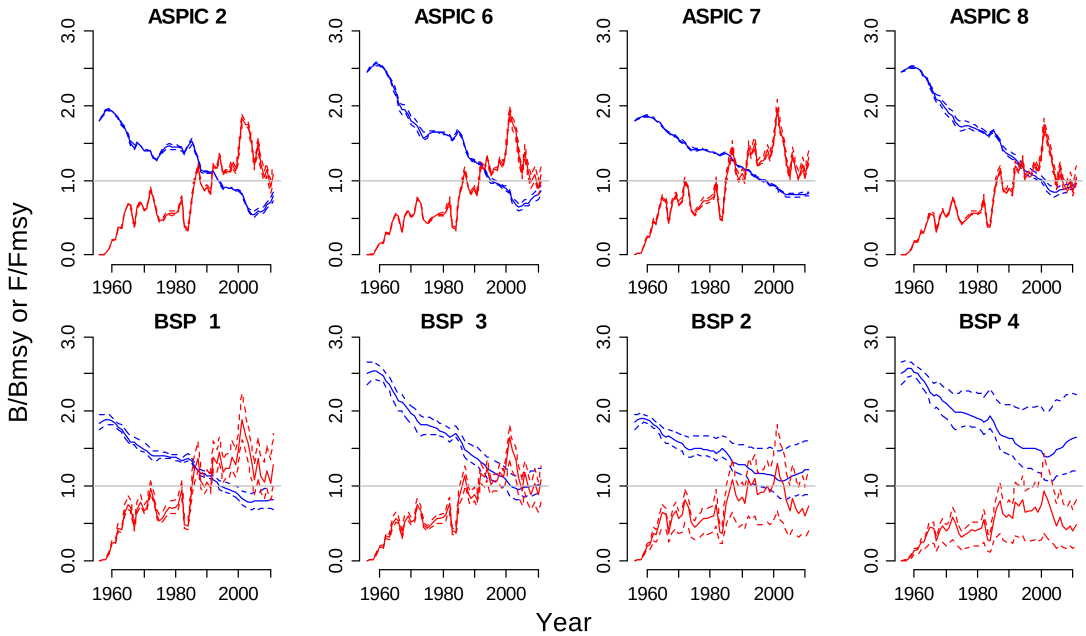


ALB-Figure 9. North Atlantic albacore probability of being overfished and overfishing (red, 0.2 %), of being neither overfished nor overfishing (green, 27.4%), and of being overfished or overfishing, but not both (yellow, 72.4%), according to the Multifan-CL Base Case.

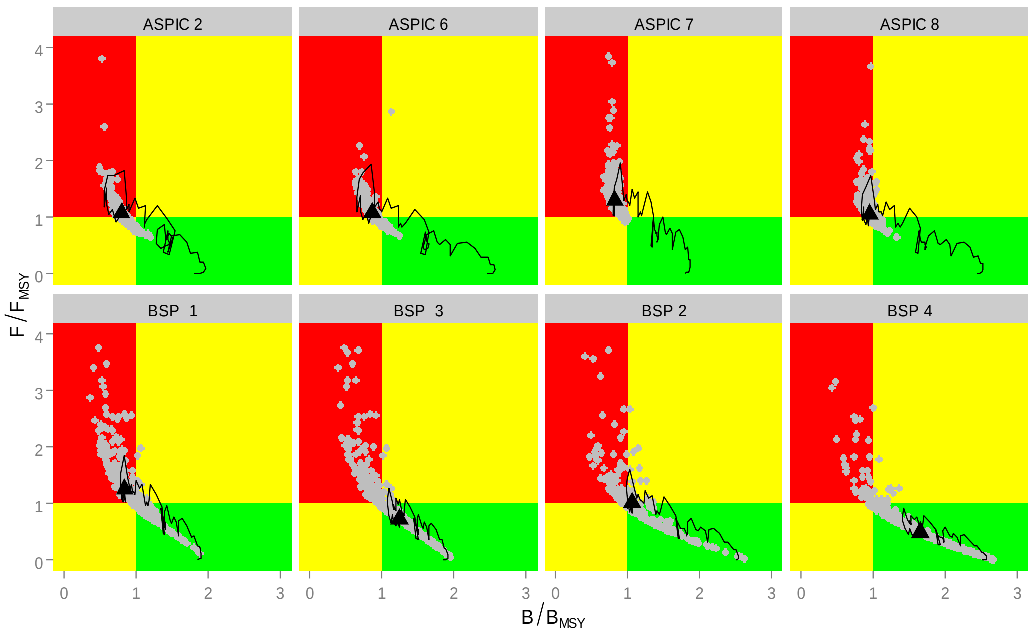


ALB-Figure 10. Standardized catch rates used in the 2013 southern albacore stock assessment.

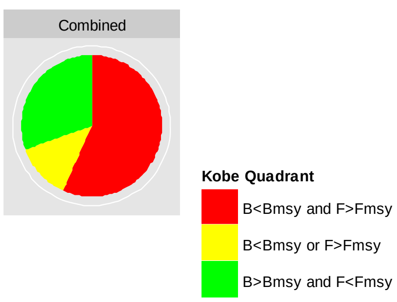
a)



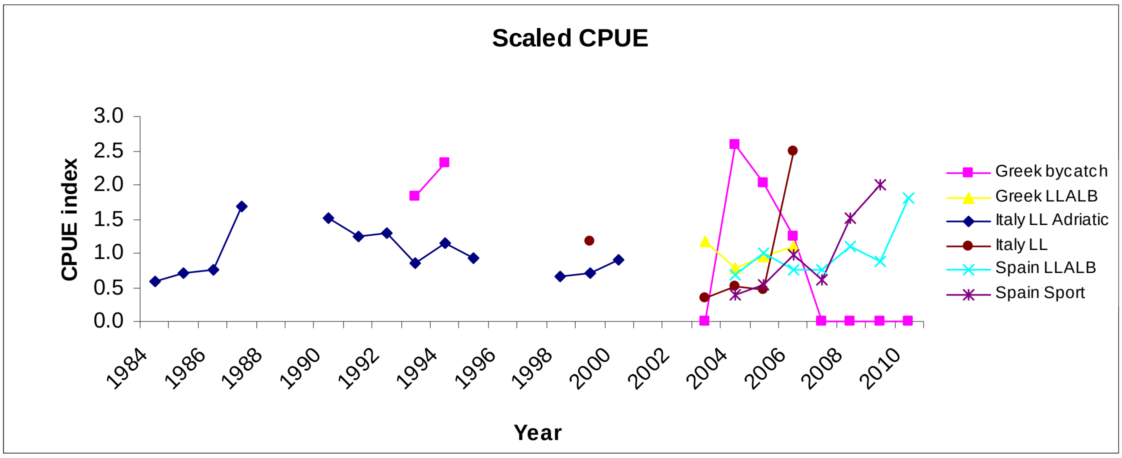
b)



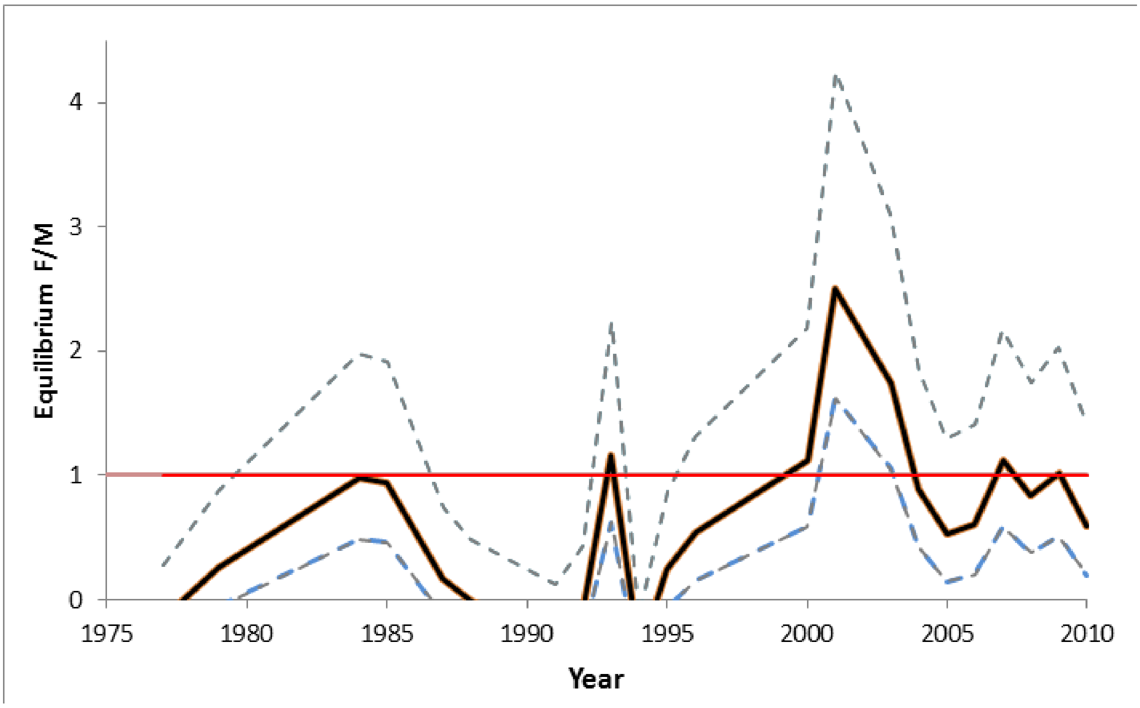
c)



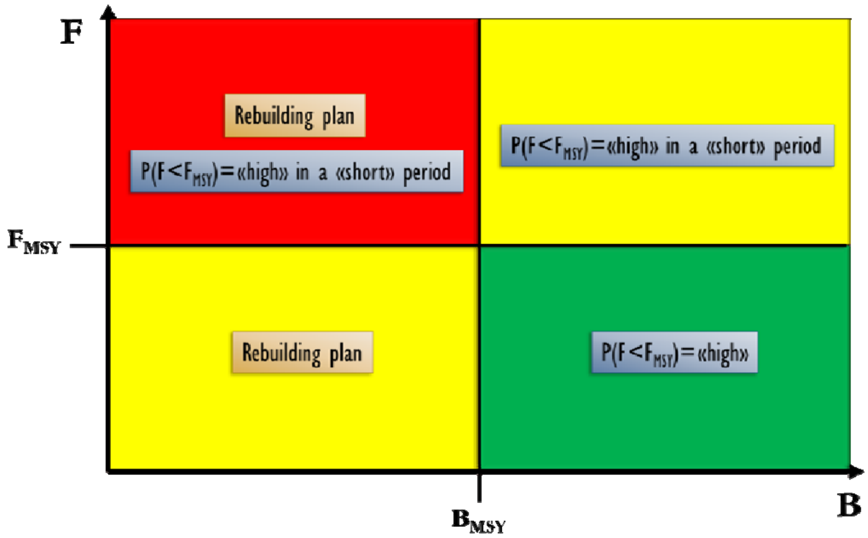
ALB-Figure 11. South Atlantic albacore. a) Median biomass (in blue) and fishing mortality rates (in red) relative to MSY levels, with 50% credibility intervals, for the 4 base case Bayesian Surplus Production (BSP) models and the point estimate biomass and 50% credibility intervals for the 4 base case ASPIC Production models. (b) Stock status trajectories of B/B_{MSY} and F/F_{MSY}, as well as uncertainty around the current estimate (Kobe plots) for the base case ASPIC models (Runs 2, 6, 7 and 8) alongside those from the base case BSP runs (1, 2, 3 and 4). (c) Combined probability of being overfished and overfishing (red, 57%), of being neither overfished nor overfishing (green (30%), and of being overfished or overfishing, but not both (yellow, 13%).



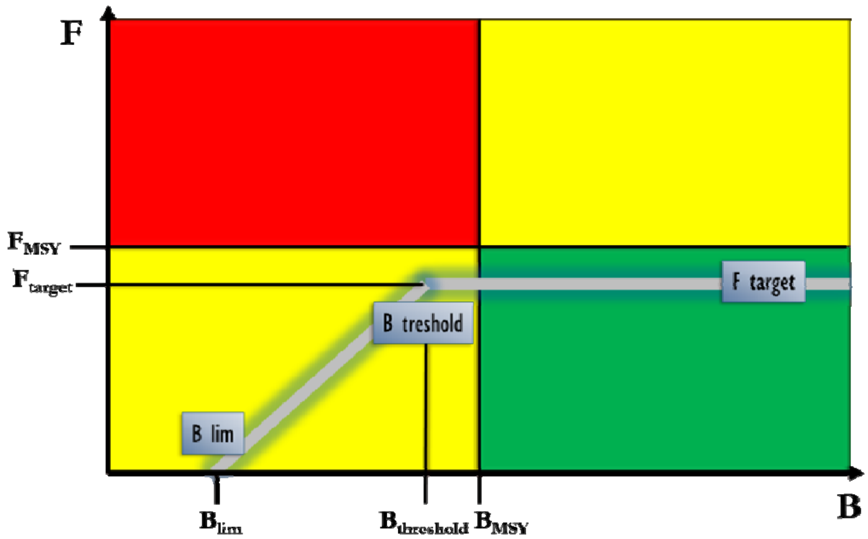
ALB-Figure 12. Set of standardized and nominal CPUEs used in the assessment of the Mediterranean albacore stock. The “Greek by-catch” indicates the probability of albacore by-catch in the swordfish fishery, practically null in some years. This series is the only one that is not included in the base case Bayesian production model.



ALB-Figure 13. Mediterranean albacore. Estimates of equilibrium fishing mortality rate relative to M (as a proxy for $F_{MSY)}$ based on length-converted catch curve analysis. The central solid line represents an M assumption of 0.3 with patterns resulting from an assumed M of 0.4 (lower dashed) and 0.2 (upper dashed) also depicted.



ALB-Figure 14. Schematic representation of the key elements of the *Recommendation by ICCAT on the principles of decision making for ICCAT conservation and management measures* [Rec. 11-13].



ALB-Figure 15. Generic form of the HCR recommended by SCRS (SCRS, 2011). Blim is the limit biomass reference point, BThreshold is the biomass point at which increasingly strict management actions should be taken as biomass decreases and Ftarget, the target fishing mortality rate to be applied such that it is lower than FMSY with 'high probability' [Rec. 11-13].

8.5 BFT – ATLANTIC BLUEFIN TUNA

In 2014, the SCRS conducted an update of the 2012 assessment of Atlantic bluefin tuna (Anon. 2013). In this update, the available data included catch, effort and size statistics through 2013. As previously discussed, there are considerable data limitations for the eastern stock up to 2007. While catch data reporting for the eastern and Mediterranean fisheries has substantially improved since 2008 and some historical statistical data have been recovered, none-the-less, most of the data limitations that have plagued previous assessments remain and will require new approaches in order to improve the scientific advice the Committee can offer. The SCRS strongly recommends the continuation of enhanced data collection program and the replacement of current assessment methods with appropriate approaches that take unquantified uncertainties into account.

During the last decade, there has been an overall shift in targeting towards large bluefin tuna, mostly in the Mediterranean. As the majority of these fish are destined for fattening and/or farming operations, it is crucial to get precise information about the total catch, the size composition, the area and flag of capture. Progress has however been made over the last years and therefore the Committee investigated in 2013-2014 the size data retrieved from the observer on board of cages programmes (see SCRS/2013/014). There was considerable quantity of information that were analyzed and compared to current catch at size. These data appeared to be of good quality and the Committee recommended the integration of this new valuable source of information in the Task II database prior to the next stock assessment (work to be completed during the 2015 bluefin tuna data Working Group). Pilot studies using dual camera system or acoustic coupled with video system have been presented at the SCRS since 2010. The results are encouraging and last studies showed that this technique can provide precise catch composition when it is used with a proper and well defined protocol (see SCRS/2013/182).

The Atlantic-wide Research Program for Bluefin Tuna (GBYP) research plan outlined the research necessary for improving the scientific advice that the Committee provides to the Commission. This plan was presented to and approved by the Commission and the GBYP was started in 2010. The Committee continues to strongly and unanimously support the GBYP, particularly with respect to obtain fisheries-independent indices of stock size, and welcomes the Commission’s continued commitment to the Program. In the absence of such a significant and sustained effort, it remains highly unlikely that the Committee will improve its scientific diagnosis and management advice in the foreseeable future.

In 2012, 2013, and 2014, the SCRS also reviewed new information on the biology, spatial dynamics, catch statistics and fisheries catch rates. The SCRS also discussed progress made by the GBYP and other research program about the aerial survey, tagging, data mining, biological sampling, stock mixing and new modeling approaches (see SCRS/2012/139 and SCRS/2013/014).

BFT-1. Biology

Atlantic bluefin tuna (BFT) mainly live in the pelagic ecosystem of the entire North Atlantic and its adjacent seas, primarily the Mediterranean Sea. Bluefin tuna have a wide geographical distribution living mostly in temperate Atlantic waters and adjacent seas (**BFT-Figure 1**). Archival tagging and tracking information confirmed that bluefin tuna can sustain cold as well as warm temperatures while maintaining stable internal body temperature. Bluefin tuna preferentially occupy the surface and subsurface waters of the coastal and open-sea areas, but archival tagging and ultrasonic telemetry data indicate that bluefin tuna can frequently dive to depths of more than 1,000 m. Bluefin tuna is also a highly migratory species that seems to display a homing behavior and spawning site fidelity in both the Mediterranean Sea and Gulf of Mexico, which constitute the two main spawning areas being clearly identified today. Less is known about feeding migrations within the Mediterranean and the North Atlantic, but results from electronic tagging indicated that bluefin tuna movement patterns vary considerably between individuals, years and areas. The appearance and disappearance of important past fisheries further suggest that important changes in the spatial dynamics of bluefin tuna may also have resulted from interactions between biological factors, environmental variations and fishing. Although the Atlantic bluefin tuna population is managed as two stocks, conventionally separated by the 45°W meridian, its population structure remains poorly understood and needs to be further investigated. Recent genetic and microchemistry studies as well as work based on historical fisheries tend to indicate that the bluefin tuna population structure is complex.

Currently, the SCRS assumes that eastern Atlantic and Mediterranean bluefin tuna mature at approximately 25 kg (age 4) and western Atlantic bluefin tuna at approximately 145 kg (age 9). Recent information received by the SCRS indicated that some individuals caught in the West Atlantic as small as 47 kg (age 5) were mature. Juvenile and adult bluefin tuna are opportunistic feeders (as are most predators). However, in general, juveniles feed on crustaceans, fish and cephalopods, while adults primarily feed on fish such as herring, anchovy, sand lance, sardine, sprat, bluefish and mackerel. Juvenile growth is rapid for a teleost fish, but slower than other tuna and billfish species. Fish born in June attain a length of about 30-40 cm long and a weight of about 1 kg by October. After one year, fish reach about 4 kg and 60 cm long. At 10 years old, a bluefin tuna is about 200 cm and 170 kg and reaches about 270 cm and 400 kg at 20 years. Bluefin tuna is a long-lived species, with a lifespan of about 40 years, as indicated by recent studies from radiocarbon deposition.

The Committee evaluated information from the bluefin meeting on biological parameters hold in 2013 and bluefin species group meetings in 2014 (SCRS/2013/014; SCI-030; 2014 bluefin tuna assessment detailed report). New contributions have been presented from GBYP and national research projects on reproduction, direct age estimations, population structure, spawning areas and larval studies.

New modeling has been conducted using a comprehensive dataset that facilitates length weight-length relationships to reflect the timing and area of spawning which the Committee feels adequate for assessment modeling and are adopted. While further analyses have to be performed to improve the adopted relationship, future assessment will rely on these relationships. Sensitivity analyses will be carried out to analyze the impact of these new relationships on the stock assessment. Substantial progress has been made in estimating regional mixing levels for Atlantic bluefin tuna from otolith stable isotope analysis. Research on larval ecology of Atlantic bluefin tuna has advanced in recent years through oceanographic habitat suitability models. Direct age estimations have been calibrated between readers from several institutions.

An important electronic and conventional tagging activity on both juveniles and adults fish has been performed in the East Atlantic and Mediterranean by GBYP, national programmes and NGOs. These ongoing efforts have started to provide significant insight into bluefin tuna stock structure, mixing and migrations and would possibly help in estimating fishing mortality rates.

The Committee recognized that there have been important recent contributions to the understanding of bluefin tuna biology and ecology that should have significant impacts on the assessment of the resource.

BLUEFIN TUNA – EAST

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

It is very well known that introduction of fattening and farming activities into the Mediterranean in 1997 and good market conditions resulted in rapid changes in the Mediterranean fisheries for bluefin tuna mainly due to increasing purse seine catches. In the last few years, nearly all of the declared Mediterranean bluefin fishery production was exported overseas. Declared catches in the East Atlantic and Mediterranean reached a peak of over 50,000 t in 1996 and then decreased substantially, stabilizing around TAC levels established by ICCAT for the most recent period (**BFTE-Figure 1**). Both the increase and the subsequent decrease in declared production occurred mainly for the Mediterranean (**BFTE-Figure 1**). Since 2008, there was a significant decrease in the reported catch following more restrictive TACs. Declared catch was, as used in the assessment (with minor updates for 2012 and 2013 at the time of the meeting), 23,849 t, 19,751 t, 11,148 t, 9,774 t, 10,852 t, and 13,133 t for the East Atlantic and Mediterranean, of which 16,205 t, 13,066 t, 6,835 t, 5,790 t, 7,019 t, and 9,016 t were declared for the Mediterranean for those same years (**BFT-Table 1**).

Information available has demonstrated that catches of bluefin tuna from the East Atlantic and Mediterranean were seriously under-reported between the mid 1990s through 2007. The Committee views this lack of compliance with TAC and under-reporting of the catch as a major cause of stock decline over that period. The Committee has estimated that realized catches during this period could have been in the order of 50,000 t to 61,000 t per year based on the number of vessels operating in the Mediterranean Sea and their respective catch rates. Estimates for 2008 and 2009 using updated vessel capacity and performance statistics from the various reports submitted to ICCAT under [Rec. 08-05] result in estimates that are significantly lower than the corresponding reported Task I data (see the 2010 ICCAT Data Preparatory Meeting on Bluefin Tuna) (Anon. 2011c). Although care is needed considering estimates of catch using these capacity measures, the Committee's interpretation is that a substantial decrease in the catch occurred in the eastern Atlantic and Mediterranean Sea in 2008 and 2009.

Recent regulatory measures have affected significantly all the CPUE indices through the change of operational pattern, length of the fishing season and target sizes. Recent tendency in the indicators are likely a reflection of positive outcomes from recent management measures. Fisheries-independent indicators (e.g. aerial and larval surveys) and a large-scale tagging program are nonetheless needed to provide more reliable stock status indicators. It is also noteworthy that no abundance indices from the Mediterranean part of the stock are used for the stock assessment.

Available indicators from the Bay of Biscay baitboat fisheries (small and medium fish) shows a general increasing trend over the whole time period, with more variable values after the mid 80s, with two peaks in the 90s and one in the mid 2000s (**BFTE-Figure 2**). This CPUE index covers the longest period (1952-2013), during which changes in selectivity took place, especially during the most recent periods because of changes in management regulations. The Spanish baitboat fishery sold most of its quota to other Spanish fisheries in 2012 and 2013. This CPUE index now includes the French baitboat fishery data and has been standardized and updated accordingly.

Indicators from Moroccan and Spanish traps targeting large fish (spawners) are standardized catch per unit of effort (CPUE) up to 2012 and include released individuals, which represent more than 10,000 individuals in 2012. The Moroccan trap index was further updated up to 2014 including 25,000 released individuals during that year. CPUE of Moroccan and Spanish traps showed a substantial increasing trend over the last years and large fluctuations, with period of high catch rates, as in the early 1980s, late 1990s and late 2000s and periods of lower catch rates, as in the mid 1990s and mid 2000s (**BFTE-Figure 2**). However, in 2013, the access to Spanish trap facilities has not been allowed to scientific observers and no data are available to ensure the continuity of this time-series. The Committee strongly requires to ensure the access to Spanish traps for coming years.

Indicators from Japanese longliners targeting large fish (spawners) in the East Atlantic (South of 40ºN) and the Mediterranean Sea displayed a recent increase after a general decline since the mid 1970s (**BFTE-Figure 2**). However, this index has not been updated since 2009 because this fleet did not operate in the Mediterranean and rarely in the East Atlantic (South of 40ºN) in recent years. Indicators from Japanese longliners targeting medium to large fish in the northeast Atlantic were available since 1990 and has been updated to 2013. This index showed a strong increasing trend over the last 3 years (**BFTE-Figure 2**). This index becomes more valuable since the major part of Japanese catch come from this fishing ground in recent years. The size of bluefin caught in this area showed a large contribution of the 2003 year class. The combined effects of this high proportion of the 2003 year class, the contraction of the spatial coverage of the Japanese longliners in recent years in response to a lower number of boats, and management regulations may affect the ability of this index to track changes in bluefin tuna abundance. However, the method used to standardize this index does not show irregularities and the continuity of this index seems to be ensured.

BFTE-3. State of the stock

The quality and the representativeness of catch statistics is the most crucial element of the bluefin tuna stock assessment. In spite of recent improvements in the data quantity and quality for the past few years, there remain important data limitations for the 2014 updated assessment of the stock (Anon. 2014d). These included poor temporal and spatial coverage for detailed size and catch-effort statistics for several fisheries, especially in the Mediterranean. Substantial under-reporting of total catches was also evident between 1998 and 2007. Nevertheless, the Committee updated the 2012 stock assessment (Anon. 2012) as requested by the Commission, applying the same methodologies and hypotheses adopted by the Committee in 2012. The pilot assessment using new historical and recent information about catch was not fully evaluated due to time constraints, instead, a comparison of the Continuity run using these new data have been carried out and results are only presented in the detailed reports (section 6.1.1 and Figures 12-14 of SCRS-2014-113). The Committee believes that while substantial improvements in catch and effort statistics are necessary in the future for more robust stock assessment, it appears unlikely that such substantial improvements can be made regarding historical fishery performance.

The updated assessment results indicated that the spawning stock biomass (SSB) peaked over 300,000 t in the late 1950s and early 1970s and then declined to about 150,000 t until the mid 2000s. In the most recent period, the SSB showed clear signs of sharp increase in all the runs that have been investigated by the Committee, up to almost 585,000 t in 2013 for the update of the 2012 Base Case which corresponds to the maximum estimated SSB over the period (see Bluefin Tuna Detailed Report, **BFTE-Figure 3**). However, the magnitude and the speed of the SSB increase vary substantially among the runs (an SSB between 439,000 t and 647,000 t in 2013) and are, therefore, still rather uncertain (see detailed report, section 6). This increase corresponds to a 4-fold increase in SSB over the past decade and ranges from 3 to 4.5-fold across the sensitivities examined. Trends in fishing mortality (F) for the younger ages (ages 2-5) displayed a continuous increase until recent years. Since 2008, F at ages 2-5 decreased sharply to reach the lowest historical values. For oldest fish (ages 10+), F had been decreasing during the first 2 decades and then rapidly increased since the 1980s and finally declined since the late 2000s (**BFTE-Figure 3**). These recent trends in F are consistent with those obtained during the 2012 stock assessment. For the 1995-2007 years, Fs for older fish are also consistent with a shift in targeting towards larger individuals destined for fattening and/or farming. Recent recruitment levels remain uncertain due to limited information about incoming year class strength and uncertainties in the indicators used to track recruitment. While the reduction in catch less than the minimum size improves the yield per recruit, it makes recent recruitments more difficult to estimate, especially without a recruitment index. The Committee noted that this is the first assessment to estimate extraordinarily large year classes in 2004-2007 (over 40% higher than the highest observed recruitments in the rest of the 64 year time series), and that these high estimates are driven mostly by the recent trends in the two fishery dependent indices for older fish. Therefore, caution is warranted until the very high estimates of recruitment for these year classes can be confirmed.

Estimates of current stock status relative to MSY benchmarks are highly sensitive to the selectivity pattern (and thus to some technical assumptions in the VPA) and, for the biomass reference point, to the hypotheses about the recruitment levels. In addition to those uncertainties, the current perception of the stock status is also closely related to the assumptions made about stock structure and migratory behavior, which remain poorly known. Nonetheless, the perception of the stock status derived from the 2014 updated assessment has improved in comparison to previous assessments, as F for both younger and older fish have declined during the recent years. All the runs investigated by the Committee also showed a clear increase of the SSB. F_{2013} appears to clearly be below the reference target $F_{0.1}$ (a reference point used as a proxy for F_{MSY} that is more robust to uncertainties than F_{MAX}) in both catch scenarios: $F_{2013}/F_{0.1}$= 0.4 and 0.36 for the reported and inflated catch scenarios, respectively. If F_{2013} would be consistent with the Convention Objectives, current SSB is most likely to be above the level expected at $F_{0.1}$: $SSB_{2013}/SSB_{0.1}$= 1.10 and 1.11 for reported and inflated catch scenario when considering medium recruitment. In the reported catch scenario, the median of the SSB is about 67% (high recruitment scenario) to 160% (low recruitment scenario) of the biomass that is expected under a $F_{0.1}$ strategy. In the inflated catch scenario, the median SSB ranges from 55% (high recruitment) to 174% (low recruitment, **BFTE-Figures 4** and **5**).

BFTE- 4. Outlook

In 2014, the Committee performed a set of projections using similar technical specifications as in 2012, *i.e.* using three mean recruitment levels and two catch scenarios (reported and inflated) and the same periods to calculate the selectivity patterns as in 2012 (computed as the geometric means over the 2007-2009 and 2009-2011 partial Fs, see (Kell *et al*., 2013 for more details). According to the 2014 VPA results and above specifications, F would remain below $F_{0.1}$ in the 10 coming years with at least 60% of probabilities for all catch levels investigated, and the probability to achieve $SSB_{F0.1}$ (*i.e.* the equilibrium SSB resulting in fishing at $F_{0.1}$) by the end of 2022, with at least 60% of probabilities, is also reached (**BFTE-Tables 1** and **2**).

Projections are known to be impaired by various sources of uncertainties that have not yet been fully quantified. One of these is that the Kobe matrix was only calculated for the Continuity run in the time available. Although the situation has improved regarding recent catch, there are still uncertainties about the speed and magnitude of the SSB increase (see the slope of **BFTE-Figure 3**), key modeling parameters for bluefin tuna productivity, the current and future recruitment levels, the stock structure within the Mediterranean and eastern Atlantic stock and the level of IUU catch (although it is clear to the Committee that the level of IUU has strongly decreased since 2008). Some of these uncertainties, as those reflected above, have not been taken into account in the Kobe matrices. Acknowledging these limitations, the 2014 updated stock assessment indicates that the rebuilding of eastern bluefin tuna at $SSB_{F0.1}$ level with a probability of at least 60% could be achieved before 2022 with the different TACs examined (up to 30,000 t, **BFTE-Table 3**). While the updated fisheries indicators are consistent with the estimation of stock rebuilding, there still remain key uncertainties regarding current and future recruitment levels and the speed and magnitude of the rebuilding of the SSB. The results from the projections thus need to be further confirmed by future data and analyses.

BFTE-5. Effect of current regulations

Catch limits have been in place for the eastern Atlantic and Mediterranean management unit since 1998. In 2002, the Commission fixed the Total Allowable Catch (TAC) for the eastern Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003 to 2006 [Rec. 02-08] and at 29,500 t and 28,500 t for 2007 and 2008, respectively [Rec. 06-05]. Subsequently, [Rec. 08-05] established TACs for 2009, 2010, and 2011 at 22,000 t, 19,950 t, and 18,500 t, respectively. However, the 2010 TAC was revised to 13,500 t by [Rec. 09-06], which also established a framework to set future (2011 and beyond) TACs at levels sufficient to rebuild the stock to B_{MSY} by 2022 with at least 60% probability. The 2011, 2012, and 2013 TACs were set at 12,900 t, 12,900 t, and 13,500 t respectively by [Rec. 10-04 and Rec. 12-03], and of 13,500t that of 2014 [Rec. 13-07].

The reported catches for 2003, 2004 and 2006 were about TAC levels, but those for 2005 (35,845 t) and 2007 (34,516 t) were notably higher than TAC. However, the Committee strongly believes, based on the knowledge of the fishing capacity, that substantial under-reporting was occurring and that actual catches up to 2007 were well above TAC. The SCRS estimates since the late 1990s, catches were close to the levels reported in the mid 1990s, but for 2007, the estimates were higher i.e. about 61,000 t in 2007 for both the East Atlantic and Mediterranean Sea. As noted, reported catch levels for 2008 (23,849 t), 2009 (19,751 t), 2010 (11,148 t), 2011 (9,774 t), 2012 (10,852 t), and 2013 (13,133 t) appear to largely reflect the removals from the stock when comparing estimates of catch using vessel capacity measures, although the utility of this method has diminished for estimating catch (**BFT-Table 1, BFTE-Figure 1**). Although care is needed when considering estimates of catch using capacity measures, the Group's interpretation is that a substantial decrease in the catch occurred in the eastern Atlantic and Mediterranean Sea through implementation of the rebuilding plan and through monitoring and enforcement controls. While current controls appear sufficient to constrain the fleet to harvests at or below TAC, the Committee has not assessed the current fishing capacity and remains concerned about current capacity which could easily harvest catch volumes well in excess of the rebuilding strategy adopted by the Commission.

Recent analyses from the reported catch-at-size and catch-at-age displayed important changes in selectivity patterns over the last years for several fleets operating in the Mediterranean Sea or the East Atlantic. This partly results from the enforcement of minimum size regulations under Rec. [06-05], which led to much lower reported catch of younger fish and subsequently a significant increase in the annual mean-weight in the catch-at-size since 2007 (**BFTE-Figure 6**). Additionally, higher abundance or higher concentration of small bluefin tuna in the north-western Mediterranean detected from aerial surveys could also reflect positive outcomes from increase minimum size regulation. Rec. [06-05] also resulted in improved yield-per-recruit levels in comparison to the early 2000s as well as to a greater recruitment to the spawning stock biomass due to higher survival of juvenile fish.

An important source of uncertainty originated from the reduction in TAC and the unexpected high level of strong year class, which has strongly affected all the index calculations for different reasons (see detailed report). The difficulties to update the Spanish baitboat, Spanish trap and Japanese indices in 2013 could be highly problematic for the coming years, as those indices are crucial for stock assessment. It also worth noting that the transfer of quotas from one fisheries to another may also affect stock assessment outcomes, as such transfers have implications for the repartition of the fishing effort and thus for selectivity patterns, which are known to impact the references points. Therefore, the Committee reiterates the importance to continue effort, through national programs and GBYP, to improve the quality of currently used abundance indices and obtain robust fisheries-independent indicators. It notes however that necessary decisions regarding management of the stock have often the side effect of adding uncertainties to stock assessment, e.g., by changing fleet behavior and fisheries selection pattern.

BFTE-6. Management recommendations

In [Res. 09-06, 10-04, 12-03, and 13-07] the Commission established a total allowable catch for eastern Atlantic and Mediterranean bluefin tuna between 12,900 t and 13,500 t since 2010. Additionally, in [Rec. 09-06] the Commission required that the SCRS provide the scientific basis for the Commission to establish a recovery plan with the goal of achieving B_{MSY} through 2022 with at least 60% of probability.

The Kobe matrices are presented indicating the probabilities of *i*) $F<F_{MSY}$ (**Table 1**) *ii*) $SSB>SSB_{MSY}$ (**Table 2**) and *iii*) ($F<F_{MSY}$ and $SSB>SSB_{MSY}$) (**Table 3**) for quotas from 0 to 30,000 t for 2014 through 2022. Shading corresponds to the probabilities of being in the ranges of 50-59%, 60- 69%, 70-79%, 80-89% and greater or equal to 90%. It should be kept in mind, however, that the Kobe matrices cannot integrate some important sources of uncertainties that currently remain unquantified as mentioned in section **BFTE-4** and detailed report.

The implementation of recent regulations through [Recs. 13-07, 12-03, 10-04, 09-06, and previous recommendations] has clearly resulted in reductions in catch and fishing mortality rates, and in a substantial increase in the spawning stock biomass for the Continuity run and the 7 sensitivity analyses of the updated assessment. All CPUE indices show increasing trends in the most recent years. However, the Committee notes that the present assessment is an update of the 2012 assessment which relies only on a Continuity model and 7 sensitivity analyses. This update showed lack of the stability of VPA results to slight changes in data inputs and model specifications

In the light of the results of the updated assessment, there are continuing positive signs of the success of the rebuilding plan and the efficiency of the management measures taken by the Commission. Noting that the goal of achieving B_{msy} (through 2022) with at least 60% probability might already have been, or will soon be reached, the Commission should consider adding a new phase to the current recovery plan.

The Committee noted that maintaining current TAC or moderately and gradually increasing over recent TACs under the current management scheme should not undermine the success of the rebuilding plan and should be consistent with the goal of achieving F_{MSY} and B_{MSY} through 2022 with at least 60% of probability. However, as the Committee was not able to provide the Commission with a robust advice on an upper bound for the TAC because of differing views about the implications of the uncertainties associated with the assessment, no agreement could be reached about the upper limit for such an increase that would not jeopardize the recovery of the stock. In equivalent situations, other scientific fora have similarly recommended moderate increases of the TAC, in applying the precautionary approach. To this end, and among other possible targets (e.g. F0.1, Fmax, etc.), a gradual increase (in steps over e.g. 2 or 3 years) of the catch to the level of the most precautionary MSY estimate would allow the population to increase even in the most conservative scenario (low recruitment scenario), noting the Commission's desire to maintain the stock in the green zone [13-07]. Nevertheless the SCRS scientists were not able to reach a consensus on the number of steps to complete the rebuilding plan, or on the management strategies.

Such stepped increases should be reviewed annually by the Commission on the advice of the SCRS (such reviews should consider stock indicators but would not necessarily extend to update stock assessment).

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY

Current reported yield (2013)	13,333 t	
	Reported catch	Inflated catch
Maximum Sustainable Yield[1]		
Low recruitment scenario (1970s)	23,256 t	23,473 t
Medium recruitment scenario (1950-2006)	33,662 t	36,835 t
High recruitment scenario (1990s)	55,860 t	74,248 t
$F_{0.1}$ [2,3]	$0.07 yr^{-1}$	$0.07 yr^{-1}$
$F_{2013}/F_{0.1}$	0.40	0.36
$SSB_{F0.1}$		
Low recruitment scenario (1970s)	351,500 t	354,600 t
Medium recruitment scenario (1950-2006)	508,700 t	556,600 t
High recruitment scenario (1990s)	843,800 t	1,121,000 t
$SSB_{2013}/SSB_{F0.1}$		
Low recruitment scenario (1970s)	1.60	1.74
Medium recruitment scenario (1950-2006)	1.10	1.11
High recruitment scenario (1990s)	0.67	0.55

TAC (2010 - 2014) 13,500 t - 12,900 t - 12, 900 t - 13,500 t – 13,500 t

[1] Approximated as the average of the potential long-term yield that is expected at a $F_{0.1}$ strategy. The levels of these yields have been computed using the selectivity pattern over 2009-2011 and can substantially change according to different selectivity patterns.

[2] The Committee decided, on the basis of current published literature, to adopt $F_{0.1}$ as the proxy for F_{MSY}. $F_{0.1}$ has been indeed shown to be more robust to uncertainty about the true dynamics of the stock and observation errors than F_{MAX}. Values are given for both reported and inflated catch scenarios, respectively. $F_{0.1}$ have been also computed using the 2012 selectivity pattern and can thus substantially change according to different selectivity patterns

[3] The recruitment levels do not impact $F_{0.1}$.

BFT-Table 1. Estimated catches (t) of northern bluefin tuna (*Thunnus thynnus*) by area, gear and flag (as used in the BFT stock assessment, 2014-07-01). The last column (2013*) shows Task 1 catches for 2013 as available during the SCRS (2014-09-29).

			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013*
TOTAL			23819	26027	29349	34131	36635	48853	49711	53320	49489	42375	35228	36541	37390	37089	33469	33505	37602	32501	36154	25849	21730	13024	11781	12606	14609	14817
BFT-E			21061	23247	26429	31849	34268	46740	47285	50807	47155	39718	32456	33766	34605	33770	31163	31381	35845	30689	34516	23849	19751	11148	9774	10852	13133	13333
	ATE		5433	6040	6556	7619	9367	6930	9646	12663	13539	11376	9628	10528	10086	10347	7362	7410	9036	7535	8037	7645	6684	4313	3984	3834	4117	4159
	MED		15628	17207	19872	24230	24901	39810	37639	38144	33616	28342	22828	23238	24519	23424	23801	23971	26810	23154	26479	16205	13066	6835	5790	7019	9016	9173
BFT-W	ATW		2759	2780	2920	2282	2367	2113	2425	2514	2334	2657	2772	2775	2784	3319	2305	2125	1756	1811	1638	2000	1980	1876	2007	1754	1476	1484
Landings	ATE	Bait boat	1971	1693	1445	1141	3447	1980	2601	4985	3521	2550	1492	1822	2275	2567	1371	1790	2018	1116	2032	1794	1260	646	636	282	236	236
		Longline	962	1496	3197	3817	2717	2176	4388	4788	4534	4300	4020	3736	3303	2896	2750	2074	2713	2448	1706	2491	1960	1194	1157	1166	1154	1192
		Other surf.	1020	562	347	834	1548	932	1047	646	511	621	498	703	712	701	560	402	1014	1047	502	187	298	143	36	48	142	145
		Purse seine	0	54	46	462	24	213	458	323	828	692	726	1147	150	884	490	1078	871	332	0	0	0	1	0	0		2
		Sport (HL+RR)	2	1	0	0	0	0	0	0	162	28	33	126	61	63	109	87	11	4	10	6	2	23	19	25	21	21
		Traps	1478	2234	1522	1365	1631	1630	1152	1921	3982	3185	2859	2996	3585	3235	2082	1978	2408	2588	3788	3166	3164	2307	2137	2311	2564	2564
	MED	Bait boat	0	25	148	158	48	0	206	5	4	11	4	0	0	1	9	17	5	0	0	0	38	0	0	0	9	9
		Longline	1121	1026	2869	2599	2342	7048	8475	8171	5672	2749	2463	3317	3750	2614	2476	2564	3101	2202	2656	2254	1344	875	869	585	605	605
		Other surf.	3289	1212	1401	1894	1607	3218	1042	1197	1037	1880	2976	1067	1096	990	2536	1106	480	301	699	1022	0	275	223	26	71	71
		Purse seine	9450	11250	13245	17807	19297	26083	23588	26021	24178	21291	14910	16195	17174	17656	17167	18785	22475	20020	22952	12641	11395	5057	4293	6094	7911	8069
		Sport (HL+RR)	457	1552	738	951	1237	2257	3556	2149	2340	1336	1622	1921	1321	1647	1392	1340	634	503	78	137	146	346	226	177	189	189
		Traps	1311	2142	1471	821	370	1204	772	601	385	1074	852	739	1177	515	221	159	115	129	95	152	144	281	165	125	222	222
	ATW	Longline	698	739	894	674	695	539	468	547	382	764	914	858	610	729	186	644	425	565	420	606	366	529	743	478	467	474
		Other surf.	755	536	578	509	406	307	384	432	293	342	281	284	202	108	140	97	89	85	63	82	121	126	148	117	121	122
		Purse seine	385	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32	178	4	28	0	11	0	0	2	29	29
		Sport (HL+RR)	786	1004	1083	586	854	804	1114	1029	1181	1108	1124	1120	1649	2035	1398	1139	924	1005	1023	1130	1251	1009	887	917	707	707
		Traps	1	2	0	1	29	79	72	90	59	68	44	16	16	28	84	32	8	3	4	23	23	39	26	17	11	11
Discards	MED	Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	9	9
	ATW	Longline	119	115	128	211	88	83	138	167	155	123	160	222	105	211	232	181	131	149	100	159	207	174	202	224	127	127
		Other surf.	14	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14
		Sport (HL+RR)	0	0	0	0	0	0	0	0	14	3	0	0	6	0	0	0	0	0	0	0	0	0	0	0		
Landings	ATE	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		China PR	0	0	0	0	0	0	0	0	0	85	103	80	68	39	19	41	24	42	72	119	42	38	36	36		38
		Chinese Taipei	109	0	0	0	6	20	4	61	226	350	222	144	304	158	0	0	10	4	0	0	0	0	0	0		**0**
		EU.Denmark	0	0	0	0	37	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.España	3565	3557	2272	2319	5078	3137	3819	6174	6201	3800	3360	3474	3633	4089	2138	2801	3102	2033	3276	2938	2409	1483	1483	1329	1553	1553
		EU.France	460	510	565	894	1099	336	725	563	269	613	588	542	629	755	648	561	818	1218	629	253	366	228	135	148	223	223
		EU.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Ireland	0	0	0	0	0	0	0	0	14	21	52	22	8	15	3	1	1	2	1	1	1	2	4	10	13	13
		EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Portugal	3	27	117	38	25	240	35	199	712	323	411	441	404	186	61	27	79	97	29	36	53	58	180	223	235	235
		EU.Sweden	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.United Kingdom	0	0	0	0	0	0	1	0	1	1	12	0	0	0	0	0	0	0	0	0	1	0	0	0		
		Faroe Islands	0	0	0	0	0	0	0	0	0	67	104	118	0	0	0	0	0	0	0	0	0	0	0	0		
		Guinée Rep.	0	0	0	0	0	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		ICCAT (RMA)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
		Iceland	0	0	0	0	0	0	0	0	0	2	27	0	0	1	0	0	0	0	0	0	0	0	2	5	4	4
		Japan	838	1464	2981	3350	2484	2075	3971	3341	2905	3195	2690	2895	2425	2536	2695	2015	2598	1896	1612	2351	1904	1155	1089	1093	1128	1128
		Korea Rep.	0	0	0	0	0	4	205	92	203	0	0	6	1	0	0	3	0	1	0	0	0	0	0	0		**0**
		Libya	0	0	0	312	0	0	0	576	477	511	450	487	0	0	0	0	0	47	0	0	0	0	0	0		
		Maroc	451	408	531	562	415	720	678	1035	2068	2341	1591	2228	2497	2565	1797	1961	2405	2196	2418	1947	1909	1348	1055	990	960	960
		NEI (ETRO)	6	74	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		NEI (Flag related)	0	0	85	144	223	68	189	71	208	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Norway	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		Panama	0	0	0	0	0	1	19	550	255	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0		
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	93	118	0	0	0	0	0	0	0	0	0	0	0		
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	MED	Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	9	9
		Algerie	820	782	800	1104	1097	1560	156	156	157	1947	2142	2330	2012	1710	1586	1208	1530	1038	1511	1311	0	0	0	69	244	244
		China PR	0	0	0	0	0	97	137	93	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Chinese Taipei	0	0	0	0	328	709	494	411	278	106	27	169	329	508	445	51	267	5	0	0	0	0	0	0		**0**

		EU.Croatia	0	0	1418	1076	1058	1410	1220	1360	1105	906	970	930	903	977	1139	828	1017	1022	825	834	619	389	371	369	384	384
		EU.Cyprus	10	10	10	10	14	10	10	10	10	21	31	61	85	91	79	105	149	110	1	132	2	3	10	18	17	17
		EU.España	1645	1822	1392	2165	2018	2741	4607	2588	2209	2000	2003	2772	2234	2215	2512	2353	2758	2689	2414	2465	1769	942	942	1064	948	948
		EU.France	4434	4713	4620	7376	6995	11843	9604	9171	8235	7122	6156	6794	6167	5832	5859	6471	8638	7663	10157	2670	3087	1754	805	791	2191	2191
		EU.Greece	182	201	175	447	439	886	1004	874	1217	286	248	622	361	438	422	389	318	255	285	350	373	224	172	176	178	178
		EU.Italy	4317	4110	3783	5005	5328	6882	7062	10006	9548	4059	3279	3845	4377	4628	4973	4686	4841	4695	4621	2234	2735	1053	1783	1788	1938	1938
		EU.Malta	29	81	105	80	251	572	587	399	393	407	447	376	219	240	255	264	346	263	334	296	263	136	142	137	155	155
		EU.Portugal	0	0	278	320	183	428	446	274	37	54	76	61	64	0	2	0	0	11	0	0	0	0	0	0		**0**
		Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64		77
		ICCAT (RMA)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0		**0**
		Israel	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Japan	127	172	85	123	793	536	813	765	185	361	381	136	152	390	316	638	378	556	466	80	18	0	0	0		
		Korea Rep.	0	0	0	0	0	684	458	591	410	66	0	0	0	0	0	700	1145	26	276	335	102	0	0	0		80
		Libya	84	328	370	425	635	1422	1540	812	552	820	745	1063	1941	638	752	1300	1091	1280	1358	1318	1082	645	0	756	929	929
		Maroc	295	1149	925	205	79	1092	1035	586	535	687	636	695	511	421	760	819	92	190	641	531	369	205	182	223	309	309
		NEI (Flag related)	0	0	0	0	0	427	639	171	1066	825	140	17	0	0	0	0	0	0	0	0	0	0	0	0		
		NEI (MED)	757	360	1799	1398	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		NEI (combined)	0	0	0	0	0	773	211	0	101	1030	1995	109	571	508	610	709	0	0	0	0	0	0	0	0		
		Panama	0	74	287	484	467	1499	1498	2850	236	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Serbia & Montenegro	0	0	0	0	0	0	2	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0		
		Syria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	41	0	34	0	0		**0**
		Tunisie	661	406	1366	1195	2132	2773	1897	2393	2200	1745	2352	2184	2493	2528	791	2376	3249	2545	2622	2679	1932	1042	852	1017	1153	1153
		Turkey	1707	2059	2459	2817	3084	3466	4219	4616	5093	5899	1200	1070	2100	2300	3300	1075	990	806	918	879	665	409	519	536	551	551
		Yugoslavia Fed.	560	940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	ATW	Argentina	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0		
		Brazil	2	1	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	1		5
		Canada	619	438	485	443	459	392	576	597	503	595	576	549	524	604	557	537	600	733	491	575	530	505	474	477	480	480
		Chinese Taipei	20	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	74	11	19	27	19	0	0	0	0	0	0		
		EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		**0**
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	1	0	0	3	1	10	5	0	4	3	2	8	0	0		0
		Japan	468	550	688	512	581	427	387	436	322	691	365	492	506	575	57	470	265	376	277	492	162	353	578	289	317	317
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	52	0	0	0	0	0	0		**0**
		Mexico	0	0	0	0	0	4	0	19	2	8	14	29	10	12	22	9	10	14	7	7	10	14	14	51	20	23
		NEI (ETRO)	30	24	23	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		NEI (Flag related)	0	0	0	0	0	0	0	2	0	0	429	270	49	0	0	0	0	0	0	0	0	0	0	0		
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Sta. Lucia	2	14	14	14	2	43	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		U.S.A.	1483	1636	1582	1085	1237	1163	1311	1285	1334	1235	1213	1212	1583	1840	1426	899	717	468	758	764	1068	803	738	713	518	518
		UK.Bermuda	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0		1
Discards	MED	Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		EU.Croatia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	5	5
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	4	4
		Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0
	ATW	Canada	14	0	0	0	0	0	0	0	6	16	11	46	13	37	14	15	0	2	0	1	3	25	36	17		**0**
		Japan	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		**0**
		U.S.A.	119	115	128	211	88	83	138	171	155	110	149	176	98	174	218	167	131	147	100	158	204	150	166	206	141	141

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

BFTE-Table 1. The probabilities of $F<F_{MSY}$ for quotas from 0 to 30,000t for 2014 through 2022. Shading corresponds to the probabilities of being in the ranges of 50-59%, 60- 69%, 70-79%, 80-89% and greater or equal to 90%.

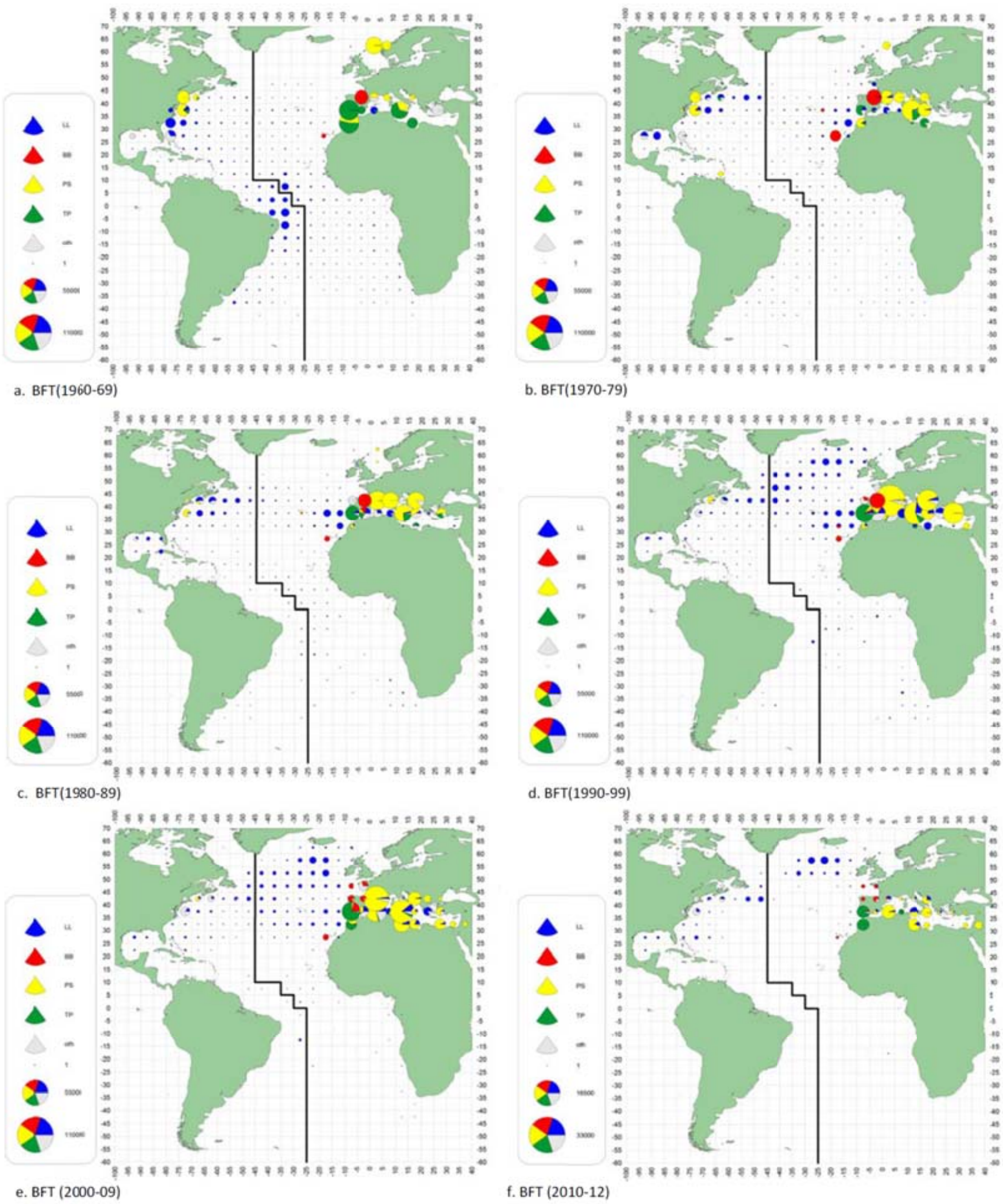
TAC	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
4000	100	100	100	100	100	100	100	100	100
6000	100	100	100	100	100	100	100	100	100
8000	100	100	100	100	100	100	100	100	100
10000	100	100	100	100	100	100	100	100	100
12000	100	100	100	100	100	100	100	100	100
13500	100	100	100	100	100	100	100	100	100
14000	100	100	100	100	100	100	100	100	100
15000	100	100	100	100	100	100	100	100	100
16000	100	100	100	100	100	100	100	100	100
18000	100	100	100	100	100	100	100	100	100
20000	100	100	100	100	100	100	100	100	100
22000	100	100	100	100	100	100	100	100	100
24000	100	100	100	100	100	100	100	100	100
26000	100	100	100	100	100	100	100	100	100
28000	100	100	100	100	100	100	100	100	100
30000	100	100	100	100	100	100	100	100	100

BFTE-Table 2. The probabilities of SSB >SSB_{MSY} for quotas from 0 to 30000 t for 2014 through 2022. Shading corresponds to the probabilities of being in the ranges of 50-59%, 60- 69%, 70-79%, 80-89% and greater or equal to 90%.

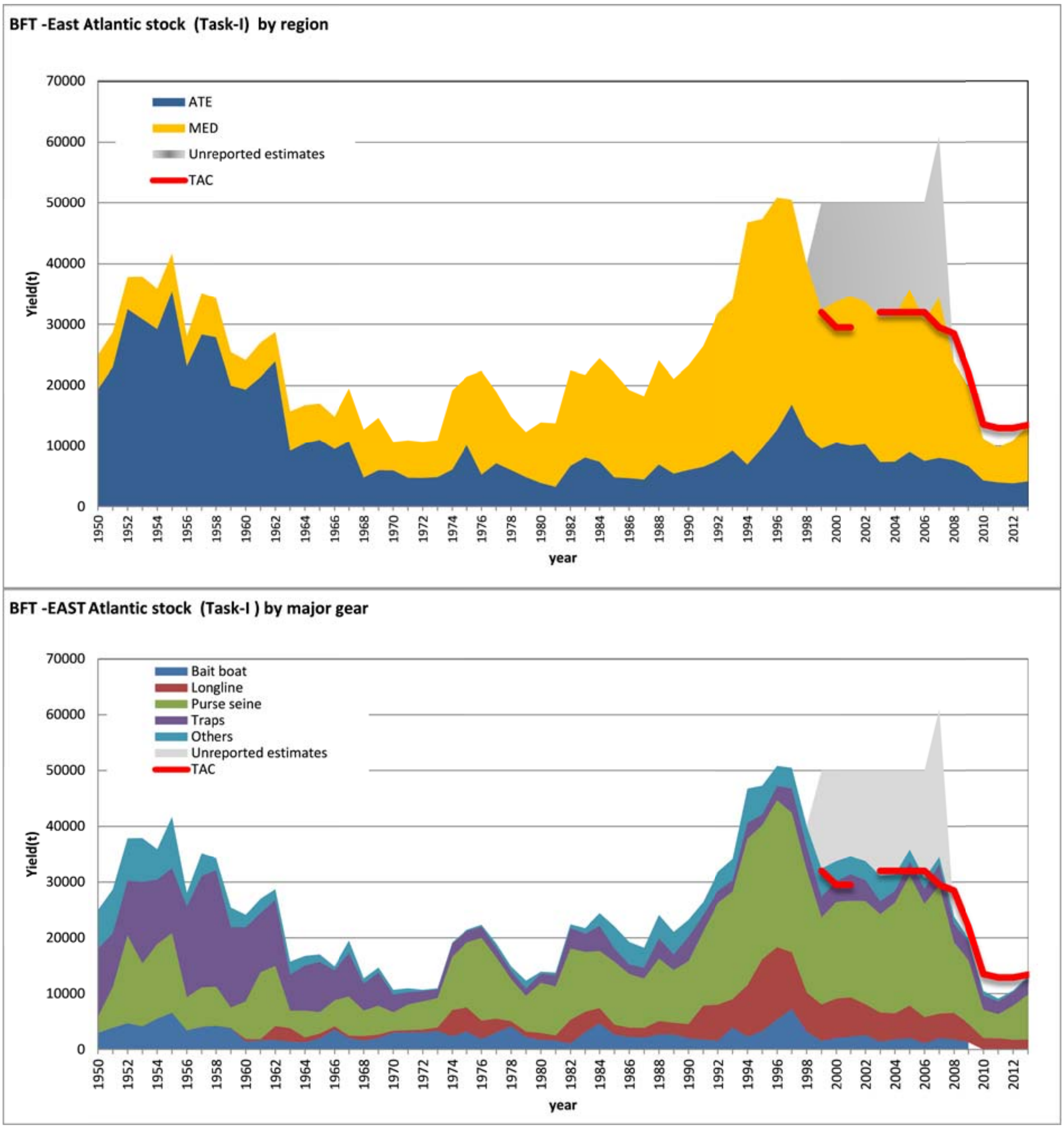
TAC	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	63	67	73	80	89	94	98	99	100
2000	63	67	73	80	88	94	97	99	100
4000	63	67	72	79	87	93	97	99	100
6000	63	67	72	79	87	93	97	99	100
8000	63	67	72	79	86	92	96	98	99
10000	63	67	72	78	86	92	96	98	99
12000	63	67	72	78	85	91	95	98	99
13500	63	67	71	77	84	91	94	97	99
14000	63	67	71	77	84	90	94	97	99
15000	63	67	71	77	84	90	94	97	99
16000	63	67	71	77	83	90	94	97	99
18000	63	67	71	76	83	89	93	96	98
20000	63	67	71	76	82	88	93	96	98
22000	63	67	70	76	82	88	92	95	97
24000	63	67	70	75	81	87	91	94	97
26000	63	67	70	75	80	86	90	94	96
28000	63	67	70	75	80	85	89	93	95
30000	63	67	70	74	79	85	89	92	95

BFTE-Table 3. The probabilities of $F<F_{MSY}$ and SSB $>SSB_{MSY}$ for quotas from 0 to 30000 t for 2014 through 2022. Shading corresponds to the probabilities of being in the ranges of 50-59 %, 60- 69 %, 70-79 %, 80-89 % and greater or equal to 90 %.

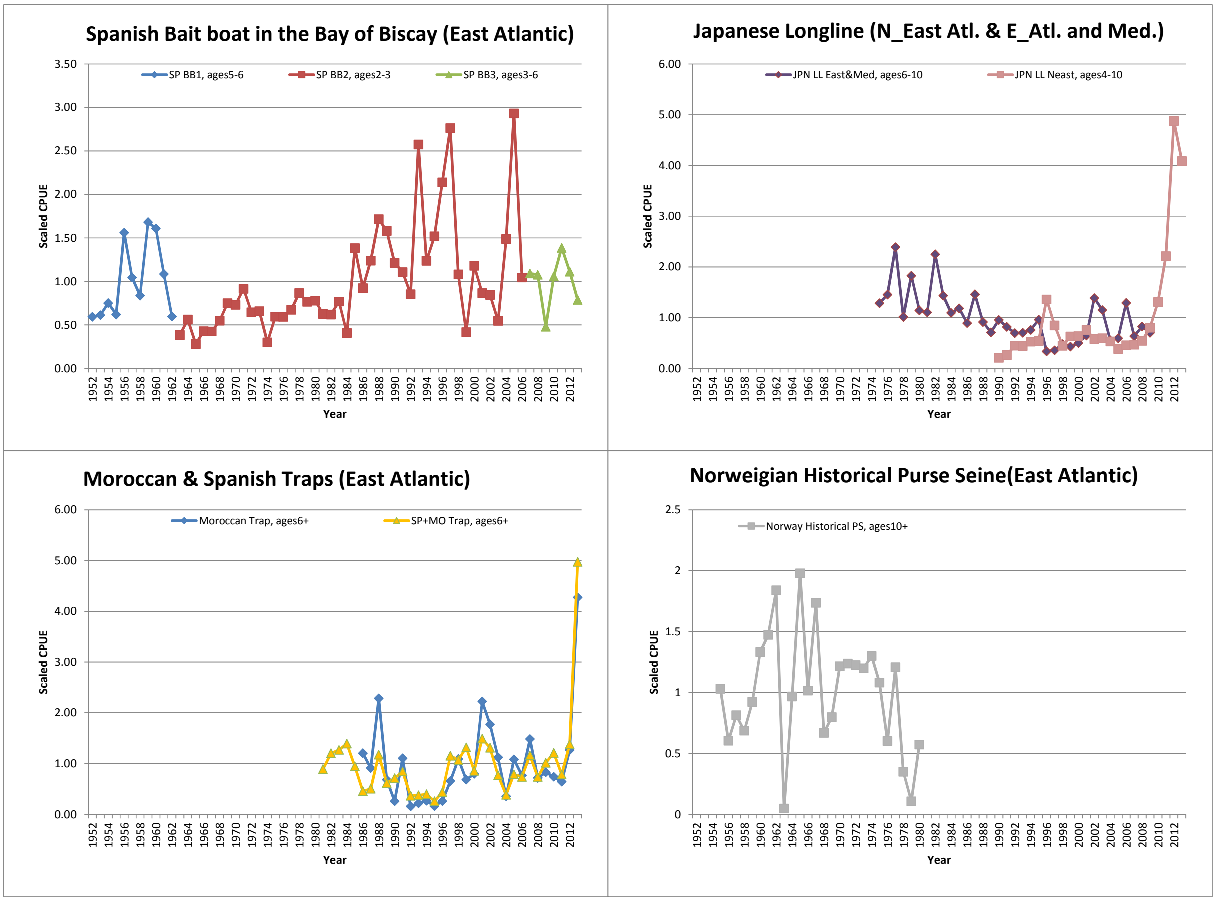
TAC	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	63	67	73	80	89	94	98	99	100
2000	63	67	73	80	88	94	97	99	100
4000	63	67	72	79	87	93	97	99	100
6000	63	67	72	79	87	93	97	99	100
8000	63	67	72	79	86	92	96	98	99
10000	63	67	72	78	86	92	96	98	99
12000	63	67	72	78	85	91	95	98	99
13500	63	67	71	77	84	91	94	97	99
14000	63	67	71	77	84	90	94	97	99
15000	63	67	71	77	84	90	94	97	99
16000	63	67	71	77	83	90	94	97	99
18000	63	67	71	76	83	89	93	96	98
20000	63	67	71	76	82	88	93	96	98
22000	63	67	70	76	82	88	92	95	97
24000	63	67	70	75	81	87	91	94	97
26000	63	67	70	75	80	86	90	94	96
28000	63	67	70	75	80	85	89	93	95
30000	63	66	69	74	79	84	89	92	95



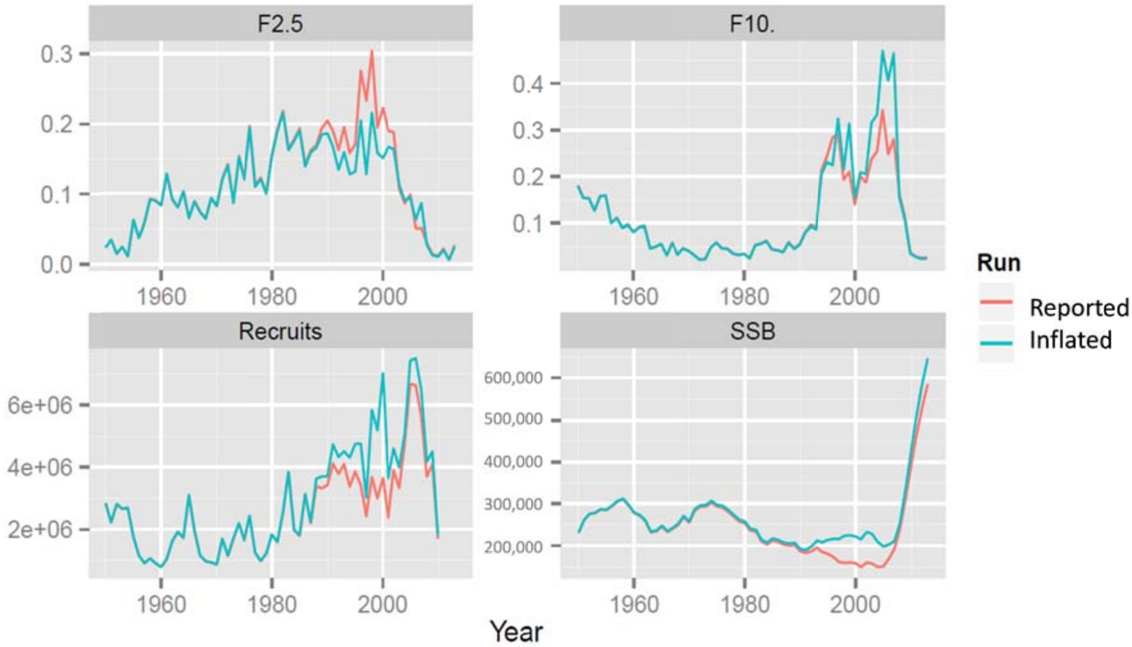
BFT-Figure 1. Geographic distribution of bluefin tuna catches per 5x5 degrees and per main gears from 1950 to 2012.



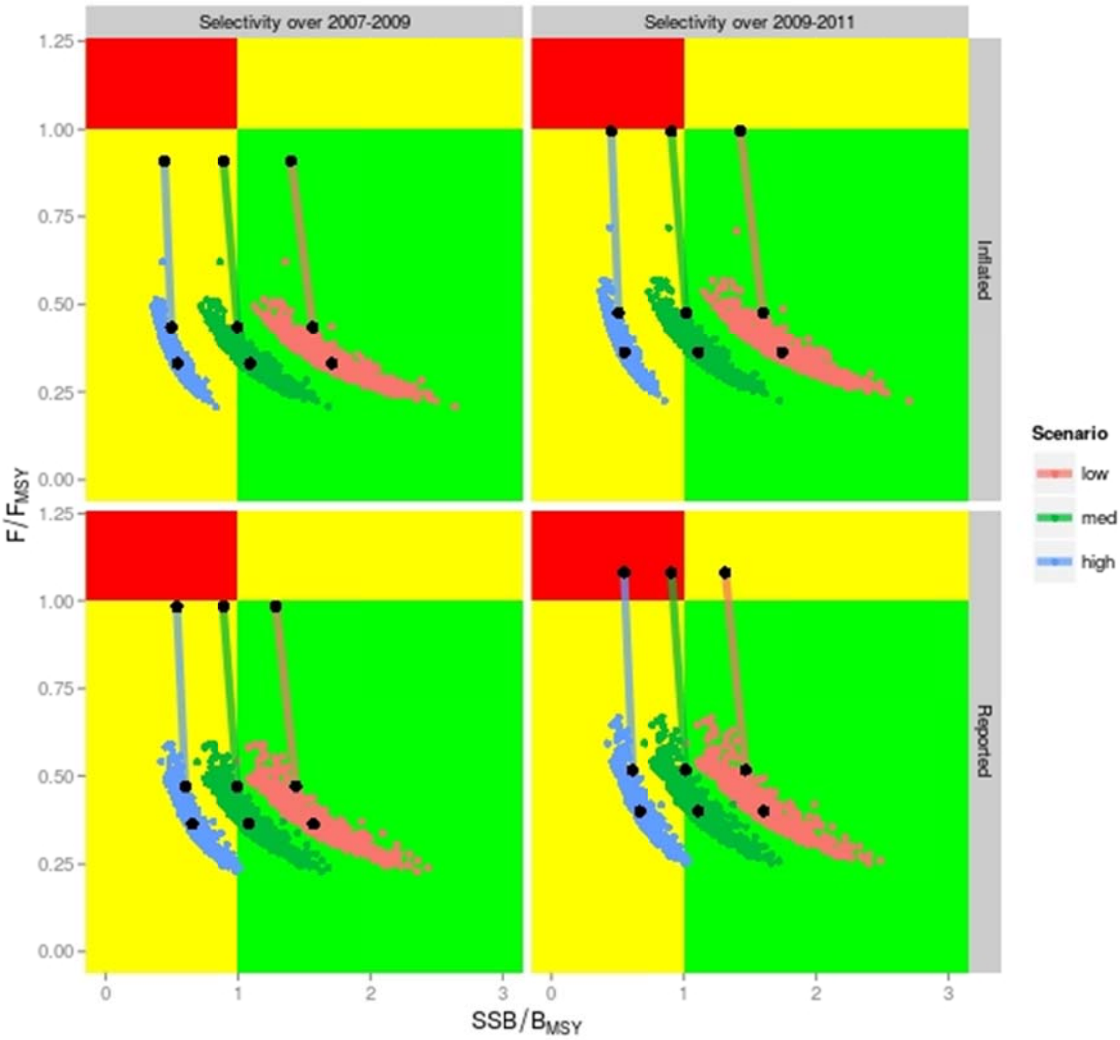
BFTE-Figure 1. Reported catch for the East Atlantic and Mediterranean from Task I data from 1950 to 2013 split by main geographic areas (top panel) and by gears (bottom panel) together with unreported catch estimated by the SCRS (using fishing capacity information and mean catch rates over the last decade) from 1998 to 2007 (the SCRS did not detect unreported catch using fishing capacity information since 2008) and TAC levels since 1998.



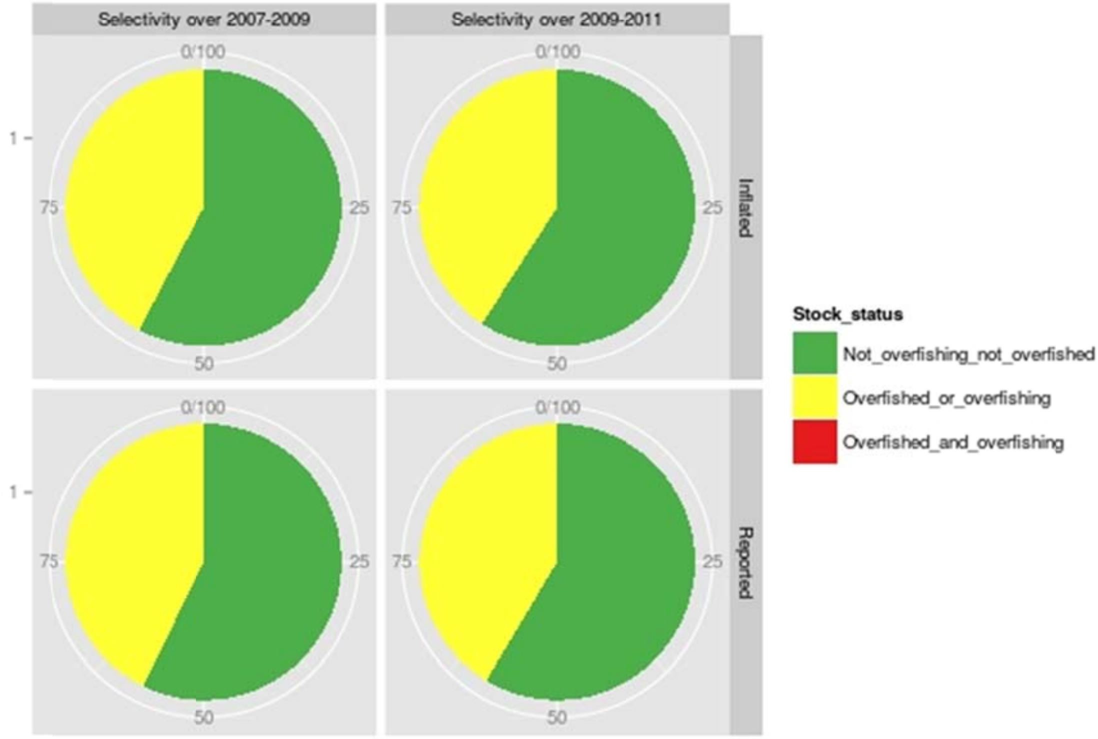
BFTE-Figure 2. Plots of the CPUE time series fishery indicators for the East Atlantic and Mediterranean bluefin tuna stock used in the 2014 stock assessment. All CPUE series are standardized series except the nominal Norway PS index. The Spanish BB series (top left panel) was split in three series to account for changes in selectivity patterns, and the latest series was updated until 2013 using both French and Spanish BB data due to the sale of the quota by the Spanish fleet. The Moroccan-Spanish traps CPUE and the Japanese Longlines CPUE for the Northeast Atlantic have been updated until 2013. The Moroccan CPUE was used only for the sensitivity analysis.



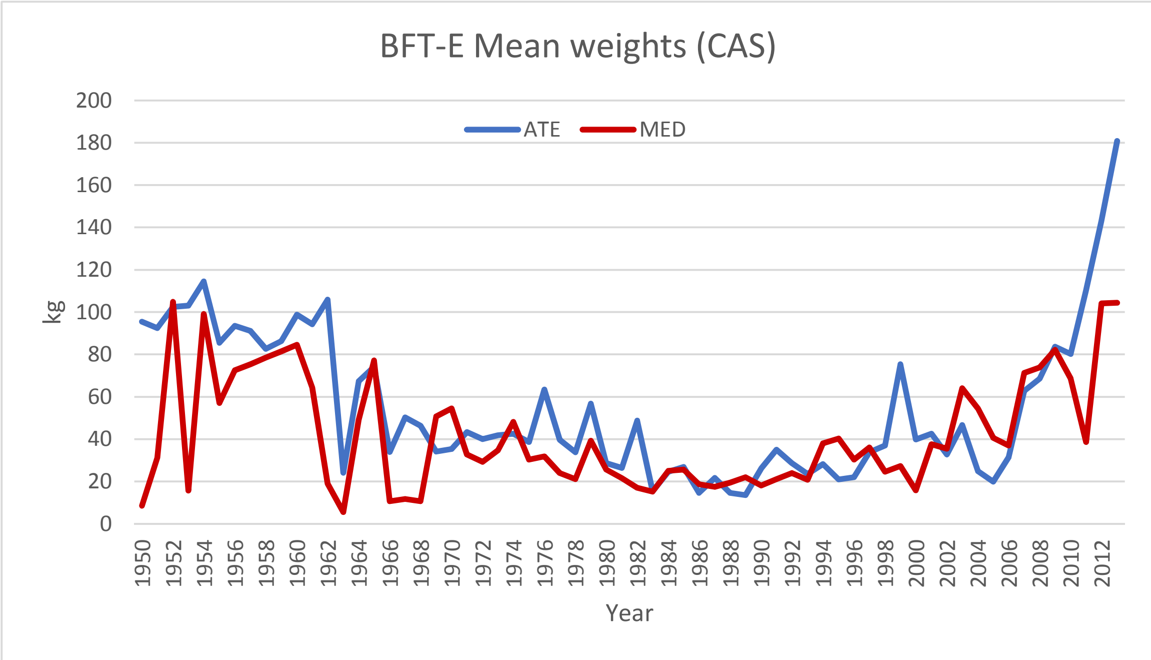
BFTE-Figure 3. Fishing mortality (for ages 2 to 5 and 10+), spawning stock biomass (in metric ton) and recruitment (in number of fish) estimates from VPA continuity run (considered as the base case in the 2014 stock assessment). Red line: reported catch; blue line: inflated (from 1998 to 2007) catch.



BFTE-Figure 4. Stock status from 2011 to the terminal year (2013) estimated from VPA continuity run with reported and inflated catch (upper and lower panels) and considering low, medium and high recruitment levels (blue, green and red lines). Blue, green and red dots represent the distribution of the terminal year obtained through bootstrapping for the corresponding three recruitment levels. Left Panel (selectivity over 2007-2009): 2013 SSB and F relative to reference points calculated with the selectivity pattern over 2007-2009 which was same period as the 2010 stock assessment. Right Panel (selectivity over 2009-2011): 2013 SSB and F relative to the reference points with the selectivity pattern over 2009-2011 which was same period as the 2012 stock assessment.



BFTE-Figure 5. Pie chart showing the proportion of the VPA continuity run results for the terminal year (2013) that are within the green quadrant of the Kobe plot chart (not overfished, no overfishing), the yellow quadrant (overfished or overfishing), and the red quadrant (overfished and overfishing). Split by catch scenario (reported and inflated) and benchmark (selectivity patterns were estimated over 2007-2009 or over 2009-2011).



BFTE-Figure 6. Plots of the annual mean weight from the catch-at-size data per main area (ATE: East Atlantic and MED: Mediterranean) from 1950 to 2013 used in the 2014 stock assessment.

BLUEFIN TUNA - WEST

BFTW-2. Fishery indicators

The total catch for the West Atlantic peaked at 18,671 t in 1964, mostly due to the Japanese longline fishery for large fish off Brazil (that started in 1962) and the U.S. purse seine fishery for juvenile fish (**BFT-Table 1, BFTW-Figure 1**). Catches dropped sharply thereafter with the collapse of the bluefin tuna by-catch longline fishery off Brazil in 1967 and decline in purse seine catches, but increased again to average over 5,000 t in the 1970s due to the expansion of the Japanese longline fleet into the northwest Atlantic and Gulf of Mexico and an increase in purse seine effort targeting larger fish for the sashimi market. The total catch for the West Atlantic including discards has been relatively stable since 1982 due to the imposition of quotas. However, since a total catch level of 3,319 t in 2002 (the highest since 1981, with all three major fishing nations indicating higher catches), total catch in the West Atlantic declined steadily to a low of 1,638 t in 2007 and then increased in 2008 and 2009 to 2,000 t and 1,980 t, respectively. The catch in 2013 was 1,484 t (**BFTW-Figure 1**). The decline through 2007 was primarily due to considerable reductions in catch levels for U.S. fisheries. Since 2002, the Canadian annual catches have been relatively stable at about 500-600 t (735 t in 2006); the 2006 catch was the highest recorded since 1977 (972 t). The 2013 Canadian catch (including dead discards) was 480t. Japanese catches have generally fluctuated between 300-500 t, with the exception of 2003 (57 t), which was low for regulatory reasons, and 2009 (162 t). Japanese landings for 2011 were considerably higher than previous at 578 t, while catches in 2012 and 2013 were 289 t and 317, respectively.

The average weight of bluefin tuna taken by the combined fisheries in the West Atlantic were historically low during the 1960s and 1970s (**BFTW-Figure 2**), for instance showing an average weight of only 33 kg during the 1965-1975 period. However, since 1980 they have been showing a quite stable trend and at a quite high average weight of 93 kg.

The overall number of Japanese vessels engaged in bluefin fishing has declined from more than 100 vessels to currently less than 10 vessels in the West Atlantic. After reaching a catch level of 2,014 t in 2002 (the highest level since 1979), the catches (landings and discards) of U.S. vessels fishing in the northwest Atlantic (including the Gulf of Mexico) declined precipitously during 2003-2007. The United States did not catch its quota in 2004-2008 with catches of 1,066, 848, 615, 858 and 922 t, respectively. However, in 2009 the United States fully realized its base quota with total catches (landings including dead discards) of 1,273 t and since that time catches have remained around 900 t with catches in 2012 of 915 t and in 2013 of 659 t.

The indices of abundance used in the 2014 assessment were updated through 2013 (**BFTW-Figure 3**). The catch rates of juvenile bluefin tuna in the U.S. rod and reel fishery fluctuate with little apparent long-term trend, but exhibit a pattern that is consistent with the strong year-classes estimated for 2002 and 2003and showed small decreases in 2012 and 2013. The catch rates of adults in the U.S. rod and reel fishery showed decreases between 2011 and 2013. Catch rates of the Japanese longline fishery north of 30^{o}N has fluctuated substantially over time but in recent years (2011-2013) have increased to the highest values of the time series. The catch rate series from the U.S. Gulf of Mexico longline fishery was split after 1991 due to management related impacts upon the indices and was also adjusted for the effects of ‘weak’ hook regulations implemented in 2011. The early time period (1987-1991) shows no clear trend while the later time period shows a generally increasing trend. Indices for the Gulf of St. Lawrence have increased rapidly since 2004 and the catch rates in 2011-2013 were the highest in the time series. The Committee questioned if the rate of increase was biologically plausible, and noted that many factors may have contributed to the increase, including changes in stock distribution, management regulations, fishing behavior and the environment, and may not have been fully accounted for in the standardization. Catch rates in southwest Nova Scotia have shown a recent decrease since 2008. The Gulf of Mexico larval survey (the only fishery independent indicator) continues to fluctuate around the low levels observed since the 1980s but 2011 and 2013 were relatively high. The general increasing trends for several indices indicate an increasing biomass, however conflicting trends between several of the indices (e.g. Canada Gulf of St. Lawrence and U.S. rod and reel) and the potential influence of unaccounted factors described above make the magnitude of this increase uncertain.

BFTW-3. State of the stock

The present update assessment included information through 2013 (Anon. 2013d). The SCRS cautions that the conclusions of this assessment do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin. Based on earlier work, the estimates of stock status can be expected to vary considerably depending on the type of data used to estimate mixing (conventional tagging or isotope signature samples) and modeling assumptions made. Mixing models will be further investigated prior to the next assessment. Another important source of uncertainty is recruitment, both in terms of recent levels (which are estimated with low precision in the assessment), and potential future levels (the "low" vs. "high" recruitment potential hypotheses which affect management benchmarks, **BFTW-Figure 4**). Improved knowledge of maturity at age will also affect the perception of changes in stock size. Finally, the lack of representative samples of otoliths requires determining the catch at age from length samples, which is imprecise for larger bluefin tuna. Many of these deficiencies are being addressed by current research programs. Assessment results were sensitive to certain assumptions and data treatments, including the abundance indices. Exclusion of the Canadian GSL index decreased the biomass estimate by 33%, whereas exclusion of the US large RR index increased biomass by about 25%. However both indices were included as the committee felt they captured the potential redistribution of the stock within the management area.

The 2014 assessment estimated trends that are consistent with previous analyses in that spawning stock biomass (SSB) declined steadily from 1970 to 1992and then fluctuated around 25 to 30% the 1970 level for about the next decade (**BFTW-Figure 5**). In recent years, however, there appears to have been a gradual increase in SSB from about 32% of the 1970 level in 2003 to an estimated 55% in 2013. Since 1998, when the rebuilding plan was adopted, the SSB has increased by 70%. The stock has experienced different levels of fishing mortality (F) over time, depending on the size of fish targeted by various fleets (**BFTW-Figure 5**). Fishing mortality on spawners (ages 9 and older) declined markedly after 2003.

Estimates of recruitment were very high in the early 1970s (**BFTW-Figure 5**), and previous analyses involving longer catch and index series suggest that recruitment was also high during the 1960s. Since 1977, recruitment has varied from year to year without trend with the exception of strong year-classes in 2002 and 2003. The current assessment suggests that both the 2002 and 2003 year classes were large; but the estimate of a strong 2002 year class may be an artefact of the lack of direct observations of the age of fish in the catch and recent regulations in the United States that limited the take of fish in that size range. Under the current maturity assumptions (age 9 and older) the 2002/2003 year classes started to contribute to the spawning biomass in 2011/2012.

A key factor in estimating MSY-related benchmarks is the highest level of recruitment that can be achieved in the long term. Assuming that average recruitment cannot reach the high levels from the early 1970s, recent F (2010-2013) is 36% of F_{MSY} and SSB_{2013} is about 225% of SSB_{MSY} (**BFTW-Figure 6, BFTW-Figure 7**). In contrast, estimates of stock status are more pessimistic with respect to spawning biomass if a high recruitment potential scenario is considered, with F =88% of F_{MSY} and SSB_{2013} =48% of SSB_{MSY}. However, the Committee notes that this is the first assessment where the stock was estimated to not be undergoing overfishing under both recruitment scenarios.

Compared to the 2012 assessment, the 2014 assessment estimated higher levels of SSB for all years dating back to the late-1990s, largely due to a rapid increase in one index and corrections to account for regulatory changes in another. In addition, the SSB_{MSY} currently estimated under the high recruitment potential scenario is updated to be 33% lower than had been estimated during the 2012 assessment due to revised estimates of the high recruitment potential (**Figure 4**) scenario, and the SSB_{MSY} currently estimated under the low recruitment potential scenario is updated to be 2% higher than had been estimated during the 2012 assessment. The re-estimation of the SSB_{MSY} values resulted in a more optimistic perception of stock status, even under the high recruitment hypothesis. The increase in SSB between 2011 and 2013 estimated in the 2014 assessment is 5%.

The Committee recognizes that the large uncertainty in stock status is exacerbated by the lack of appropriate information/data and scientific surveys, and suggests using a scientific research quota (as recommended previously by the SCRS) to help support the improvement of stock abundance indices for western Atlantic bluefin tuna and overcome this standstill situation. However, the Committee also points out that the collection of the information mentioned above is a long-term endeavor.

BFTW-4. Outlook

A medium-term outlook evaluation of changes in spawning stock size and yield over the remaining rebuilding period under various management options was conducted in 2014. Future recruitment was assumed to fluctuate under two scenarios: (i) average levels observed for 1976-2010 (96,500 fish, the low recruitment potential scenario) and (ii) levels that increase as the stock rebuilds (MSY level of 212,000 fish, the high recruitment potential scenario). The Committee has insufficient evidence to favor either scenario over the other and notes that both are plausible (but not extreme) lower and upper bounds on rebuilding potential. A preliminary analysis conducted after the assessment meeting indicated an improved fit of assessment outputs by the low recruitment potential hypothesis; however, the Committee could not agree whether this provided sufficient evidence to favour that scenario, in light of prior analyses that gave conflicting conclusions.

The outlook for bluefin tuna in the West Atlantic is summarized in **BFTW-Figure 8 and BFTW-Tables 1-3**. The low recruitment potential scenario suggests the stock is above the MSY level with greater than 60% probability and catches of 2,500 t or lower will maintain it above the MSY level. Constant catches of 2,250 t would result in a short-term minor decrease but with 2019 SSB approximately equal to that in 2013. If the high recruitment potential scenario is correct, then the western stock will not rebuild by 2019 even with no catch, although catches less than 2,500 t are predicted to prevent overfishing.

The Committee reiterates that the effects of mixing and management measures on the eastern stock remains a considerable source of uncertainty for the outlook of the western stock.

BFTW-5. Effect of current regulations

The Committee previously noted that Recommendations 08-04, 10-03 and 12-02 were expected to result in a rebuilding of the stock towards the convention objective. The present assessment estimates that the spawning biomass has increased substantially in recent years, which is consistent with these expectations.

BFTW-6. Management recommendations

In 1998, the Commission initiated a 20-year rebuilding plan designed to achieve SSB_{MSY} with at least 50% probability. In response to recent assessments, the Commission recommended a total allowable catch (TAC) of 1,900 t in 2009, 1,800 t in 2010 [Rec. 08-04] and 1,750 t in 2011, 2012, 2013 and 2014 [Rec. 10-03, Rec. 12-02, 13-09].

The 2014 assessment indicates similar historical trends in abundance as in previous assessments, but a more rapid increase in recent years. The strong 2002/2003 year classes and recent reduction in fishing mortality have contributed to this in recent years.

Future stock productivity, as with prior assessments, is based upon two hypotheses about future recruitment: a ‘high recruitment potential scenario” in which future recruitment has the potential to achieve levels that occurred in the early 1970s and a “low recruitment potential scenario” in which future recruitment is expected to remain near present levels (even if stock size increases). The results of this assessment have shown that long term implications of future biomass are different between the two hypotheses and the issue of identifying one of these two hypotheses, or an alternative one, as being the more realistic remains unresolved.

Probabilities of achieving SSB_{MSY} within the Commission rebuilding period were projected for alternative catch levels **(BFTW-Table 1)**. The "low recruitment potential scenario" suggests that spawning biomass is currently above SSB_{MSY}, whereas the "high recruitment potential scenario" suggests that SSB_{MSY} has a very low probability of being achieved within the rebuilding period. Despite this large uncertainty about the long term future productivity of the stock, under either recruitment scenario catches of less than 2,250 t are estimated to allow the spawning biomass to be at or above current levels by 2019 (with 50% probability) and this level of catch should not be exceeded. Maintaining catch at current levels (1,750 t) is expected to allow the spawning biomass to increase more quickly, which may help resolve the issue of low and high recruitment potential.

Should the Commission decide to have a scientific research quota (such as proposed in SCRS/2013/200, SCRS/2013/203) then that quota should be included within a TAC that is consistent with the scientific advice above. The Committee notes continued stock growth will increase ability to discriminate between alternative recruitment hypotheses.

As noted previously by the Committee, both the productivity of western Atlantic bluefin tuna and western Atlantic bluefin tuna fisheries are linked to the eastern Atlantic and Mediterranean stock. Therefore, management actions taken in the eastern Atlantic and Mediterranean are likely to influence the recovery in the western Atlantic, because even small rates of mixing from East to West can have considerable effects on the West due to the fact that eastern plus Mediterranean resource is much larger than that of the West.

WEST ATLANTIC BLUEFIN TUNA SUMMARY (Catches and Biomass in t)		
Current (2013) Catch (including discards)	1,484 t	
Assumed recruitment	Low potential	High potential
Maximum Sustainable Yield (MSY)	3,050 (2807-3307)[1]	5,316 (4,442-5863)[1]
SSB_{MSY}	13,226 (*12,969-13,645)*[1]	63,102 (50,096-72,921)
SSB_{2013}/SSB_{MSY}	2.25 (1.92-2.68)[1]	0.48 (0.35-0.72)[1]
F_{MSY}	0.20 (0.17-0.24)[1]	0.08 (0.07-0.10)[1]
$F_{0.1}$	0.12 (0.11-0.13)[1]	0.12 (0.11-0.13)[1]
$F_{2010\text{-}2012}/F_{MSY}$[2]	0.36 (0.28-0.43)[1]	0.88(0.64-1.08)[1]
$F_{2010\text{-}2012}/F_{0.1}$	0.60 (0.50-0.72)[1]	0.60 (0.50-0.72)[1]
Stock status	Overfished: NO	Overfished: YES
	Overfishing: NO	Overfishing: NO
Management Measures:	[Rec. 08-04] TAC of 1,900 t in 2009 and 1,800 t in 2010, including dead discards. [Rec. 10-03, 12-02, 13-09] TAC of 1,750 t in 2011-2014, including dead discards.	

[1] Median and approximate 80% confidence interval from bootstrapping from the assessment.
[2] $F_{2010\text{-}2012}$ refers to the geometric mean of the estimates for 2010-2012 (a proxy for recent F levels).

BFTW-Table 1. Kobe II matrices (updated during the 2014 stock assessment) giving the probability that the spawning stock biomass will exceed the level that will produce MSY ($SSB>SSB_{MSY}$, not overfished) in any given year for various constant catch levels under the low recruitment and high recruitment scenarios. The current TAC of 1,750 t [Rec. 13-09] is indicated in bold.

Low Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	100.0%	100.0%	100.0%	100.0%	100.0%
1500	100.0%	100.0%	100.0%	100.0%	100.0%
1700	100.0%	100.0%	100.0%	100.0%	100.0%
1750	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
1800	100.0%	100.0%	100.0%	100.0%	100.0%
2000	100.0%	100.0%	100.0%	100.0%	100.0%
2250	100.0%	100.0%	100.0%	100.0%	100.0%
2500	100.0%	100.0%	100.0%	100.0%	100.0%
2750	100.0%	100.0%	100.0%	100.0%	100.0%
3000	100.0%	100.0%	100.0%	100.0%	100.0%
3250	100.0%	100.0%	100.0%	100.0%	100.0%
3500	100.0%	100.0%	100.0%	100.0%	99.8%

High Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	1.2%	1.4%	1.4%	1.6%	6.0%
1500	1.2%	1.2%	1.2%	1.2%	1.6%
1700	1.2%	1.2%	1.2%	1.2%	1.6%
1750	**1.2%**	**1.2%**	**1.0%**	**1.2%**	**1.6%**
1800	1.2%	1.2%	1.0%	1.2%	1.6%
2000	1.2%	1.2%	1.0%	1.2%	1.4%
2250	1.2%	1.2%	0.8%	0.4%	1.2%
2500	1.2%	1.2%	0.6%	0.4%	1.2%
2750	1.2%	1.0%	0.4%	0.4%	1.2%
3000	1.2%	0.8%	0.4%	0.4%	0.8%
3250	1.2%	0.8%	0.4%	0.2%	0.8%
3500	1.2%	0.8%	0.4%	0.2%	0.6%

BFTW-Table 2. Kobe II matrices (updated during the 2014 stock assessment) giving the probability that the fishing mortality rate (F) will be less than the level that will produce MSY ($F<F_{MSY}$, no overfishing) in any given year for various constant catch levels under the low recruitment and high recruitment scenarios. The current TAC of 1,750 t [Rec. 13-09] is indicated in bold.

Low Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	100.0%	100.0%	100.0%	100.0%	100.0%
1500	100.0%	100.0%	100.0%	100.0%	100.0%
1700	100.0%	100.0%	100.0%	100.0%	100.0%
1750	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
1800	100.0%	100.0%	100.0%	100.0%	100.0%
2000	100.0%	100.0%	100.0%	100.0%	100.0%
2250	100.0%	100.0%	100.0%	100.0%	100.0%
2500	100.0%	100.0%	100.0%	100.0%	100.0%
2750	100.0%	100.0%	100.0%	100.0%	100.0%
3000	100.0%	100.0%	100.0%	100.0%	99.6%
3250	100.0%	99.8%	99.6%	99.4%	98.4%
3500	99.6%	99.4%	98.6%	97.6%	96.4%

High Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	100.0%	100.0%	100.0%	100.0%	100.0%
1500	99.8%	99.8%	100.0%	100.0%	100.0%
1700	98.0%	98.2%	98.6%	98.8%	99.2%
1750	**97.2%**	**97.8%**	**98.2%**	**98.8%**	**99.0%**
1800	96.6%	97.4%	97.8%	98.2%	98.6%
2000	89.2%	91.6%	93.2%	94.8%	96.0%
2250	73.6%	79.2%	83.0%	85.6%	88.2%
2500	54.4%	59.8%	64.6%	69.0%	71.8%
2750	34.6%	40.0%	44.8%	50.2%	51.6%
3000	22.0%	24.2%	27.6%	30.6%	32.0%
3250	13.8%	15.2%	17.0%	18.4%	19.2%
3500	7.8%	9.0%	9.8%	10.0%	9.8%

BFTW-Table 3. Kobe II matrices (updated during the 2014 stock assessment) giving the joint probability that the fishing mortality rate will be less than the level that will produce MSY ($F<F_{MSY}$) and the spawning stock biomass (SSB) will exceed the level that will produce MSY ($B>B_{MSY}$) in any given year for various constant catch levels under the low recruitment and high recruitment scenarios. The current TAC of 1,750 t [Rec. 13-09] is indicated in bold.

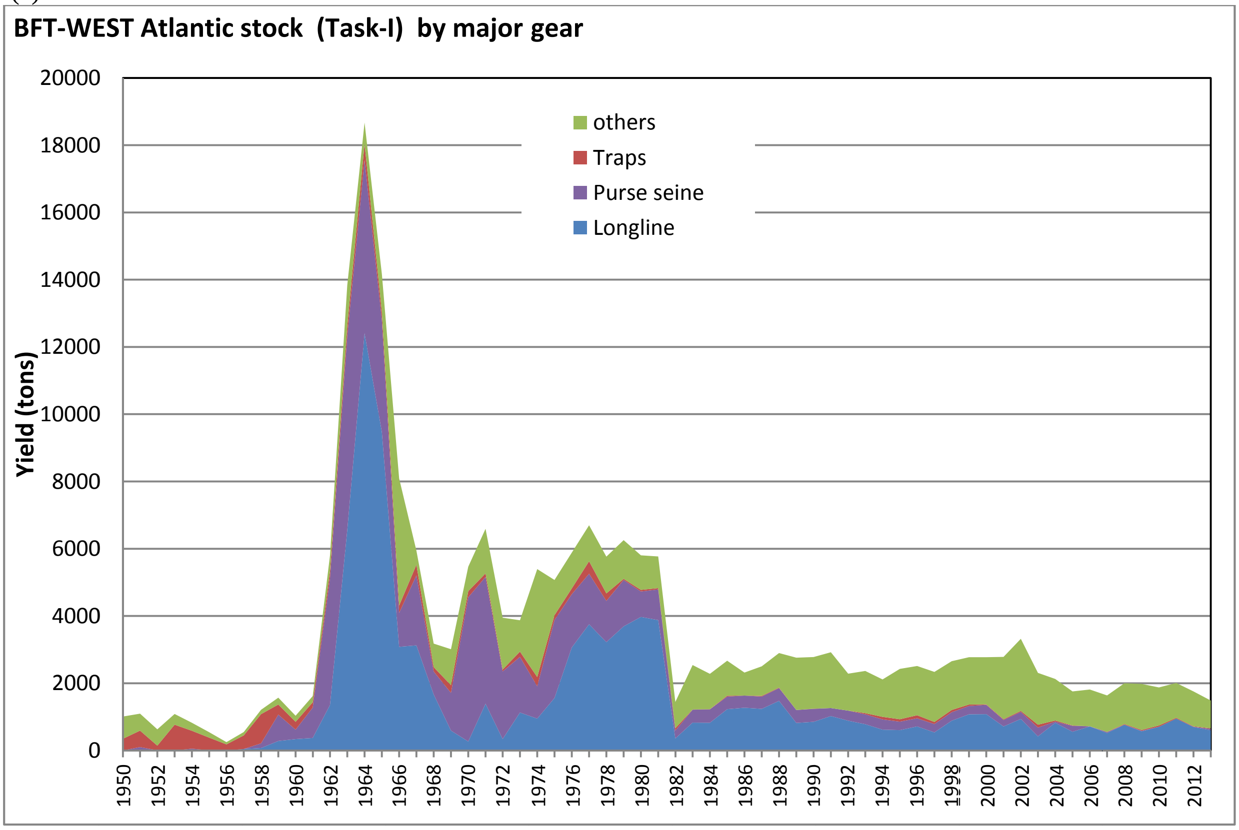
Low Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	100.0%	100.0%	100.0%	100.0%	100.0%
1500	100.0%	100.0%	100.0%	100.0%	100.0%
1700	100.0%	100.0%	100.0%	100.0%	100.0%
1750	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
1800	100.0%	100.0%	100.0%	100.0%	100.0%
2000	100.0%	100.0%	100.0%	100.0%	100.0%
2250	100.0%	100.0%	100.0%	100.0%	100.0%
2500	100.0%	100.0%	100.0%	100.0%	100.0%
2750	100.0%	100.0%	100.0%	100.0%	100.0%
3000	100.0%	100.0%	100.0%	100.0%	99.6%
3250	100.0%	99.8%	99.6%	99.4%	98.4%
3500	99.6%	99.4%	98.6%	97.6%	96.4%

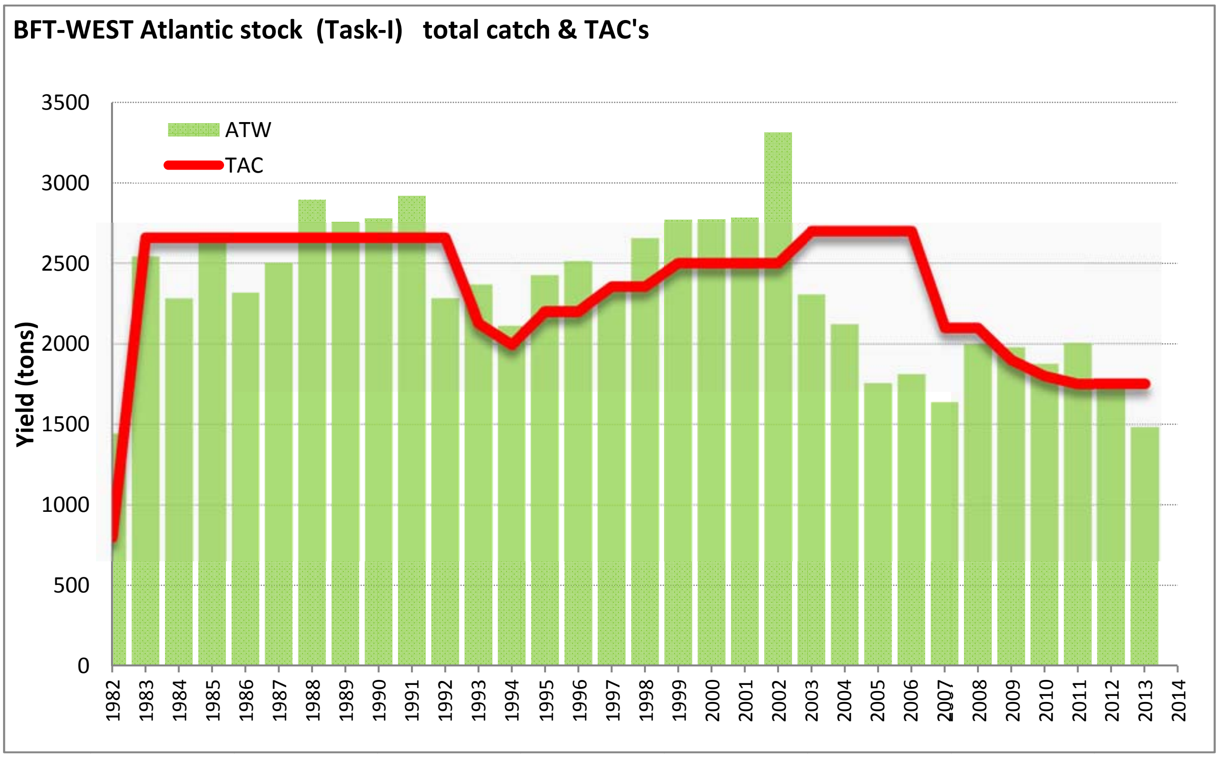
High Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	1.2%	1.4%	1.4%	1.6%	6.0%
1500	1.2%	1.2%	1.2%	1.2%	1.6%
1700	1.2%	1.2%	1.2%	1.2%	1.6%
1750	**1.2%**	**1.2%**	**1.0%**	**1.2%**	**1.6%**
1800	1.2%	1.2%	1.0%	1.2%	1.6%
2000	1.2%	1.2%	1.0%	1.2%	1.4%
2250	1.2%	1.2%	0.8%	0.4%	1.2%
2500	1.2%	1.2%	0.6%	0.4%	1.2%
2750	1.2%	1.0%	0.4%	0.4%	1.2%
3000	1.2%	0.8%	0.4%	0.4%	0.8%
3250	1.2%	0.8%	0.4%	0.2%	0.8%
3500	1.0%	0.6%	0.2%	0.2%	0.6%

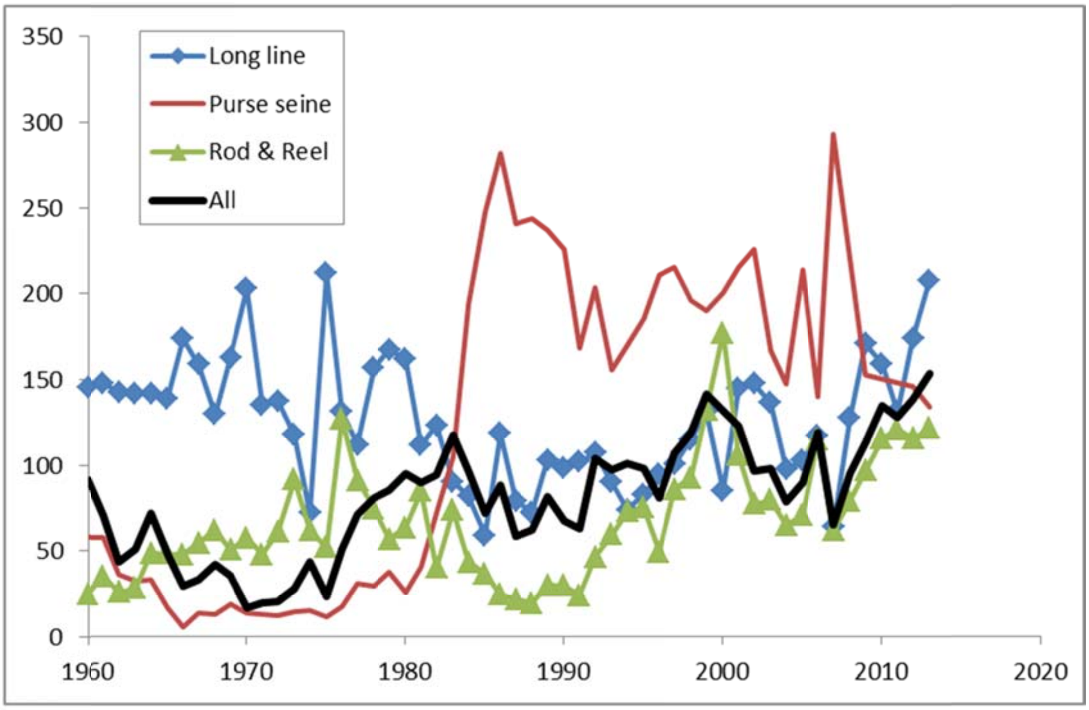
(a)



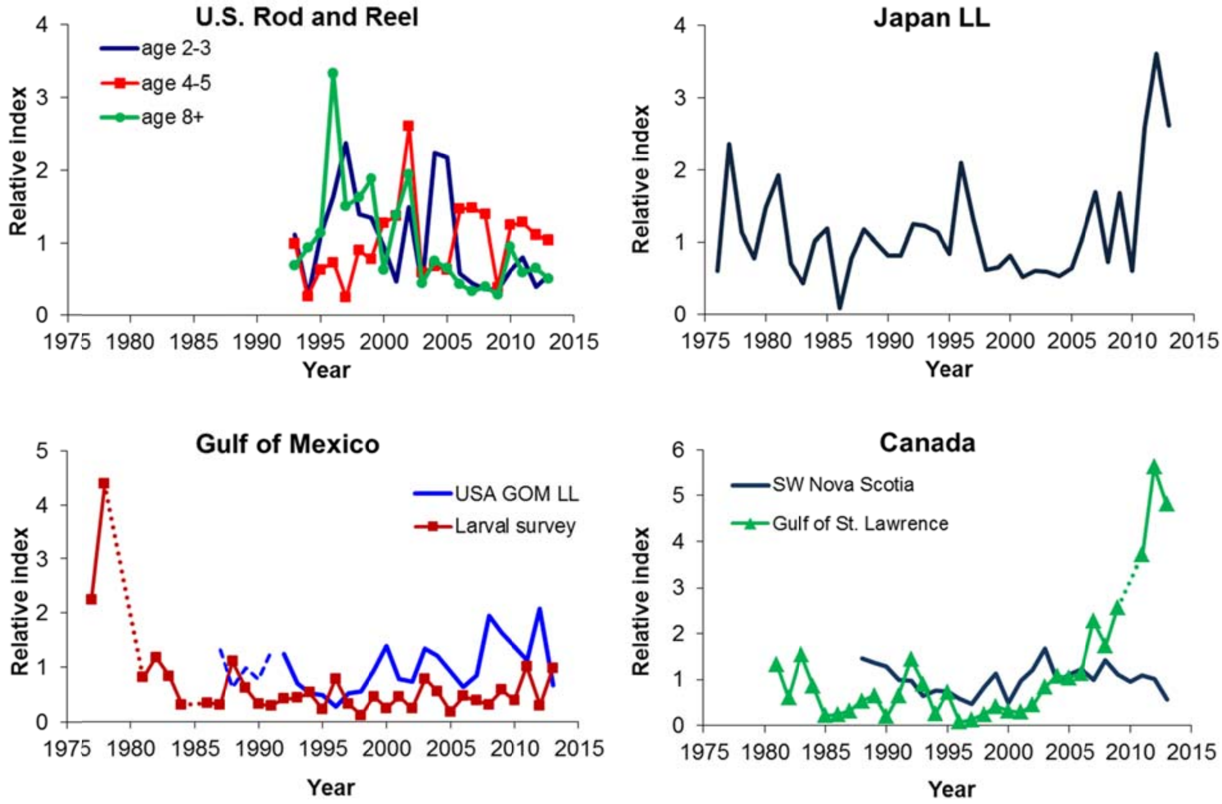
(b)



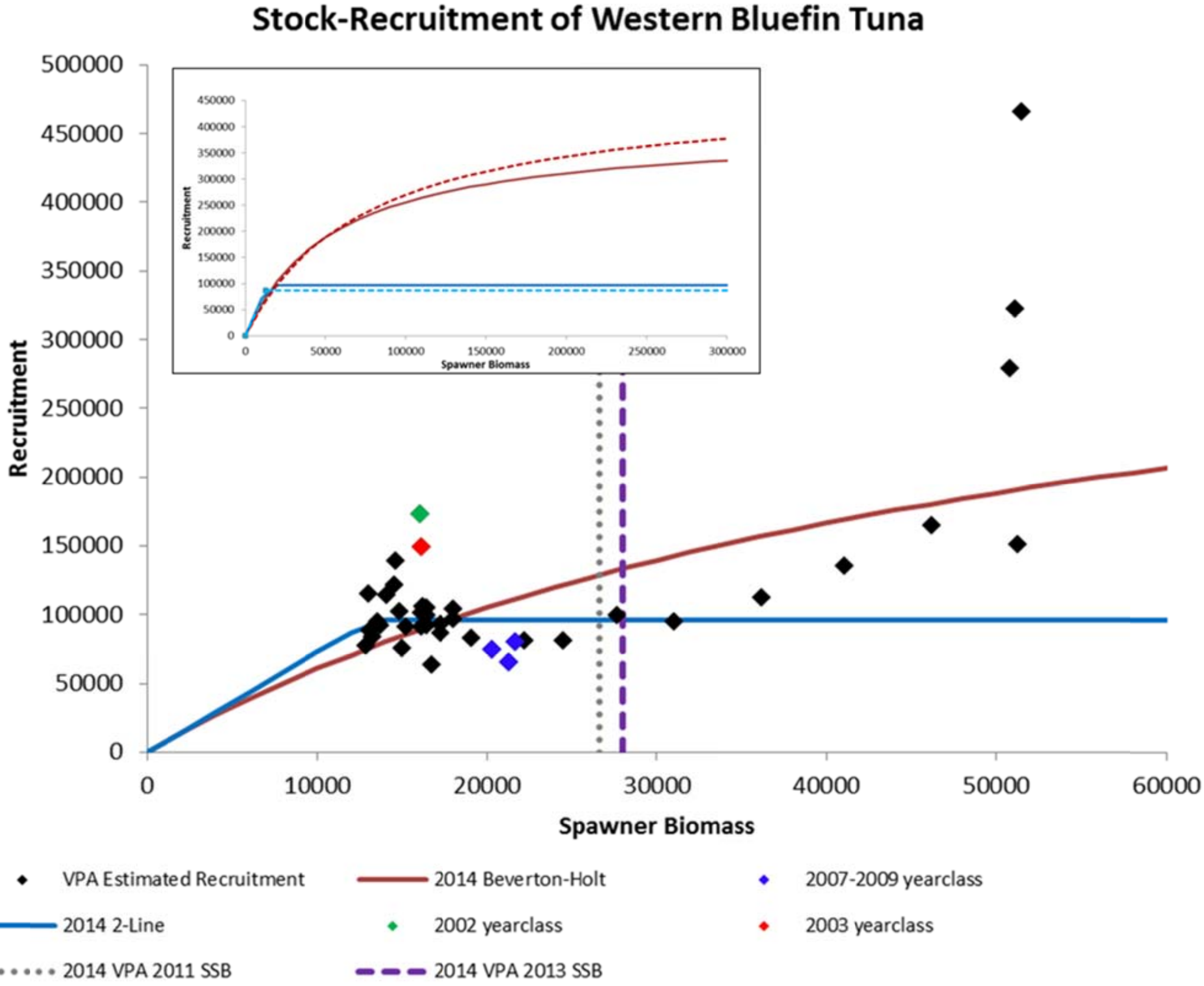
BFTW-Figure 1. Historical catches of western bluefin tuna: (a) by gear type and (b) in comparison to TAC levels agreed by the Commission.



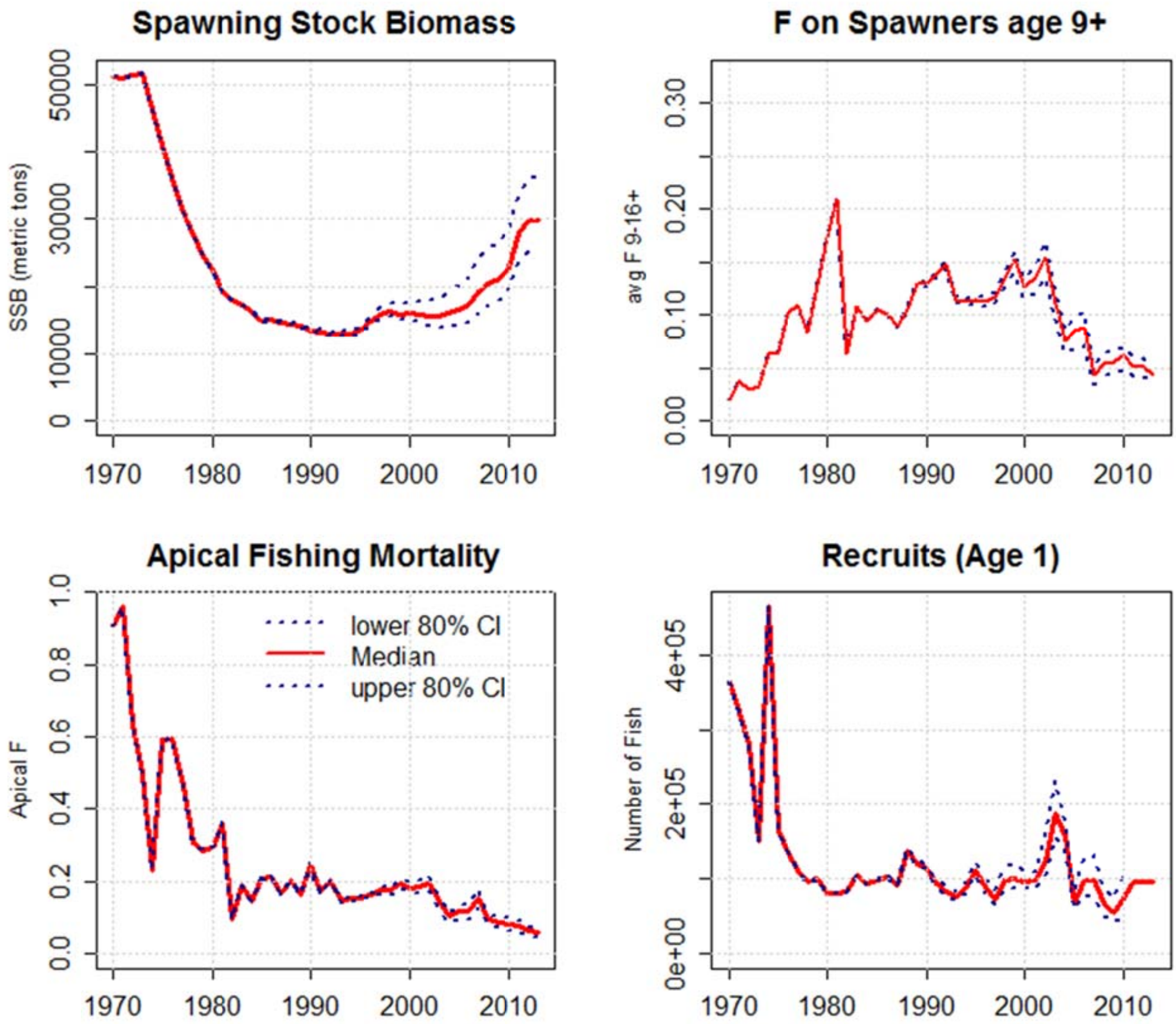
BFTW-Figure 2. Mean weight of western bluefin tuna catches by purse seine, longline, rod and reel, and all gears combined (estimated from the catch-at-size compiled information).



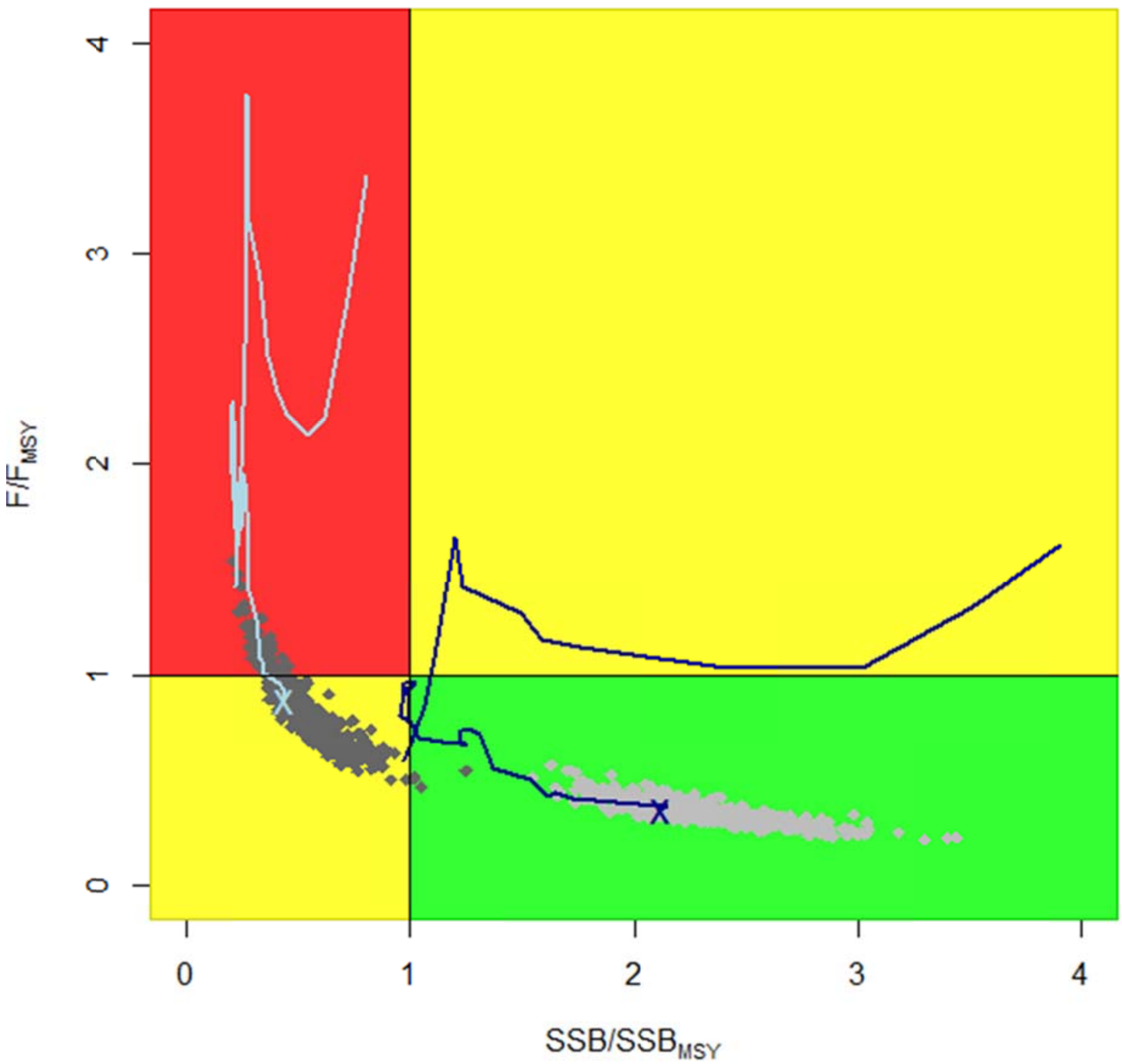
BFTW-Figure 3. Updated indices of abundance for western bluefin tuna. The dashed portions of the larval survey, U.S. Gulf of Mexico, and Canada Gulf of St. Lawrence indices bridge the gaps between years where data were missing or otherwise considered unreliable by the 2014 SCRS (and not used in the base assessment).



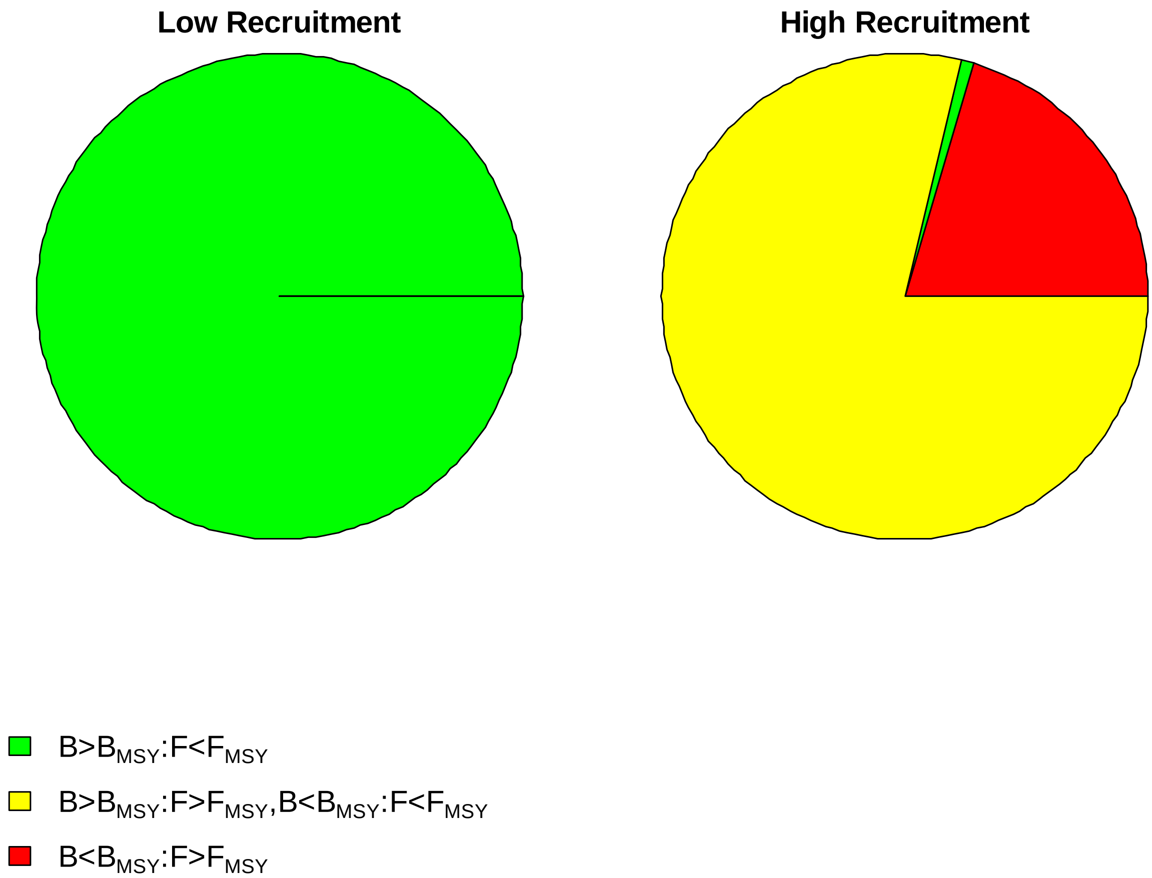
BFTW-Figure 4. Recruitment scenario derived from the 2014 stock assessment. The low recruitment potential scenario (2-line) implies future recruitment will remain near present levels even if stock size increases. The 'high recruitment potential scenario" (Beverton-Holt) implies future recruitment increases with stock size and has the potential to achieve levels that occurred in the early 1970s. Points represent the estimates from the 2014 base assessment, with the 2002, 2003, and recent year class estimates (2008-2010) highlighted. The two vertical lines represent SSB estimates from the 2014 assessment for 2011 (leftmost) and 2013 (rightmost). The inset graph shows the corresponding relationships estimated for the 2012 (dashed lines) and 2014 (solid lines) assessments illustrating the difference in the estimated stock recruitment relationship between 2012 and 2014.



BFTW-Figure 5. Median estimates of spawning biomass (age 9+), fishing mortality on spawners, apical fishing mortality (F on the most vulnerable age class) and recruitment for the base VPA model. The 80% confidence intervals are indicated with dotted lines. The recruitment estimates for the last three years of the VPA are considered unreliable and have been replaced by the median levels corresponding to the low recruitment scenario.

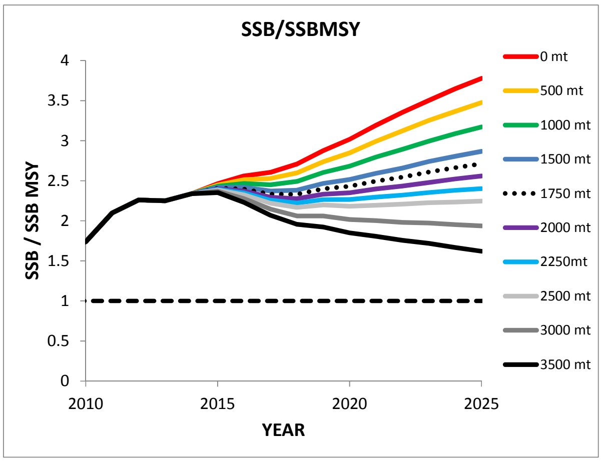


BFTW-Figure 6. Estimated status of stock relative to the Convention objectives (MSY) by year (1973 to 2013) and recruitment scenario (light blue=high recruitment potential, dark blue=low recruitment potential). The light gray dots represent the status estimated for 2013 under the low recruitment scenario, corresponding to bootstrap estimates of uncertainty. The dark blue lines give the historical point estimates for the low recruitment, and the light blue gives the historic trend for the high recruitment.

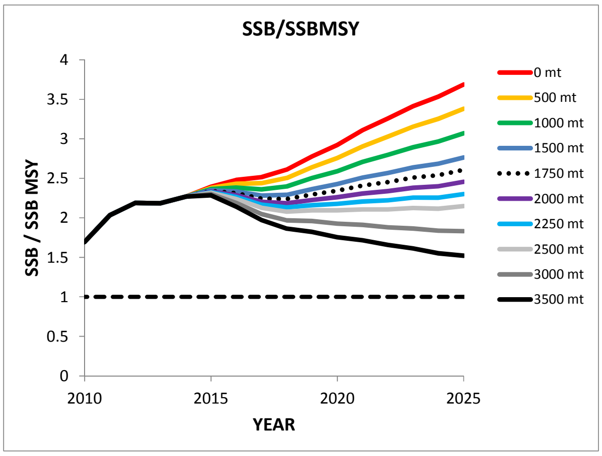


BFTW-Figure 7. Pie chart summarizing stock status, showing the proportion of model outputs that are not overfished and not undergoing overfishing (green), either overfished or undergoing overfishing (yellow) and both overfished and undergoing overfishing (red).

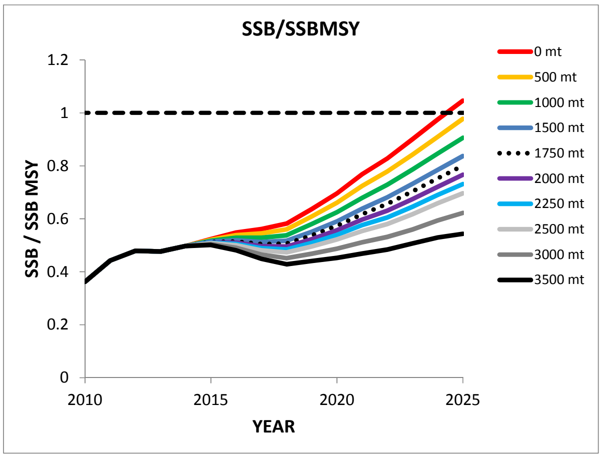
A) 50% probability
Low recruitment potential



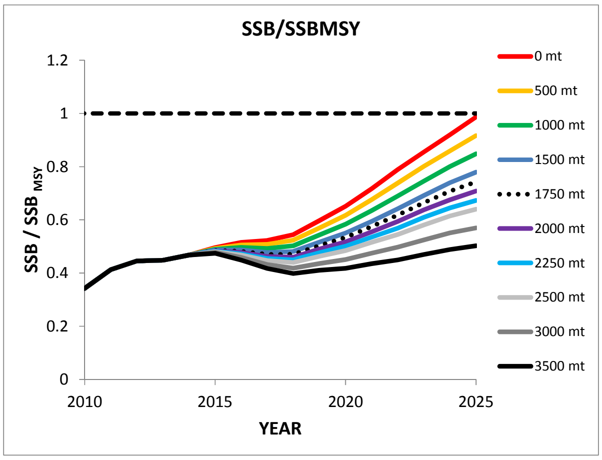
B) 60% probability
Low recruitment potential



C) 50% probability
High Recruitment potential



D) 60% probability
High recruitment potential



BFTW-Figure 8 Projections of spawning stock biomass (SSB) for the Base Case assessment under low recruitment potential (top panels) and high recruitment potential (bottom panels) with an assumed catch of 1,750 mt in 2014 and various levels of constant catch starting in 2015. The labels “50%” and “60%” refer to the probability that the SSB will be greater than or equal to the values indicated by each curve. The curves corresponding to each catch level are arranged sequentially in the same order as the legends. A given catch level is projected to have a 50% or 60% probability of meeting the convention objective (SSB greater than or equal to the level that will produce the MSY) in the year that the corresponding curve meets the dashed horizontal line.

8.6 BUM-BLUE MARLIN

The most recent assessment for blue marlin was conducted in 2011 through a process that included a data preparatory meeting in May 2010 (Anon. 2011c) and an assessment meeting in April 2011 (Anon. 2012a). The last year of fishery data used in the assessment was 2009.

BUM-1. Biology

The central and northern Caribbean Sea and northern Bahamas have historically been known as the primary spawning area for blue marlin in the western North Atlantic. Recent reports show that blue marlin spawning can also occur north of the Bahamas in an offshore area near Bermuda at about 32º-34º North. Ovaries of female blue marlin caught by artisanal vessel in Côte d'Ivoire show evidence of pre-spawning and post-spawning, but not of spawning. In this area females are more abundant than males (4:1 female/male ratio). Coastal areas off West Africa have strong seasonal upwelling, and may be feeding areas for blue marlin.

Atlantic blue marlin inhabits the upper parts of the open ocean. Although they spend much of the time on the upper mixed layer they dive regularly to maximum depths of around 300 m, with some vertical excursions down to 800 m. They do not confine themselves to a narrow range of temperatures but most tend to be found in waters warmer than 17°C. The distribution of time at depth is significantly different between day and night. At night, the fish spent most of their time at or very close to the surface. During daylight hours, they are typically below the surface, often at 40 to 100+ m. These patterns, however, can be highly variable between individuals and also vary depending on the temperature and dissolved oxygen of the surface mixed layer. This variability in the use of habitat by blue marlin indicates that simplistic assumptions about habitat usage made during the standardization of CPUE data may be inappropriate.

BUM-2. Fishery indicators

The decadal geographic distribution of the catches is given in **BUM-Figure 1**. The Committee used Task I catches as the basis for the estimation of total removals (**BUM-Figure 2**). Total removals for the period 1990-2009 were obtained during the 2011 Blue Marlin Stock Assessment Session and the White Marlin Data Preparatory Meeting (Anon. 2012a) by modifying Task I values with the addition of blue marlin that the Committee estimated from catches reported as billfish unclassified. Additionally the reporting gaps were filled with estimated values for some fleets.

During the 2011 blue marlin assessment (Anon. 2012a) it was noted that catches continued to decline through 2009. Over the last 20 years, Antillean artisanal fleets have increased the use of Moored Fish Aggregating Devices (MFADs) to capture pelagic fish. Catches of blue marlin caught around MFADs are known to be significant and increasing in some areas, however reports to ICCAT on these catches are incomplete. Although historical catches from some Antillean artisanal fleets have been recently included in Task I, there still is an unknown number of Antillean artisanal fleets that may have unreported catches of blue marlin caught around MFADs. It is important that the amount of these catches be documented. Recent reports from purse seine fleets in West Africa suggest that blue marlin is more commonly caught with tuna schools associated with FADs than with free tuna schools. Task I catches of blue marlin (**BUM-Table 1**) in 2013 were 1,098 t, compared to 2,153 t reported for 2012. Task I catches of blue marlin for 2013 are preliminary. Due to the work conducted by the Committee and improved reporting by CPCs the amount of unclassified billfish in the Task I table has been reduced.

A number of relative abundance indices were estimated during the blue marlin 2011 assessment. However, given the apparent shift in landings from industrial to non-industrial fleets in recent times, it is imperative that CPUE indices are developed for all fleets that have substantial landings.

During the 2011 assessment, an estimated standardized combined CPUE index for blue marlin showed a sharp decline during the period 1960-1975, followed by a period of stabilization from about 1976 to 1995, and further decline thereafter to the lowest value in the series (**BUM-Figure 3**).

BUM-3. State of the stocks

Unlike the partial assessment of 2006 assessment, the Committee conducted a full assessment in 2011, which included estimations of management benchmarks. The results of the 2011 assessment indicated that the stock remains overfished and undergoing overfishing (**BUM-Figure 4**). In contrast to the results of the 2006 assessment, which indicate that, the declining trend in biomass had partially stabilized, current results indicated a continued decline trend. Current status of the blue marlin stock is presented in **BUM Figure 5.** However, the Committee recognizes the high uncertainty with regard to data and the productivity of the stock.

BUM-4. Outlook

Although uncertain, the results of the 2011 stock assessment indicated that if the recent catch levels of blue marlin (3,358 t in 2010) are not substantially reduced, the stock will continue to decline further (**BUM-Figure 6; BUM-Table 2**). The current management plan has the potential of recovering the blue marlin stock to the BMSY level if properly conducted.

BUM-5. Effect of current regulations

A 2006 recommendation [Rec. 06-09] established that the annual amount harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% for white marlin and 50% for blue marlin of the 1996 or 1999 landing levels, whichever is greater. Furthermore, in 2012, the Commission established a TAC for 2013, 2014, and 2015 of 2,000 t [Rec. 12-04], placed additional catch and commerce restrictions in recreational fisheries for blue marlin and white marlin, and requested methods for estimating live and dead discards of blue marlin and white marlin/spearfish.

The Committee is concerned with the significant increase in the contribution from non-industrial fisheries to the total blue marlin harvest and that these fisheries are not fully accounted for in the current ICCAT database. The Committee expressed its serious concern over this limitation on data for future assessments. Such data limitation precludes any analysis of the current regulations.

Some fisheries/fleets are using circle hooks, which can minimize deep hooking and increase the survival of marlins hooked on longlines and recreational gear. More countries have started reporting data on live releases since 2006. Additional information has come about, for some fleets, regarding the potential for modifying gears to reduce the by-catch and increase the survival of marlins. Such studies have also provided information on the rates of live releases for those fleets. However there is not enough information on the proportion of fish being released alive for all fleets, to evaluate the effectiveness of the ICCAT recommendation relating to the live release of marlins.

BUM-6. Management recommendations

In 2012, the Commission implemented [Rec. 12-04], intended to reduce the total harvest to 2,000 t in 2013, 2014, and 2015 to allow the rebuilding of the blue marlin stock from the overfished condition. The Committee expressed its concern on the effectiveness of such measure in light of severe under reporting currently occurring in some fisheries. Therefore, the Committee alerts the Commission that unless such non-compliance issues are properly addressed the adoption of additional measures might be rendered ineffective.

The Commission may consider the adoption of measures such as, but not limited to the mandated use of non-offset circle hooks as terminal gear. Recent research has demonstrated that in some longline fisheries the use of non-offset circle hooks resulted in a reduction of marlin mortality, while the catch rates of several of the target species remained the same or were greater than the catch rates observed with the use of conventional J hooks or offset circle hooks. The Committee considers that this approach may be more efficient and enforceable than time-area closures and, thus, it recommends that the Commission considers this alternative approach. Currently, three ICCAT Contracting Parties (Brazil, Canada, and the U.S.) already mandate or encourage the use of circle hooks in their pelagic longline fleets. In addition, reducing fishing mortality of blue marlin from non-industrial fisheries should be considered.

ATLANTIC BLUE MARLIN SUMMARY	
BUM	
Maximum Sustainable Yield	2,837 t (2,343 – 3,331 t)[1]
Current (2013) Yield	1,098 t[2]
Relative Biomass (SSB_{2009}/SSB_{MSY})	0.67 (0.53 – 0.81)[1]
Relative Fishing Mortality (F_{2009}/F_{MSY})	1.63 (1.11 – 2.16)[1]
Overfished	Yes
Overfishing	Yes
Conservation and Management Measures in Effect:	Recommendation [Rec. 12-04]. Reduce the total harvest to 2,000 t in 2013, 2014, and 2015

1. Stock Synthesis version 3.2.0.b model results. Values correspond to median estimates, 95% confidence interval values are provided in parenthesis.

2 2013 yield should be considered provisional.

BUM-Table 1. Estimated catches (t) of Atlantic blue marlin (*Makaira nigricans*) by area, gear and flag.

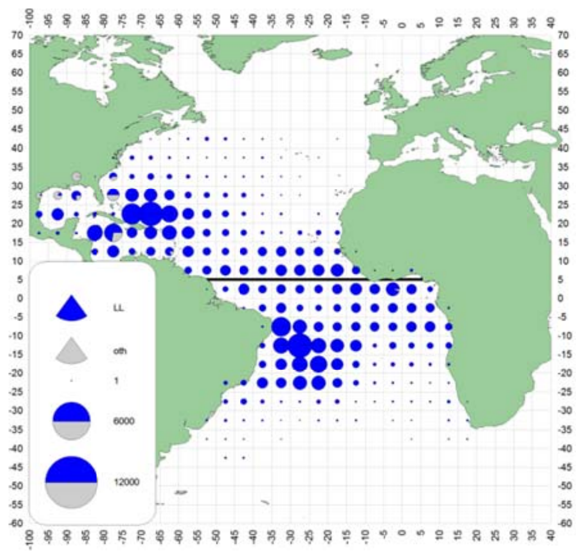
			1989	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
TOTAL			4387	4650	4269	3142	3223	4318	4260	5451	5787	5791	5456	5377	4446	3733	4320	2854	3298	2948	3978	4497	3497	3207	2376	2153	1098
	ATN		1694	2055	1528	1237	1250	1728	1757	2213	2310	2827	2387	2553	1735	1525	1642	1245	1286	1302	1539	1958	1700	1541	1337	1385	641
	ATS		2693	2595	2741	1905	1974	2590	2503	3238	3478	2963	3069	2824	2711	2208	2678	1609	2011	1646	2439	2539	1797	1667	1038	768	457
Landings	ATN	Longline	1057	1692	1080	740	792	1279	1188	1591	1712	1633	1448	1368	920	920	976	968	1031	982	1061	1496	1352	1212	972	965	388
		Other surf.	300	155	245	261	217	220	343	363	440	1088	820	1089	694	466	625	212	212	221	316	227	217	199	179	207	159
		Sport (HL+RR)	147	49	62	90	113	118	73	64	60	56	38	36	97	90	22	31	18	62	120	197	90	110	132	174	38
	ATS	Longline	2017	1958	2286	1490	1419	1767	1679	2194	2545	2068	1977	1776	1465	901	1234	909	1010	807	1400	1051	945	822	586	496	265
		Other surf.	675	634	453	414	553	821	822	1041	863	893	1090	1049	1245	1308	1444	701	1000	836	1030	1484	847	839	443	258	189
		Sport (HL+RR)	1	2	1	0	1	2	2	2	28	0	0	0	0	0	0	0	2	1	9	3	5	6	7	13	2
Discards	ATN	Longline	191	159	142	146	127	111	153	196	97	49	81	60	22	37	19	34	24	36	42	37	40	19	53	38	56
		Other surf.	0	0	0	0	0	0	0	0	0	1	0	0	2	11	0	1	1	0	0	1	2	0	0	1	
	ATS	Longline	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0	0	0	2	0	0	0	0	2	1	1
Landings	ATN	Barbados	3	18	12	18	21	19	31	25	30	25	19	19	18	11	11	0	0	25	0	0	0	9	13	14	11
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4
		Brazil	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	0	41	48	41	51	79	133	9	31	15	17	10	49	0	4	2	26	47	35	38	24
		Chinese Taipei	11	937	716	336	281	272	187	170	355	80	44	64	65	48	66	104	38	35	30	16	25	13	25	18	13
		Cuba	74	112	127	135	69	39	85	43	53	12	38	55	56	34	3	4	7	7	0	0	0	0	0	0	
		Curaçao	50	50	40	40	40	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	64	69	75	36	44	55	58	106	76	76	60	0	
		Dominican Republic	0	0	0	0	0	0	0	0	41	71	29	19	23	0	207	0	0	0	0	0	0	0	0	0	
		EU.España	7	5	1	6	7	6	2	25	5	36	15	25	8	1	6	27	12	23	14	23	6	14	2	4	4
		EU.France	62	85	98	115	179	191	197	252	299	333	370	397	428	443	443	450	470	470	461	585	498	344	461	395	0
		EU.Portugal	5	1	4	2	15	11	10	7	3	47	8	20	17	2	31	27	24	36	56	56	25	56	16	23	10
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Grenada	40	52	64	52	58	52	50	26	47	60	100	87	104	69	72	45	42	33	49	54	45	45	45	0	
		Jamaica	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	593	250	145	193	207	532	496	798	625	656	427	442	155	125	148	174	251	199	221	489	477	460	197	242	120
		Korea Rep.	252	240	34	11	2	16	16	41	16	0	0	0	0	0	0	0	3	14	30	43	28	53	44	26	17
		Liberia	0	0	0	0	0	0	87	148	148	701	420	712	235	158	115	0	0	0	0	0	0	0	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	**0**
		Mexico	0	0	0	0	3	13	13	13	13	27	35	68	37	50	70	90	86	64	91	81	93	89	68	106	86
		Mixed flags (FR+ES)	0	0	0	0	0	0	0	0	0	0	0	34	71	35	38	65	37	29	43	26	39	45	49	0	
		NEI (BIL)	103	18	20	38	0	0	0	0	0	0	0	52	164	254	151	28	0	49	68	82	45	0	0	0	
		NEI (ETRO)	0	0	0	0	71	134	149	178	225	330	312	202	112	7	6	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	5	38	38	0	0	0	0	0	0	0	1	0	0	1	0	
		Senegal	1	1	4	8	0	9	0	2	5	0	0	0	11	24	32	11	1	5	91	114	61	41	64	155	31
		St. Vincent and Grenadines	1	0	0	1	2	2	2	0	1	0	0	0	0	19	0	0	0	0	1	3	2	1	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	4	1	0	10	5	0	18	17	21	53	46	70	72	58	64	119	99
		Trinidad and Tobago	13	11	6	1	2	16	28	14	49	15	20	51	17	16	9	11	7	14	16	34	26	22	25	46	48
		U.S.A.	124	29	33	51	80	88	43	43	46	50	37	24	16	17	19	26	16	17	9	13	6	4	6	14	9
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	15	17	18	19	11	15	15	15	3	5	1	2	2	2	2	2	2	2	2	2	0	1	2	2	3
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
		Ukraine	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	6	8	5	
		Venezuela	149	70	49	66	74	122	106	137	130	205	220	108	72	76	84	83	138	131	206	120	107	136	96	138	108
	ATS	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	3	43	15
		Benin	0	6	6	6	6	5	5	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	
		Brazil	60	52	61	125	147	81	180	331	193	486	509	452	780	387	577	195	612	298	262	182	150	133	63	48	16
		China PR	0	0	0	0	0	21	25	21	27	41	68	15	61	73	72	49	47	0	61	11	51	54	64	24	21
		Chinese Taipei	462	767	956	488	404	391	280	490	1123	498	442	421	175	246	253	211	113	64	203	132	170	140	174	115	65
		Cuba	77	90	62	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	82	88	105	79	139	212	177	157	222	182	275	206	196	78	109	115	107	178	150	991	463	450	42	23	26
		EU.España	15	0	12	40	37	49	38	133	117	159	110	115	86	27	6	24	12	68	25	32	54	151	14	30	40
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	2	1	6	1	0	24	69	79	102	81	84	38	30	15
		Gabon	0	0	0	0	1	2	0	304	5	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	
		Ghana	430	324	126	123	236	441	471	422	491	447	624	639	795	999	415	470	759	405	683	191	140	116	332	234	163
		Japan	962	967	755	824	719	991	913	881	724	529	363	441	180	142	294	366	191	290	699	539	345	272	205	189	62

		Korea Rep.	437	84	503	13	11	40	40	103	40	2	3	1	1	0	0	1	4	19	33	47	8	32	13	8	7
		Mixed flags (FR+ES)	144	199	137	116	146	133	126	96	82	80	83	113	80	96	110	106	112	108	92	113	125	133	0	0	
		NEI (BIL)	0	0	0	0	0	0	0	0	0	0	0	1	20	4	16	61	7	110	141	123	133	0	0	0	
		NEI (ETRO)	0	0	0	0	103	192	214	256	323	474	449	290	162	10	8	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	10	0	8
		Panama	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	2	33	0	0	0	0	0	0	0	0	7	0	3	3	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
		S. Tomé e Príncipe	19	17	18	21	25	28	33	36	35	33	30	32	32	32	32	9	21	26	0	68	70	72	72	0	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	15
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	2	0	0	1	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
		Togo	0	0	0	0	0	0	0	0	23	0	73	53	141	103	775	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	12	2
		Uruguay	0	0	0	0	0	3	1	1	26	23	0	0	0	1	5	3	2	8	5	0	6	0	0	0	**0**
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	
Discards	ATN	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	191	159	142	146	127	111	153	196	97	50	81	60	25	49	19	35	25	36	42	38	42	19	50	39	56
	ATS	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**0**
		U.S.A.	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	

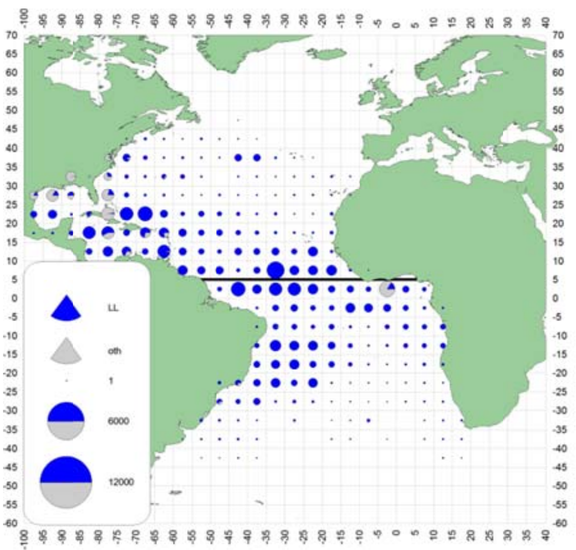
Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

BUM Table 2. Kobe II Strategy Matrix (K2SM). Percent values indicate the probability of achieving the goal of $SSB_{yr} >= SSB_{MSY}$ and $F_{yr} < F_{MSY}$ for each year (yr) under different constant catch scenarios (TAC t).

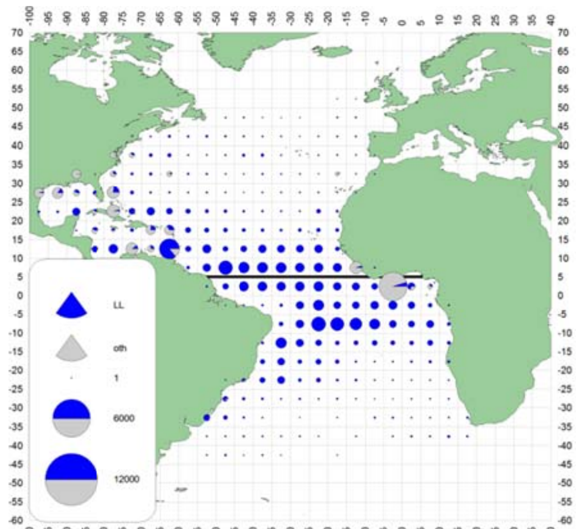
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
0	0%	2%	9%	19%	33%	49%	63%	74%	81%	87%	92%	94%	96%	97%	98%
500	0%	2%	6%	13%	23%	35%	47%	58%	67%	74%	80%	84%	88%	91%	93%
1000	0%	1%	4%	9%	15%	22%	31%	40%	49%	56%	63%	68%	73%	77%	81%
1500	0%	1%	3%	6%	9%	13%	18%	24%	30%	36%	41%	46%	50%	55%	59%
2000	0%	1%	2%	3%	5%	7%	10%	12%	16%	18%	21%	24%	27%	29%	32%
2500	0%	1%	1%	2%	3%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
3000	0%	0%	1%	1%	1%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%
3500	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%
4000	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



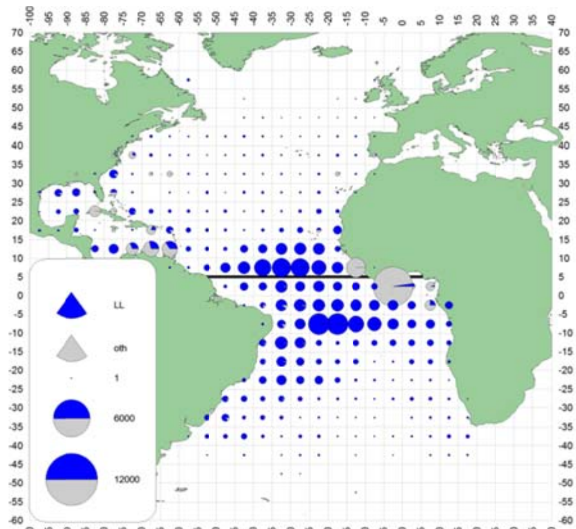
a. BUM (1960-69)



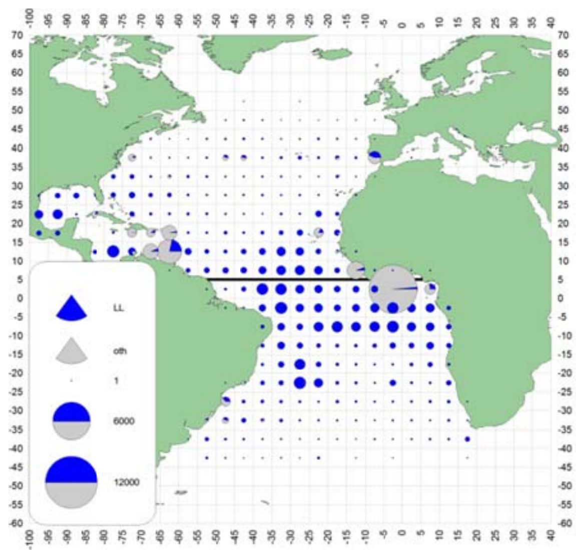
b. BUM (1970-79)



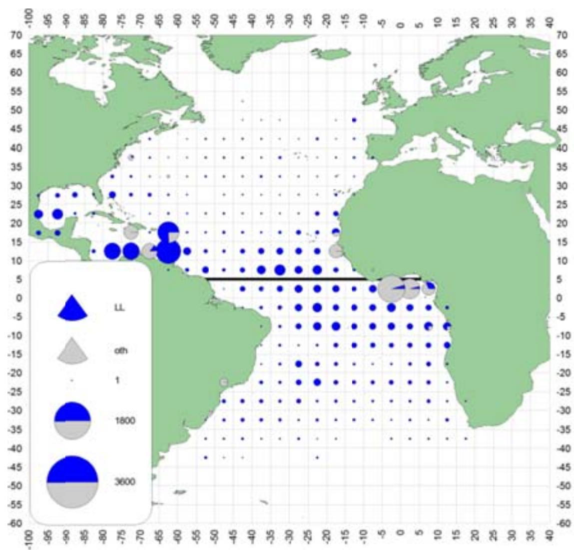
c. BUM (1980-89)



d. BUM (1990-99)

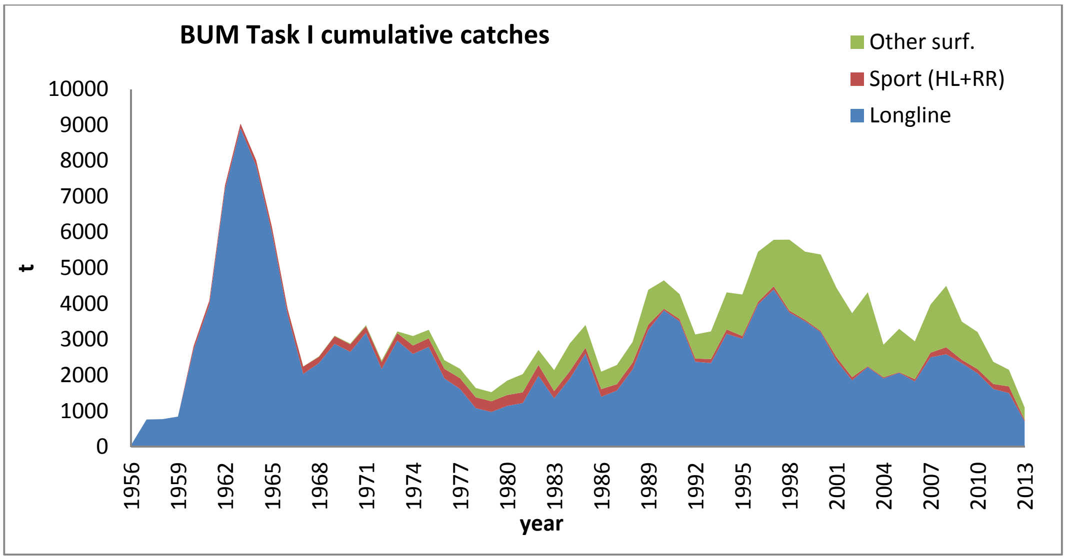


e. BUM (2000-09)

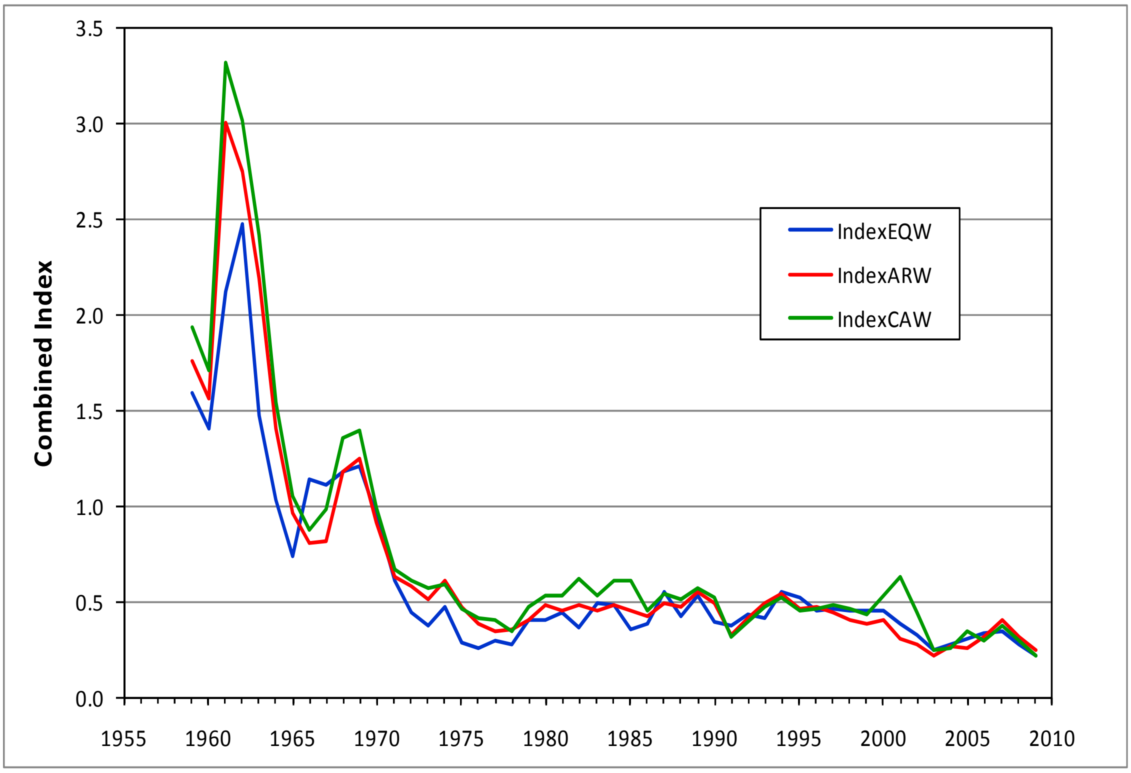


f. BUM(2010-12)

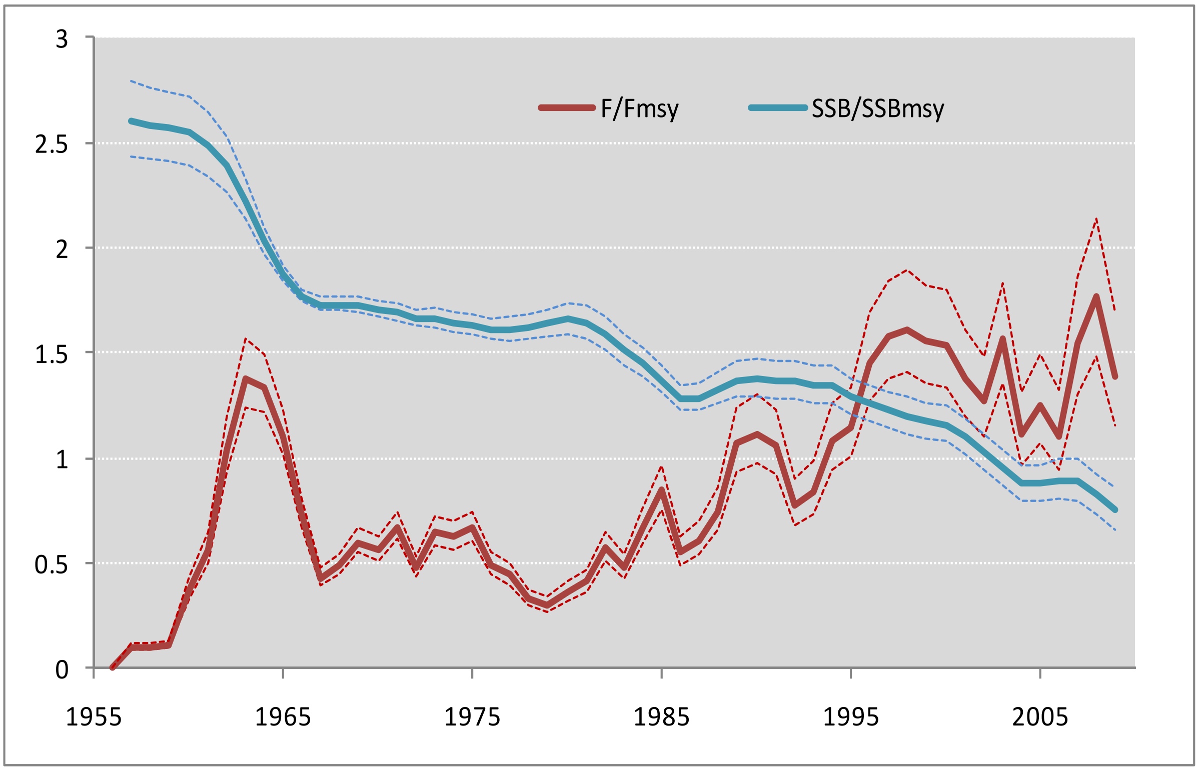
BUM-Figure 1. Geographic distribution of mean blue marlin catch by major gears and decade.



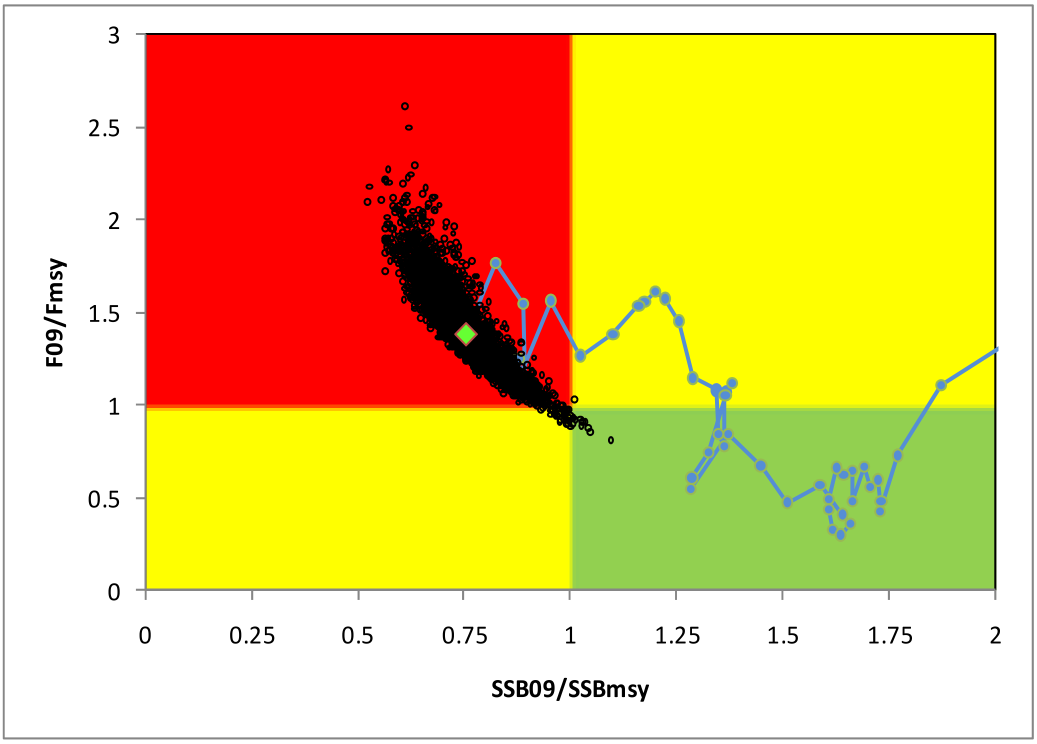
BUM-Figure 2. Total catch of blue marlin reported in Task I.



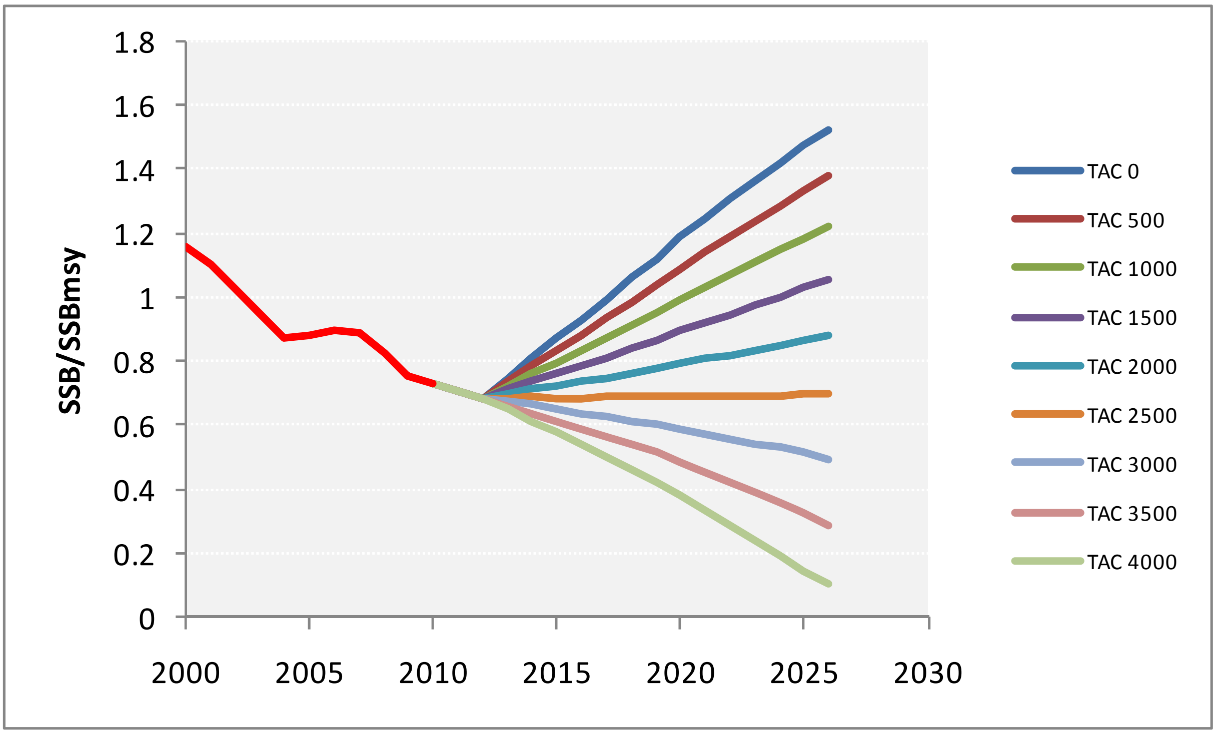
BUM-Figure 3. Blue marlin standardized combined CPUE indices estimated using equal weighting for all CPUE series (EQW), weighting the CPUE series by area (ARW) and by catch (CAW).



BUM-Figure 4. Trends of F/F_{MSY} and SSB/SSB_{MSY} ratios for blue marlin from the base model (SS3). Solid lines represent median from MCMC runs, and broken lines the 10% and 90% percentiles, respectively.



B**UM-Figure 5.** Phase plot for blue marlin from the base model in final year model assessment (2009). Individual points represent MCMC iterations, large diamond the median of the series. Blue circles with line represent the historic trend of the median F/F_{MSY} vs. SSB/SSB_{MSY} 1965-2008.



BUM-Figure 6. Trends of SSB/SSB_{MSY} ratios under different scenarios of constant catch projections (TAC tons) for blue marlin from the base model. Projections start in 2010; for 2010/11 a catch of 3,341 t was assumed.

8.7 WHM-WHITE MARLIN

The most recent assessment for white marlin was conducted in 2012 through a process that included a data preparatory meeting in April 2011 (Anon. 2012a) and an assessment meeting held in May 2012 (Anon. 2013b). The last year of fishery data used in the assessment was 2010.

WHM-1. Biology

White marlin spawning areas occur mainly in the tropical western North and South Atlantic, predominantly in the same offshore locations in their normal range. In the North Atlantic, spawning activity has been reported off eastern Florida (USA), the Windward Passage (between La Hispaniola and Cuba), and north of Puerto Rico. Seasonal spawning concentrations have been noted northeast of Hispaniola and Puerto Rico, and off the east coast of Hispaniola. Spawning activity has also been reported for the equatorial Atlantic (5°N-5°S) off northeastern Brazil, and in the South Atlantic off southern Brazil.

Previous reports have mentioned that spawning takes place during austral and boreal spring-summer. In the North Atlantic, reproduction events occur from April to July, with spawning activity peaking around April-May. In the equatorial Atlantic (5°N-5°S), spawning occurs during May-June, and in the South Atlantic, reproduction events take place from December to March.

White marlin inhabits the surface mixed layer of the open ocean. Although they spend most of their time in the warm waters of the epipelagic zone, they do not confine themselves to a narrow range of temperatures but are known to explore temperatures ranging 7.8-29.6 °C. Information from pop-up satellite archival tag (PSAT) data indicated frequent short-duration dives extending to >300 m depths, although most dives ranged from 100 to 200 m. Two types of diving behavior have been identified for white marlin, (1) a shorter duration V-shaped dive, and (2) a U-shaped dive characterized as those confined to a specific depth range for a prolonged period. These patterns, however, can be highly variable between individuals and also vary depending on the temperature and dissolved oxygen of the surface mixed layer. Therefore, it is important to consider vertical habitat use and the environmental factors that influence it during the standardization of CPUE data.

All white marlin biological material sampled prior to the confirmation of the presence of roundscale spearfish (*T. georgii*) in 2006, are now presumed to contain an unknown proportion of roundscale spearfish. Therefore reproductive parameters, growth curves and other biological studies previously thought to describe white marlin may not accurately represent this species.

WHM-2. Fishery indicators

It has now been confirmed that white marlin landings reported to ICCAT include roundscale spearfish in significant numbers, so that historical statistics of white marlin most likely comprise a mixture of the two species. Studies of white marlin/roundscale spearfish ratios in the western Atlantic have been conducted, with overall estimated ratios between 23-27%, although they varied in time and space. Previously, these were thought to represent only white marlin. However, there is little information on these species ratios in the eastern Atlantic.

The decadal geographic distribution of the catches is given in **WHM-Figure 1**. The Committee used Task I catches as the basis for the estimation of total removals (**WHM-Figure 2**). Total removals for the period 1990-2010 were obtained during the 2012 White Marlin Stock Assessment Session by modifying Task I values with the addition of white marlin that the Committee estimated from catches reported as billfish unclassified.

Additionally the reporting gaps for some fleets were completed using estimates based on catch values reported for years before and/or after the gap(s) years.

Task I catches of white marlin in 2012 and 2013 were 376 t and 415 t, respectively (**WHM-Table 2**). Task I catches of white marlin for 2013 are to be considered preliminary. Due to the work conducted by the Committee and improved reporting by CPCs the amount of unclassified billfish in the Task I table has been minimized.

A series of indices of abundance for white marlin were presented and discussed during the 2011 and 2012 meetings. Following the guidelines developed by the SCRS Working Group on Stock Assessment Methods (WGSAM), seven CPUE series were selected for their inclusion in the assessment models. In general, the indices showed no discerning trend during the latter part of the time series examined (**WHM-Figure 3**). During the 2012 assessment, an estimated standardized combined CPUE index for white marlin showed a sharp decline during the period 1960-1991, and a relatively stable trend thereafter (**WHM-Figure 3**).

WHM-3. State of the stock

Unlike the partial assessment conducted in 2006, the Committee conducted a full assessment in 2012, which included estimations of management benchmarks. Two models were used to estimate the status of the stock, a surplus production model (ASPIC), and a fully integrated model (SS3). The methods used for the fully integrated model followed very closely to those used in the 2011 blue marlin assessment. As recommended by the Working Group in 2010, the model configuration was an effort to use all available data on white marlin, including lengths, dimorphic growth patterns and other biological data. Although it is believed that the modeling methods employed were relatively robust, the input data for the models were very likely less so. Perhaps the most important uncertainty was that associated with the landings data. There remains uncertainty not only in the species composition but also the magnitude of the catch. This is especially a problem with the landings data starting in 2002 when CPCs were mandated to release billfish that were alive at haulback. This lead to a decrease in reported landings but not necessarily a decrease in fishing and/or release mortality. This apparent drop in landings lead to a marked decrease in the estimates of F/F_{MSY} from 2002-present, however the Committee considers that this trend is likely overly optimistic due to unreported catch and unaccounted release mortality.

The results of the 2012 assessment indicated that the stock remains overfished but most likely not undergoing overfishing (**WHM-Figure 4, Figure 5**). Relative fishing mortality has been declining over the last ten years and is now most likely to be below F_{MSY} (**WHM-Figure 6**). Relative biomass has probably stopped declining over the last ten years, but still remains well below B_{MSY} (**WHM-Figure 6**). There is considerable uncertainty in these results. The two assessment models provide different estimates about the productivity of the stock, with the integrated model suggesting that white marlin is a stock that can rebuild relatively fast whereas the surplus production model suggests the stock will rebuild very slowly. The results from both approaches are considered to be equally plausible. These results are conditional on the reported catch being a true reflection of the fishing mortality experienced by white marlin. Sensitivity analyses suggest that if recent fishing mortality has been greater than reported, because discards are not reported by many fleets, estimates of stock status would be more pessimistic and current relative biomass would be lower and overfishing would continue. The presence of unknown quantities of roundscale spearfish in the reported catches and data used to estimate relative abundance of white marlin increases the uncertainty for the stock status and outlook for this species.

WHM-4. Outlook

The outlook for this stock remains uncertain because of the possibility that reported catches underestimate fishing mortality and the lack of certainty in the productivity of the stock. As a result forecasts of how the stock will respond to different levels of catch are uncertain (**WHM-Table 2**). At current catch levels of about 400 t the stock will likely increase in size, but is very unlikely to rebuild to B_{MSY} in the next ten year period (**WHM-Table 2**). Fishing mortality is highly likely to remain below F_{MSY}. The speed at which the stock biomass may increase and the time necessary to rebuild the stock to B_{MSY} remains highly uncertain. This will depend on whether current reported catches are true estimates of fishing mortality, and on the true productivity of the white marlin stock.

WHM-5. Effect of current regulations

A 2006 recommendation [Rec. 06-09] established that the annual amount harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% for white marlin and 50% for blue marlin of the 1996 or 1999 landing levels, whichever is greater. Furthermore, in 2012, The Commission established a TAC for 2013, 2014, and 2015 of 400 t [Rec. 12-04], placed additional catch and commerce restrictions in recreational fisheries for blue marlin and white marlin, and requested methods for estimating live and dead discards of blue marlin and white marlin/spearfish.

The Committee is concerned with the significant increase in the contribution from non-industrial fisheries to the total white marlin harvest and that these fisheries are not fully accounted for in the current ICCAT database. The Committee expressed its serious concern over this limitation on data for future assessments. Such data limitation precludes any analysis of the current regulations. In addition the Committee expressed concern of the status of white marlin due to the misidentification of spearfishes in the white marlin catches. This situation adds uncertainty to the stock assessment results.

The Committee noted that more countries have started reporting data on live releases in 2006. However there is not enough information on the proportion of fish being released alive to evaluate the effectiveness of the ICCAT recommendation, relating to the live release of white marlin.

WHM-6. Management recommendations

In 2012, the Commission implemented [Rec. 12-04], intended to reduce the total harvest to 400 t in 2013, 2014, and 2015 to allow the rebuilding of the white marlin stock from the overfished condition. The Committee expressed its concern on the effectiveness of such measure in light of the misidentification of spearfishes in the white marlin catches, which causes uncertainty in stock assessment results and enforcement related problems.

One approach to reduce fishing mortality could be the use of non-offset circle hooks as terminal gear. Recent research has demonstrated that in some longline fisheries the use of non-offset circle hooks resulted in a reduction of marlin mortality, while the catch rates of several of the target species remained the same or were greater than the catch rates observed with the use of conventional J hooks or offset circle hooks. The Committee considers that this approach may be more efficient and enforceable than time-area closures and, thus, it recommends that the Commission considers this alternative approach. Currently, three ICCAT Contracting Parties (Brazil, Canada, and the United States) already mandate or encourage the use of circle hooks on their pelagic longline fleets. In addition, reducing fishing mortality of white marlin from non-industrial fisheries should be considered.

ATLANTIC WHITE MARLIN SUMMARY	
MSY	874 t [1] - 1604 t [2]
Current (2013) Yield	415 t [3]
Relative Biomass:	
B_{2010}/B_{MSY}	0.50 (0.42-0.60)[4]
SSB_{2010}/SSB_{MSY}	0.322 (0.23-0.41)[5]
Relative Fishing Mortality:	
F_{2010}/F_{MSY}	0.99 (0.75-1.27)[4] 0.72 (0.51-0.93)[5]
$Catch_{recent}$[6]/$Catch_{1996}$ Longline and Purse seine	0.30
Overfished	Yes
Overfishing	Not likely[7]
Conservation and Management Measure in Effect:	Recommendation [Rec. 12-04]. Reduce the total harvest to 400 t in 2013, 2014, and 2015

[1] ASPIC estimates.
[2] SS3 estimates.
[3] 2013 yield should be considered provisional.
[4] ASPIC estimates with 10 and 90 percentiles.
[5] SS3 estimates with approximate 95% confidence intervals.
[6] $Catch_{recent}$ is the average annual longline and purse seine catch for 2009-2011.
[7] Overfishing could be occurring if catches are under reported.

WHM-Table 1. Estimated catches (t) of Atlantic white marlin (*Tetrapturus albidus*) by area, gear and flag.

			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL			1829	1659	1627	1462	1544	2114	1761	1573	1430	1682	1569	1368	978	905	732	742	655	447	601	634	656	433	385	376	415
	ATN		376	407	239	610	543	660	639	669	483	529	492	484	431	293	253	257	287	196	162	136	203	217	198	259	189
	ATS		1453	1252	1388	853	1002	1454	1122	905	947	1152	1077	883	547	612	478	485	368	251	438	498	453	215	187	118	225
Landings	ATN	Longline	241	266	108	466	413	531	473	554	431	475	399	408	381	230	204	204	252	161	123	105	164	192	152	214	160
		Other surf.	11	40	21	35	34	57	48	31	5	17	29	34	30	24	32	24	17	23	30	19	23	12	7	20	13
		Sport (HL+RR)	16	21	19	21	30	30	18	20	14	6	6	2	4	6	1	1	1	2	1	2	2	6	3	3	4
	ATS	Longline	1333	1152	1328	805	950	1420	1086	860	853	979	1021	827	475	497	425	454	325	202	404	417	381	161	146	113	66
		Other surf.	119	96	60	48	52	33	31	40	57	173	55	56	71	116	53	31	43	48	15	80	72	53	39	2	159
		Sport (HL+RR)	0	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	
Discards	ATN	Longline	107	81	90	88	66	42	100	64	33	31	57	41	16	29	17	27	17	9	8	9	13	8	36	20	12
		Other surf.	0	0	0	0	0	0	0	0	0	1	0	0	1	4	0	0	0	0	0	0	2	0	0	1	
	ATS	Longline	0	0	0	0	0	0	0	0	37	1	0	0	1	0	0	0	0	2	19	1	0	2	2	0	0
Landings	ATN	Barbados	11	39	17	24	29	26	43	15	41	33	25	25	24	15	15	0	0	33	0	0	0	6	3	5	6
		Brazil	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	0	0	0	0	0	4	4	8	8	8	5	5	3	2	1	2	5	3	2	2	1	2	1	2	3
		China PR	0	0	0	0	0	6	7	6	7	10	20	1	7	4	2	1	4	1	0	1	3	4	1	2	1
		Chinese Taipei	4	85	13	92	123	270	181	146	62	105	80	59	68	61	15	45	19	16	1	0	1	1	0	1	0
		Costa Rica	0	0	0	0	0	0	0	0	0	0	3	14	0	0	1	0	0	0	0	0	0	0	0	0	
		Cuba	21	14	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	
		EU.España	12	12	9	18	15	25	17	97	89	91	74	118	43	4	19	19	48	28	32	10	8	50	3	21	19
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	11	30	3	2	0	1	2	1	18	10
		Grenada	0	0	0	0	0	0	0	0	0	0	0	1	15	8	14	33	10	12	11	17	14	0	0	0	
		Japan	73	34	45	180	33	41	31	80	29	39	25	66	15	10	21	23	28	27	10	22	27	31	18	31	13
		Korea Rep.	82	39	1	9	4	23	3	7	5	0	0	0	0	0	0	0	4	0	0	0	8	19	19	0	
		Liberia	0	0	0	0	0	0	0	1	1	3	8	4	3	4	3	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	2	8	8	3	5	6	11	18	44	15	15	28	25	16	13	14	19	20	28	36	30
		Mixed flags (FR+ES)	0	0	0	0	0	0	0	0	0	0	0	3	5	3	3	5	3	2	2	2	3	3	0	0	
		NEI (BIL)	0	0	0	0	0	0	0	0	0	0	0	34	72	4	8	0	26	9	14	18	20	0	0	0	
		NEI (ETRO)	0	0	0	0	23	43	47	57	72	105	100	64	36	2	2	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	1	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
		Trinidad and Tobago	7	6	3	0	1	11	18	8	32	10	13	4	2	5	12	6	6	5	12	10	11	15	14	39	33
		U.S.A.	10	17	13	11	19	13	7	12	8	5	5	1	3	6	1	1	1	1	0	2	2	2	26	1	4
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	47	79	47	187	226	148	171	164	90	80	61	25	72	110	55	55	60	26	52	26	70	54	47	79	56
	ATS	Argentina	8	9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Belize	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brazil	204	205	377	211	301	91	105	75	105	217	158	105	172	407	266	80	244	90	52	55	53	36	60	71	152
		Cambodia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	0	3	4	3	4	5	10	1	13	19	6	6	4	5	10	3	5	4	2	2	1
		Chinese Taipei	979	810	790	506	493	1080	726	420	379	401	385	378	84	117	89	127	37	28	53	38	27	19	28	14	7
		Cuba	22	6	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	1	2	1	5	1	2	2	3	1	1	1	1	3	2	0	1	0	1
		EU.España	1	0	17	6	12	2	19	54	4	10	45	68	18	2	3	45	10	23	14	21	8	62	2	13	17
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	19	0	35	39	9	16	7	
		Gabon	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	68	31	17	14	22	1	2	1	3	7	6	8	21	2	1	1	1	0	0	4	4	0	1	1	37
		Honduras	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	73	92	77	68	49	51	26	32	29	17	15	17	41	5	12	13	6	11	11	12	16	10	13	11	11
		Korea Rep.	53	42	56	1	4	20	20	52	18	0	0	0	0	0	11	40	3	0	113	96	70	24	24	0	
		Mixed flags (FR+ES)	27	37	11	10	12	11	9	7	7	9	8	9	8	9	10	8	8	8	7	8	9	9	37	0	
		NEI (BIL)	0	0	0	0	0	0	0	0	0	0	0	0	5	0	21	134	16	27	156	186	179	0	0	0	
		NEI (ETRO)	0	0	0	0	91	171	190	228	288	421	399	258	144	9	7	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	0	0	0	1	0	2	2	0	
		S. Tomé e Príncipe	16	19	26	24	17	21	21	30	45	40	36	37	37	37	37	21	33	29	0	36	37	38	0	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	
		Togo	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	1	1	1	3	0	3	0	1	24	22	0	0	0	1	9	2	5	9	3	0	5	0	0	0	
Discards	ATN	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	107	81	90	88	66	42	100	64	33	32	57	41	17	33	17	27	17	10	8	10	14	8	36	21	12
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ATS	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19	1	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	
		U.S.A.	0	0	0	0	0	0	0	0	37	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	

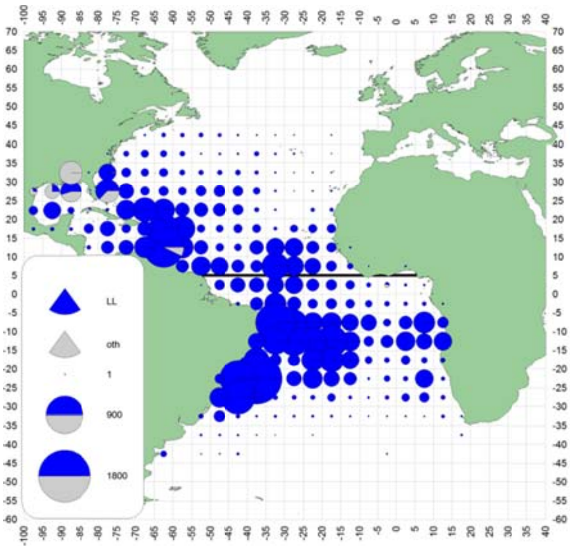
Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

WHM-Table 2. Kobe II Strategy Matrix (K2SM) of the combined models (ASPIC and SS3). Percent values indicate the probability of achieving the goal of $F<F_{MSY}$, $B>B_{MSY}$, and SSByr >= SSB_{MSY} and Fyr < F_{MSY} for each year (yr) under different constant catch scenarios (TAC tons).

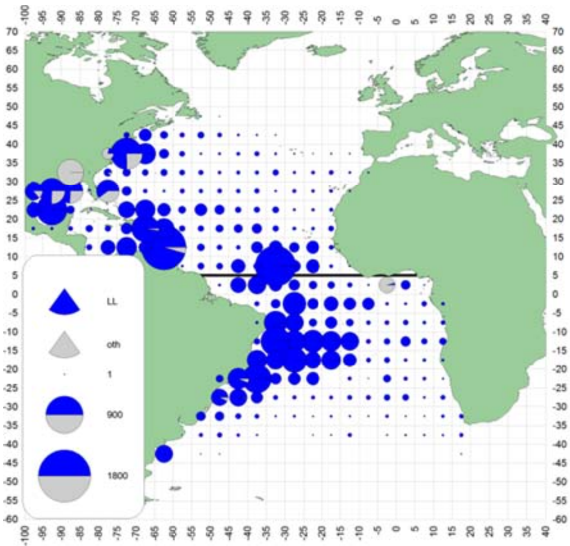
F<Fmsy	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
200	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
400	73%	74%	75%	77%	79%	79%	81%	82%	84%	85%
600	9%	11%	12%	12%	13%	14%	16%	16%	17%	19%
800	0%	0%	0%	0%	1%	1%	1%	1%	1%	1%
1000	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1200	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1400	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1600	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

B>Bmsy	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%
200	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
400	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
600	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
800	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1000	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1200	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1400	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1600	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

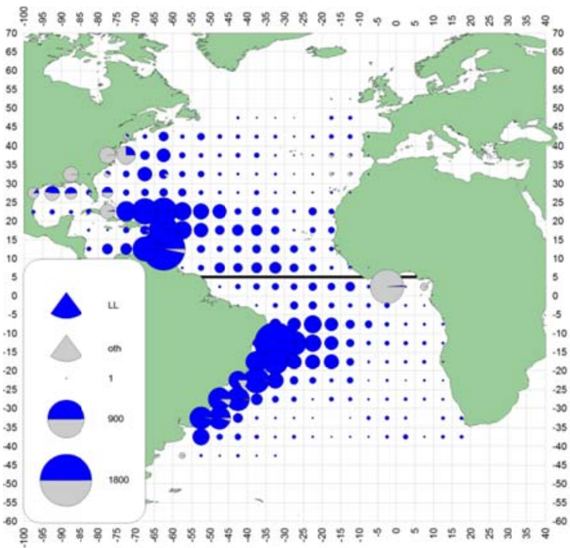
F<Fmsy and B>Bmsy	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%
200	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
400	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
600	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
800	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1000	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1200	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1400	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1600	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



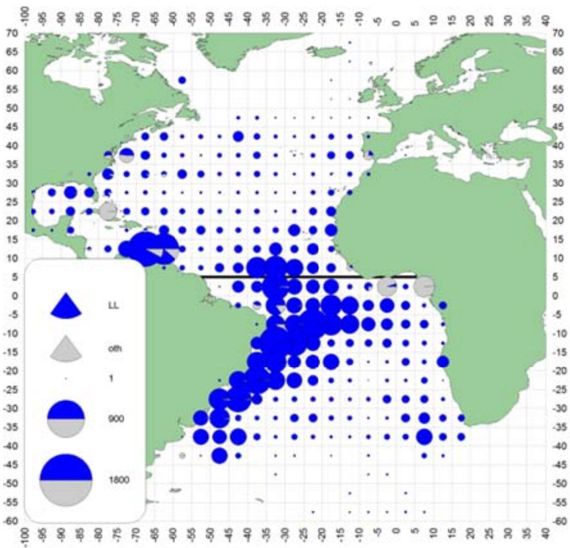
a. WHM (1960-69)



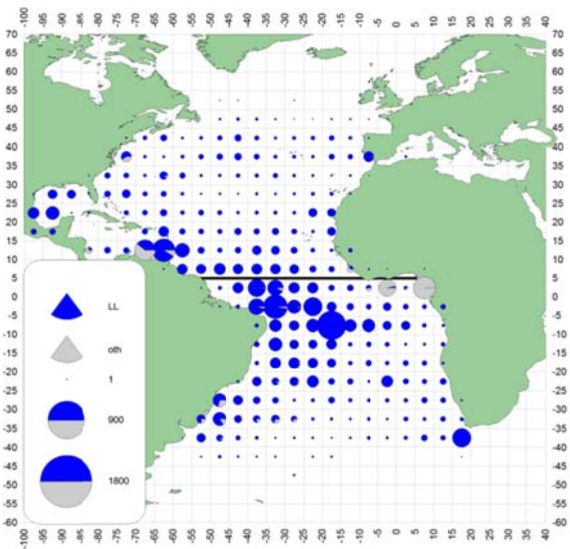
b. WHM (1970-79)



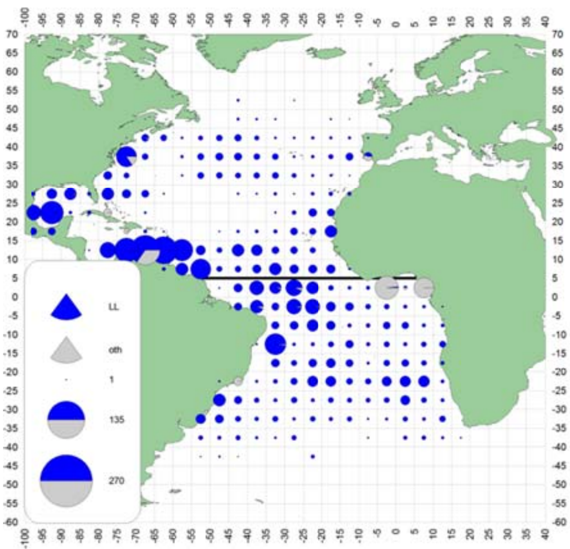
c. WHM (1980-89)



d. WHM (1990-99)

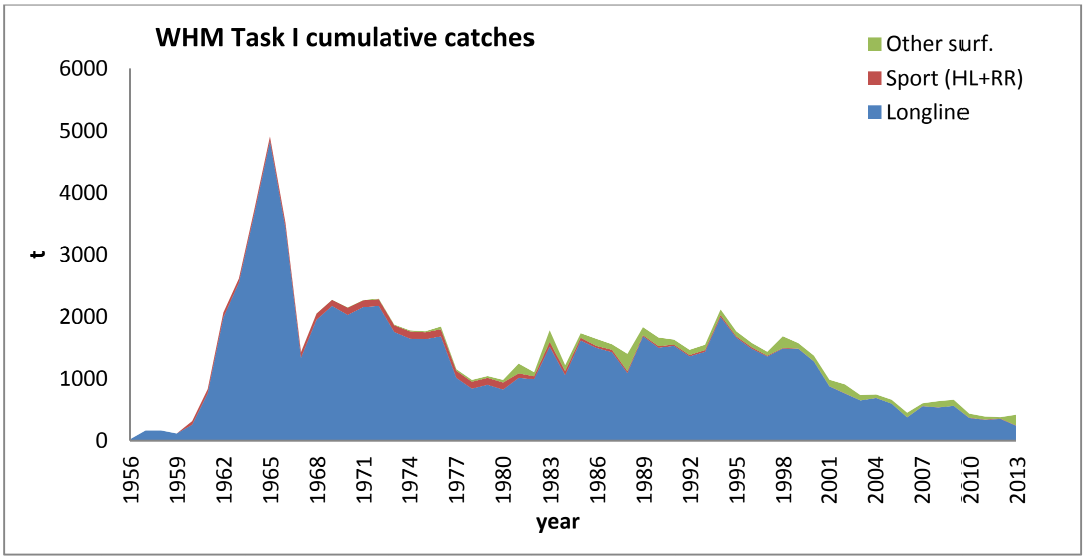


e. WHM (2000-09)

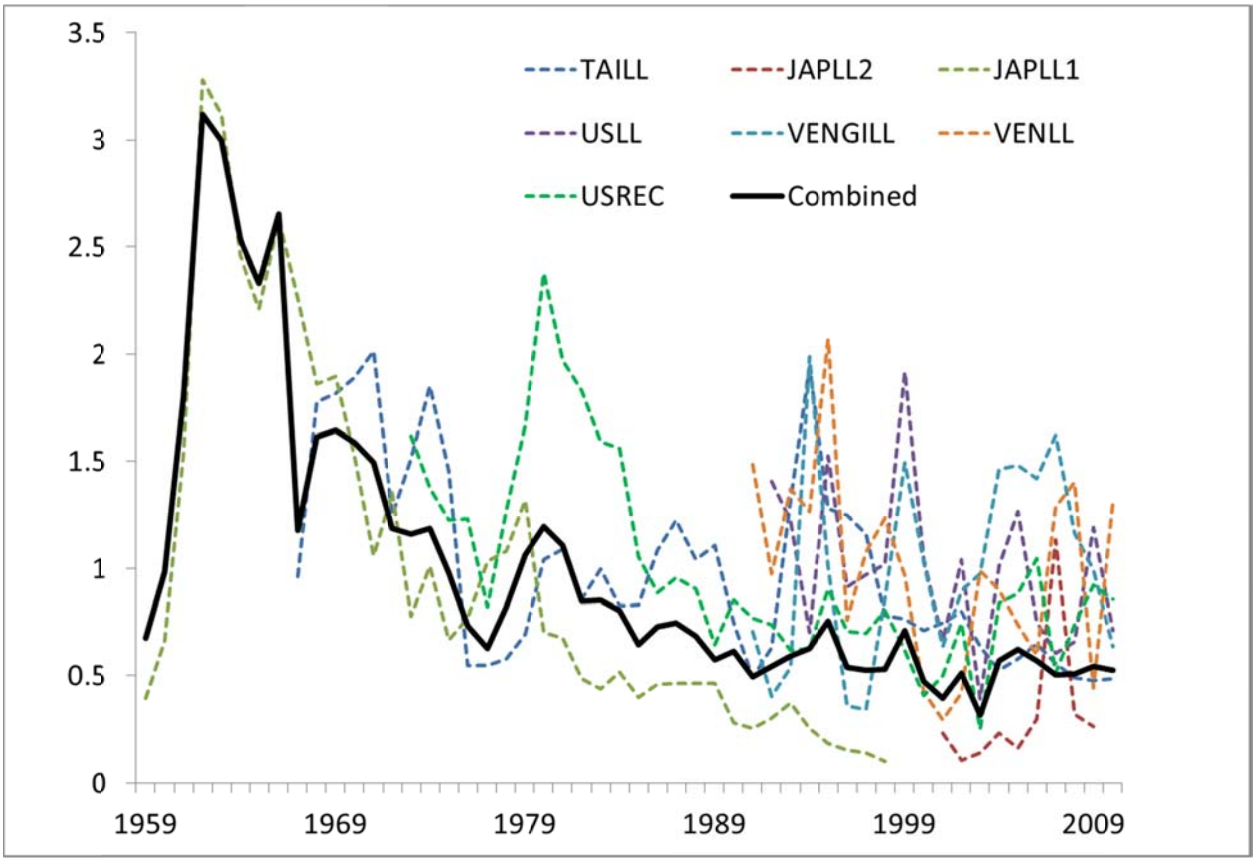


f. WHM (2010-12)

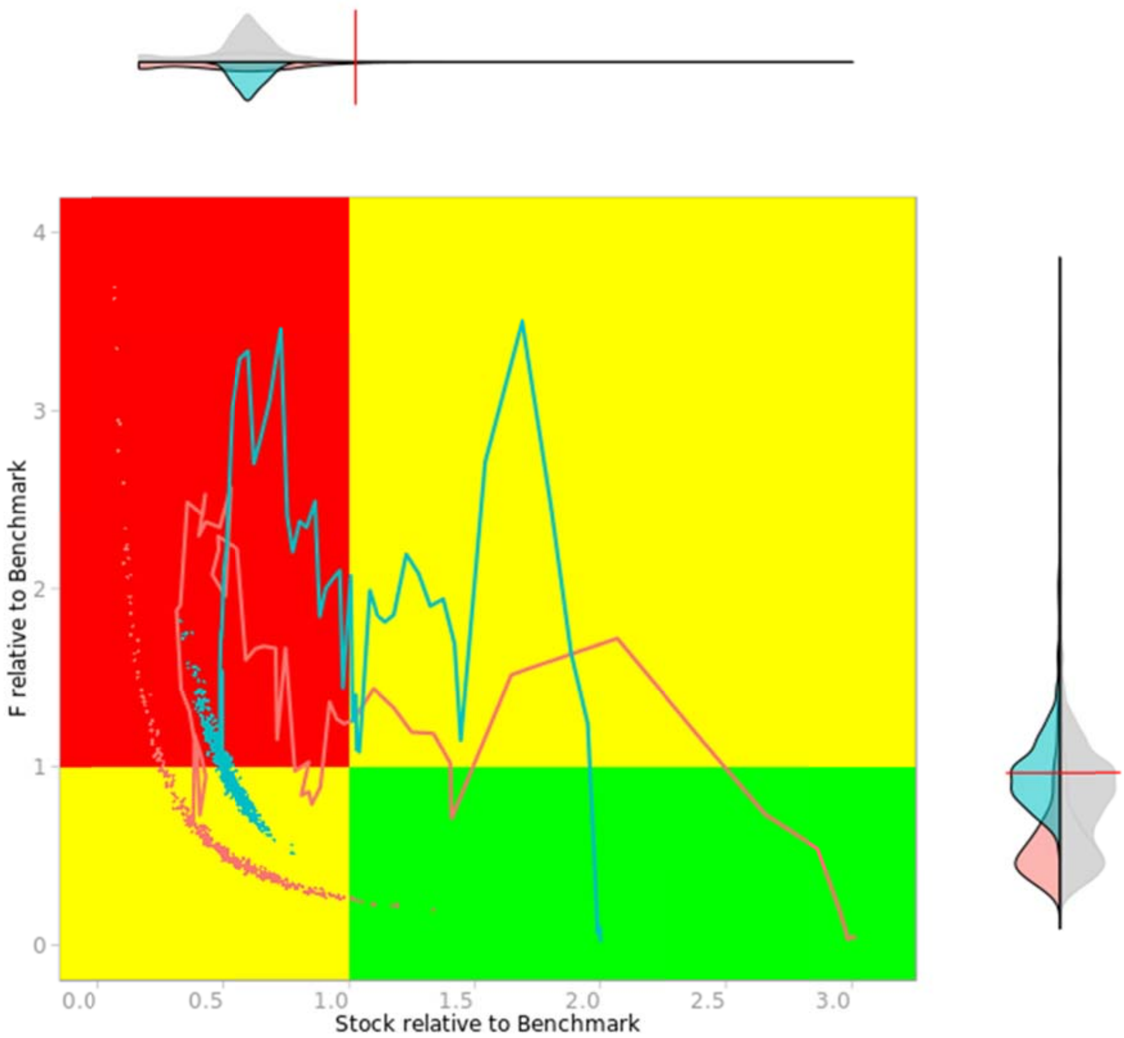
WHM-Figure 1. Geographic distribution of mean white marlin catch by major gears and decade.



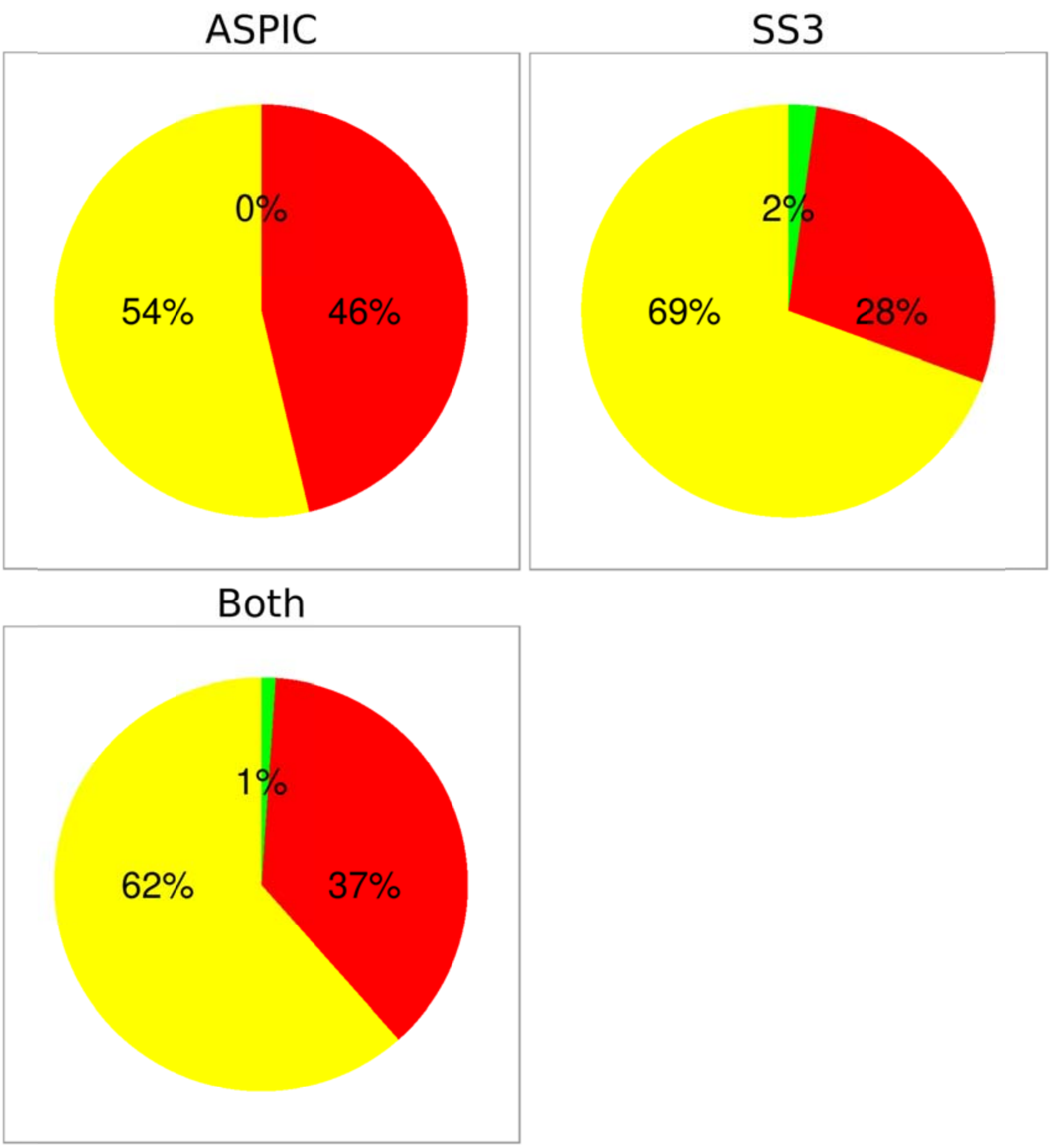
WHM-Figure 2. Total catch of white marlin reported in Task I for the period 1956-2013.



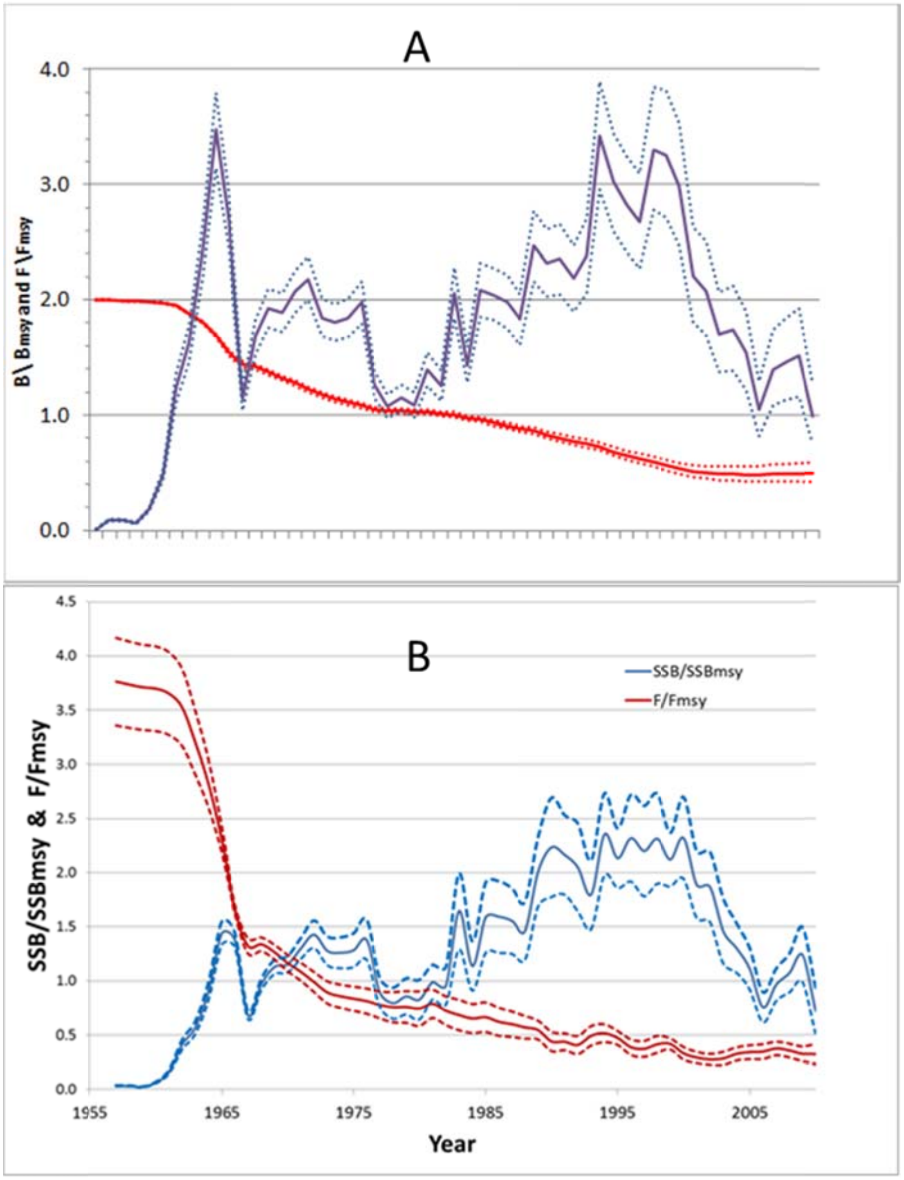
WHM-Figure 3. White marlin indices of abundance presented and selected during the meeting. For graphing purposes the indices were scaled to their respective mean value for the period 1990-2010.



WHM-Figure 4. Kobe phase plot panel showing the estimated trajectories for stock (B) relative to B_{MSY} and harvest rate (F) relative to F_{MSY} (line) along with the bootstrap estimates for 2012. The green quadrant corresponds to the stock not being overfished and no overfishing occurring and the red quadrant to the stock being overfished and overfishing occurring. The red line represents the SS3 model, and the blue line represents the ASPIC model (large panel). The marginal densities plots for stock relative to B_{MSY} and harvest rate relative to F_{MSY} are also shown (top and right of large panel); the upper part (grey) are combined probabilities for both ASPIC and SS3, and the lower part (blue and pink) are individual probabilities of ASPIC and SS3 overlaid. The red lines represent the benchmark levels (ratios equal to 1.0).



WHM-Figure 5. Pie chart showing the proportion of assessment results for 2012 that are within the green quadrant of the Kobe plot chart (not overfished, no overfishing), the yellow quadrant (overfished or overfishing), and the red quadrant (overfished and overfishing).



WHM-Figure 6. Historical ASPIC (A) and SS3 (B) estimates of biomass over biomass at MSY ratio (red) and fishing mortality over fishing mortality at MSY ratios (blue) for white marlin.

8.8 SAI – SAILFISH

Sailfish *(Istiophorus platypterus)* has a pan-tropical distribution. ICCAT has established, based on life history information on migration rates and geographic distribution of catch, that there are two management units for Atlantic sailfish, eastern and western (**SAI-Figure 1**). The first successful assessment that estimated reference points for eastern and western sailfish stocks was conducted in 2009 (Anon. 2010a).

SAI-1. Biology

Larval sailfish are voracious feeders initially feeding on crustaceans from the zooplankton but soon switching to a diet of fish larvae. Temperature preferences for adult sailfish appear to be in the range of 25-28°C. A study undertaken in the Straits of Florida and the southern Gulf of Mexico indicated that habitat preferences from satellite tagged sailfish were primarily within the upper 20~50 m of the water column. The tag data also indicated common short-term movements to depths in excess of 100 m, with some dives as deep as 350 m. Sailfish is the most coastal of all billfish species and conventional tagging data suggest that they move shorter distances than the other billfish (**SAI-Figure 2**). Sailfish grow rapidly and reach a maximum size of 160 cm for males and 220 cm for females, with females reaching maturity at 155 cm. Sailfish reach a maximum age of at least 17 years.

Sailfish spawn over a wide area and year around. In the North, evidence of spawning has been detected in the Straits of Florida, and off the Venezuelan, Guyanese and Surinamese coasts. In the southwest Atlantic, spawning occurs off the southern coast of Brazil between 20° and 27°S, and in the east Atlantic, off Senegal and Côte d'Ivoire. Timing of spawning can differ between regions. From the Florida Straits to the areas off Guyana sailfish spawn in the second semester of the year, while in the southwestern Atlantic and the tropical eastern Atlantic they spawn late and early in the year.

SAI-2. Description of the fisheries

Sailfish are targeted by coastal artisanal and recreational fleets and, to a less extent, are caught as by-catch in longline and purse seine fisheries (**SAI-Figure 1**). Historically, catches of sailfish were reported together with spearfish by many longline fleets. In 2009 these catches were separated by the Committee (**SAI-Table 1**). Historical catches of unclassified billfish continue to be reported to the Committee making the estimation of sailfish catch difficult. Catch reports from countries that have historically been known to land sailfish continue to suffer from gaps and there is increasing ad-hoc evidence of un-reported landings in some other countries. These considerations provide support to the idea that the historical catch of sailfish has been under-reported, especially in recent times where more and more fleets encounter sailfish as by-catch or target them.

Reports to ICCAT estimate that the Task I catch for 2013 was 1,090 t and 412 t for the east and west stocks, respectively (**SAI-Figure 3**). Task I catches of sailfish for 2013 are preliminary because they do not include reports from all fleets.

SAI-3. State of the stocks

ICCAT recognizes the presence of two stocks of sailfish in the Atlantic, the eastern and western stocks. There is increasing evidence that an alternative stock structure with a north western stock and a south/eastern stock should be considered. Assessments of stocks based on the alternative stock structure option have not been done to date; however, conducting them should be a priority for future assessments.

In 2009 ICCAT conducted a full assessment of both Atlantic sailfish stocks (Anon. 2010a) through a range of production models and by using different combinations of relative abundance indices (**SAI-Figure 4**). It is clear that there remains considerable uncertainty regarding the stock status of these two stocks, however, many assessment model results present evidence of overfishing and evidence that the stocks are overfished, more so in the east than in the west. Although some of the results suggest a healthy stock in the west, few suggest the same for the east. The eastern stock is also assessed to be more productive than the western stock, and probably able to provide a greater MSY. The eastern stock is likely to be suffering stronger overfishing and most probably has been reduced further below the level that would produce the MSY than the western stock. Reference points obtained with other methods reach similar conclusions.

Examination of recent trends in abundance suggests that both the eastern and western stocks suffered their greatest declines in abundance prior to 1990. Since 1990, trends in relative abundance conflict between different indices, with some indices suggesting declines, other increases and others not showing a trend (**SAI-Figure 4**). Examination of available length frequencies for a range of fleets show that average length and length distributions do not show clear trends during the period where there are observations. A similar result was obtained in the past for marlins. Although it is possible that, like in the case of the marlins, this reflects the fact that mean length is not a good indicator of fishing pressure for billfish it could also reflect a pattern of high fishing pressure over the period of observation.

SAI-4. Outlook

Both the eastern and western stocks of sailfish may have been reduced to stock sizes below B_{MSY}. There is considerable uncertainty on the level of reduction, particularly for the west, as various production model fits indicated the biomass ratio B_{2007}/B_{MSY} both above and below 1.0. The results for the eastern stock were more pessimistic than those for the western stock in that more of the results indicated recent stock biomass below B_{MSY}. Therefore there is particular concern over the outlook for the eastern stock.

SAI-5. Effect of current regulations

No ICCAT regulations for sailfish are in effect, however, some countries have established domestic regulations to limit the catch of sailfish. Among these regulations are: requirement of releasing all billfish from longline vessels, minimum size restrictions, circle hooks and catch and release strategies in sport fisheries.

SAI-6. Management recommendations

The Committee recommends that catches for the eastern stock should be reduced from current levels. It should be noted, however, that artisanal fishermen harvest a large part of the sailfish catch along the African coast.

The Committee recommends that catches of the western stock of sailfish should not exceed current levels. Any reduction in catch in the West Atlantic is likely to help stock re-growth and reduce the likelihood that the stock is overfished. It should be noted, however, that artisanal fishermen harvest a large part of the sailfish catch of the western sailfish stock.

One approach to reduce fishing mortality could be the use of non-offset circle hooks as terminal gear. Recent research has demonstrated that in some longline fisheries the use of non-offset circle hooks resulted in a reduction of istiophorid mortality, while the catch rates of several of the target species remained the same or were greater than the catch rates observed with the use of conventional J hooks or offset circle hooks. The Committee considers that this approach may be more efficient and enforceable than time-area closures and, thus, it recommends that the Commission considers this alternative approach. Currently, three ICCAT Contracting Parties (Brazil, Canada, and the United States) already mandate or encourage the use of circle hooks in their pelagic longline fleets. In addition, reducing fishing mortality of sailfish from non-industrial fisheries should be considered.

The Committee is concerned about the incomplete reporting of sailfish catches, particularly for the most recent years, because it increases uncertainty in stock status determination. The Committee recommends all countries landing or having dead discards of sailfish, report these data to the ICCAT Secretariat.

ATLANTIC SAILFISH SUMMARY

	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	600-1,100[1] t	1,250-1,950[1] t
2013 Catches (Provisional)	412 t	1,090 t
B_{2007}/B_{MSY}	Possibly < 1.0	Likely < 1.0
F_{2007}/F_{MSY}	Possibly > 1.0	Likely > 1.0
Overfished	Possibly	Likely
Overfishing	Possibly	Likely
2008 Replacement Yield	Not estimated	Not estimated
Management Measures in Effect:	None[2]	None[2]

[1]Results from Bayesian production model with informative priors. These results represent only the uncertainty in the production model fit. This range underestimates the total uncertainty in the estimates of MSY.
[2] Some countries have domestic regulations.

SAI-Table 1. Estimated catches (t) of Atlantic sailfish (Istiophorus albicans) by area, gear and flag.

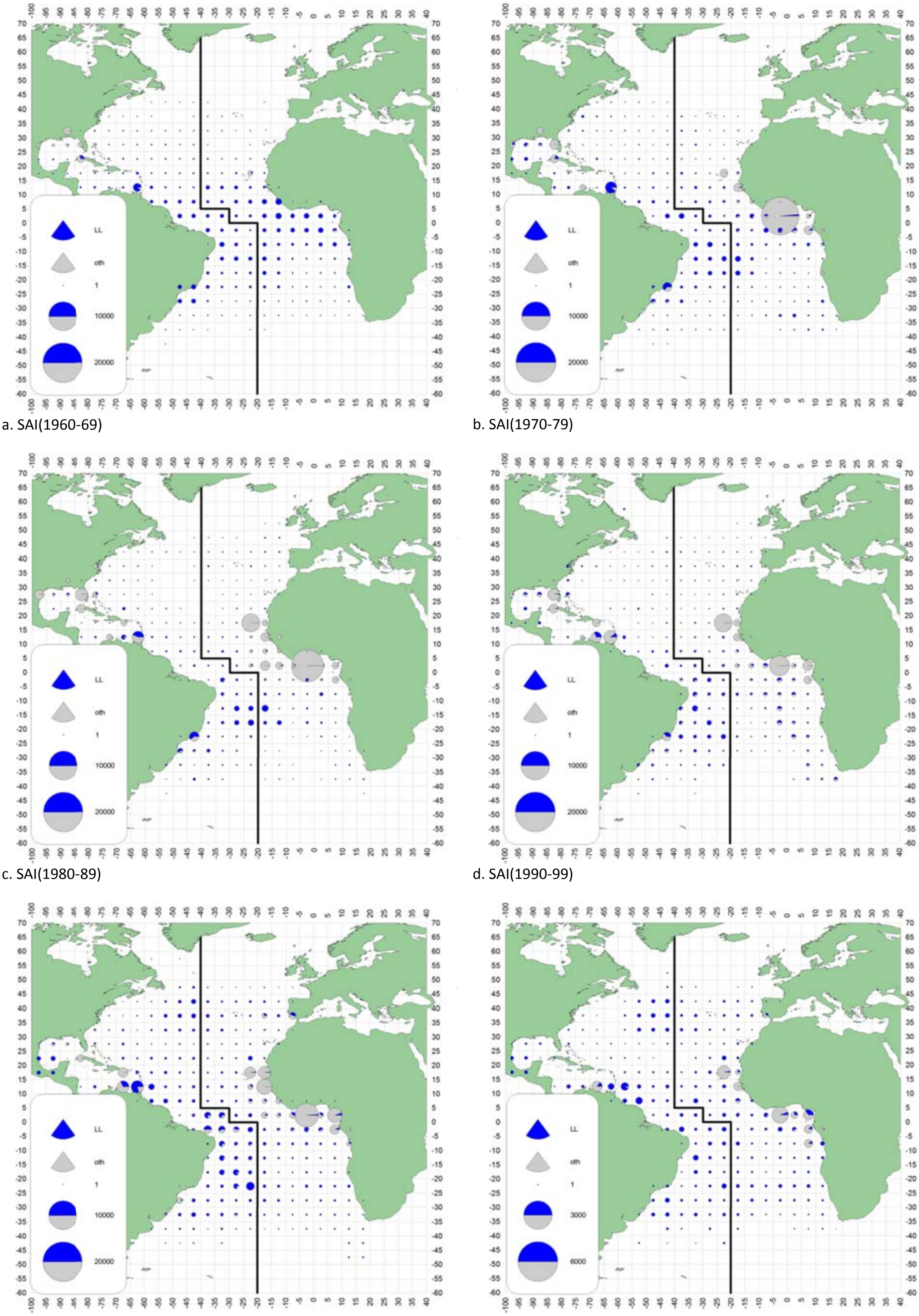
			1989	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
TOTAL			2673	3475	2591	3105	3093	2231	2358	2923	2500	2709	2724	3798	4480	4294	3943	3984	3629	2997	3837	3734	3498	2553	2053	2030	1502
	ATE		1710	2315	1476	1780	1815	1172	1234	1881	1337	1362	1342	1978	2761	2313	2625	2587	2194	1901	2542	2196	2062	1797	1238	1125	1090
	ATW		963	1160	1115	1325	1278	1059	1124	1041	1163	1346	1382	1820	1719	1981	1318	1397	1435	1096	1295	1537	1437	756	815	905	412
Landings	ATE	Longline	112	109	47	104	256	151	189	196	206	275	273	195	269	354	322	261	294	566	555	596	555	483	454	484	625
		Other surf.	1153	1249	1000	983	1111	954	910	1504	644	859	883	1231	1725	1862	2022	2106	1756	1289	1798	1488	927	871	643	583	348
		Sport (HL+RR)	445	957	429	692	448	67	135	182	488	228	186	551	767	98	282	219	143	46	189	113	580	443	141	58	117
	ATW	Longline	316	316	159	357	484	346	338	260	323	499	533	1097	1245	1265	873	747	1062	646	830	1018	965	658	694	712	308
		Other surf.	238	514	521	599	498	468	410	482	433	553	615	602	402	603	440	642	368	442	452	502	457	92	101	154	86
		Sport (HL+RR)	352	267	371	333	233	217	348	230	350	267	163	76	60	106	0	0	0	2	6	7	4	2	10	19	7
Discards	ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ATW	Longline	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7	3	5	8	9	10	4	10	18	12
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Landings	ATE	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	
		Benin	8	21	20	21	20	20	20	19	6	4	5	5	12	2	2	5	3	3	4	0	0	0	0	0	
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	0	3	3	3	3	5	9	4	5	11	4	4	8	16	8	1	4	5	2	4	1
		Chinese Taipei	3	5	4	80	157	38	58	24	56	44	66	45	50	62	49	15	25	36	109	121	80	21	51	53	41
		Cuba	53	61	184	200	77	83	72	533	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	55	58	38	69	40	54	66	91	65	35	80	45	47	65	121	73	93	78	52	448	74	0	108	192	80
		EU.España	14	0	13	3	42	8	13	42	38	15	20	8	150	210	183	148	177	200	192	206	280	174	154	201	402
		EU.Portugal	0	0	0	1	2	1	2	1	2	27	53	11	3	8	13	19	31	136	43	49	103	170	121	70	109
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
		Gabon	0	0	0	0	3	3	110	218	2	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	
		Ghana	465	395	463	297	693	450	353	303	196	351	305	275	568	592	566	521	542	282	420	342	358	417	299	201	220
		Honduras	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	26	31	6	15	27	45	52	47	19	58	16	26	6	20	22	70	50	62	144	199	94	115	142	157	66
		Korea Rep.	12	12	22	2	2	5	5	11	4	0	0	0	0	0	0	0	0	0	0	0	1	0	5	0	6
		Liberia	0	0	0	0	0	0	33	85	43	136	122	154	56	133	127	106	122	118	115	0	0	0	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	**0**
		Mixed flags (FR+ES)	432	595	174	150	182	160	128	97	110	138	131	353	400	365	413	336	264	274	205	251	308	265	56	0	
		NEI (BIL)	0	0	0	0	0	0	0	0	0	0	0	28	269	408	213	55	1	105	43	20	11	0	0	0	
		NEI (ETRO)	0	0	0	0	27	51	57	69	86	127	120	77	43	3	2	16	7	8	10	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
		S. Tomé e Príncipe	86	97	84	78	81	88	92	96	139	141	141	136	136	136	136	515	346	292	384	114	119	121	121	0	
		Senegal	552	1040	466	860	462	162	167	240	560	260	238	786	953	240	673	567	463	256	737	446	630	484	174	247	165
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	5	0	0	0	0	0	
		Togo	0	0	0	0	0	0	0	0	9	22	36	23	62	55	95	135	47	31	71	0	0	0	0	0	
		U.S.A.	0	0	2	4	1	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATW	Aruba	16	13	9	5	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	
		Barbados	69	45	29	42	50	46	74	25	71	58	44	44	42	26	27	26	42	58	42	0	0	18	36	36	39
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	12	0	0	52	8	0	4
		Brazil	147	301	90	351	243	129	245	310	137	184	356	598	412	547	585	534	416	139	123	268	433	78	137	108	25
		China PR	0	0	0	0	0	3	3	3	3	3	9	4	3	1	0	1	0	0	0	1	2	1	1	1	0
		Chinese Taipei	86	42	37	17	112	117	19	19	2	65	17	11	33	31	13	8	21	5	14	10	11	6	9	27	7
		Cuba	55	126	83	70	42	46	37	37	40	28	196	208	68	32	18	50	72	47	56	0	0	0	0	0	
		Curaçao	10	10	10	10	15	15	15	15	15	15	15	15	0	0	0	0	0	0	0	0	0	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	5	3	0	1	0	3	3	4	2	0	2	0	
		Dominican Republic	44	40	31	98	50	90	40	40	101	89	27	67	81	260	91	144	165	133	147	0	0	0	0	0	
		EU.España	0	0	8	13	13	19	36	5	30	42	7	14	354	449	196	181	113	148	248	393	451	306	233	239	26
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	7	0	2	12	12	110	19	53	101	48	19	9	4	
		Grenada	98	218	316	310	246	151	119	56	83	151	148	164	187	151	171	112	147	159	174	216	183	0	0	0	
		Japan	12	12	27	0	1	8	2	4	17	3	10	12	3	3	10	5	22	4	1	33	43	36	13	16	7
		Korea Rep.	12	16	1	2	3	4	4	12	4	0	0	0	0	0	0	0	0	0	0	0	1	0	45	4	1
		Mexico	0	0	0	0	2	19	19	10	9	65	40	118	36	34	45	51	55	41	46	45	48	34	32	51	63
		NEI (BIL)	0	0	0	0	0	0	0	0	0	0	0	297	268	0	0	0	0	68	81	252	17	0	0	0	
		NEI (ETRO)	0	0	0	0	15	27	30	36	46	67	64	41	23	1	1	9	4	4	6	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	2	1	4	4	4	2	1	3	0	1	0	2	164	3	86	73	59	18	13	8	7	4	4	3
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2	2	3	2
		Trinidad and Tobago	10	7	3	3	1	2	1	4	10	25	37	3	7	6	8	10	9	17	13	32	16	16	38	72	34
		U.S.A.	324	242	343	294	202	179	345	231	349	267	163	76	58	103	0	0	0	0	0	3	3	0	0	7	3
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	24	24	65	71	206	162	93	155	175	248	169	83	126	159	133	158	178	184	248	154	162	178	235	314	186
Discards	ATE	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	ATW	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7	4	5	7	10	10	4	10	19	11

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

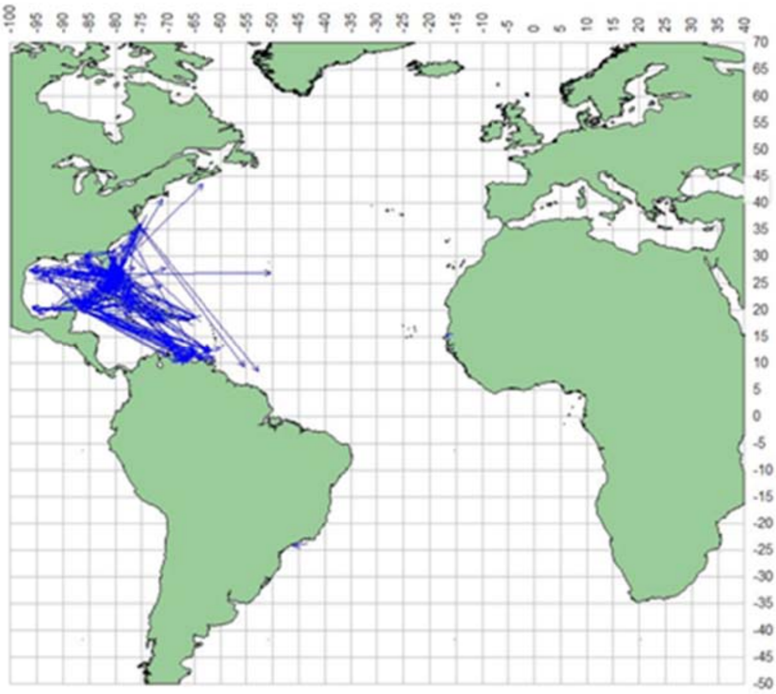
SPF-Table 1. Estimated catches (t) of longbill spearfish (Tetrapturus pfluegeri) by area, gear and flag.

			1989	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
TOTAL			418	481	214	273	540	320	240	165	201	266	306	278	188	179	133	188	169	340	167	166	140	245	147	229	133
	ATE		310	417	131	255	419	198	207	128	194	192	255	178	79	84	50	51	68	75	66	60	78	110	66	168	102
	ATW		108	64	83	19	121	122	33	37	7	74	51	100	110	95	84	137	101	265	102	106	62	135	81	61	32
Landings	ATE	Longline	40	44	24	163	307	100	129	69	126	106	174	118	78	84	50	51	68	75	66	60	78	110	66	168	102
		Other surf.	270	373	107	92	112	98	78	59	68	86	81	60	0	0	0	0	0	0	0	0	0	0	0	0	
	ATW	Longline	108	64	83	19	121	122	26	34	7	74	51	100	110	95	84	137	101	265	102	106	62	135	81	61	32
		Other surf.	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Sport (HL+RR)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	ATE	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATW	Longline	0	0	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landings	ATE	China PR	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Chinese Taipei	4	8	6	135	263	63	97	41	94	73	112	75	52	62	25	15	25	37	22	2	6	15	7	5	1
		EU.España	0	0	0	0	12	0	5	1	1	9	29	14	7	5	0	0	3	3	0	2	7	29	19	17	17
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	8	2	6	25	9	18	
		Japan	31	32	10	27	31	36	26	25	30	22	33	29	20	16	25	36	40	21	36	53	59	35	31	127	83
		Korea Rep.	5	4	8	1	1	1	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mixed flags (FR+ES)	270	373	107	92	112	98	78	59	68	86	81	60	0	0	0	0	0	0	0	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATW	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	3	0	
		Brazil	0	0	0	0	0	0	0	0	0	0	0	27	56	39	3	0	0	5	4	0	0	0	24	4	11
		Chinese Taipei	85	41	36	16	111	116	19	18	2	64	16	11	24	39	12	11	20	17	20	0	0	6	14	4	0
		EU.España	0	0	0	0	5	0	1	0	0	0	24	50	22	5	25	0	5	14	0	2	5	3	4	3	1
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	15	44	10	10	0	3	
		Japan	10	13	46	1	1	2	3	4	1	8	11	11	3	12	40	41	58	54	25	45	26	71	20	19	5
		Korea Rep.	5	9	0	1	2	4	4	10	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	0	135	23	13	7	8	5	4	3
		Trinidad and Tobago	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	0	0	0	0	1	0	0	1	0	1	0	0	4	0	3	3	17	5	15	3	14	24	12	24	11
Discards	ATE	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	ATW	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

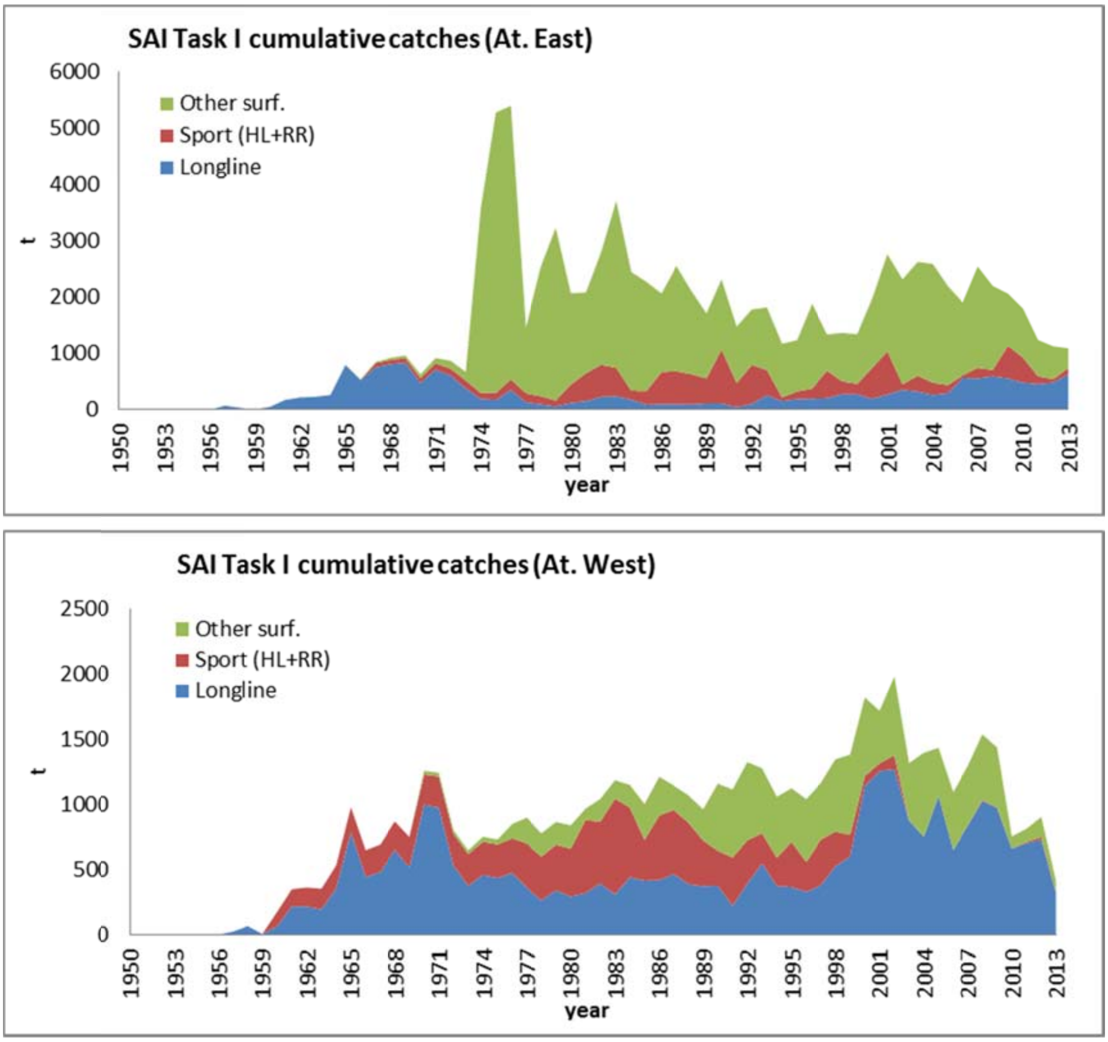
Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included on the table.



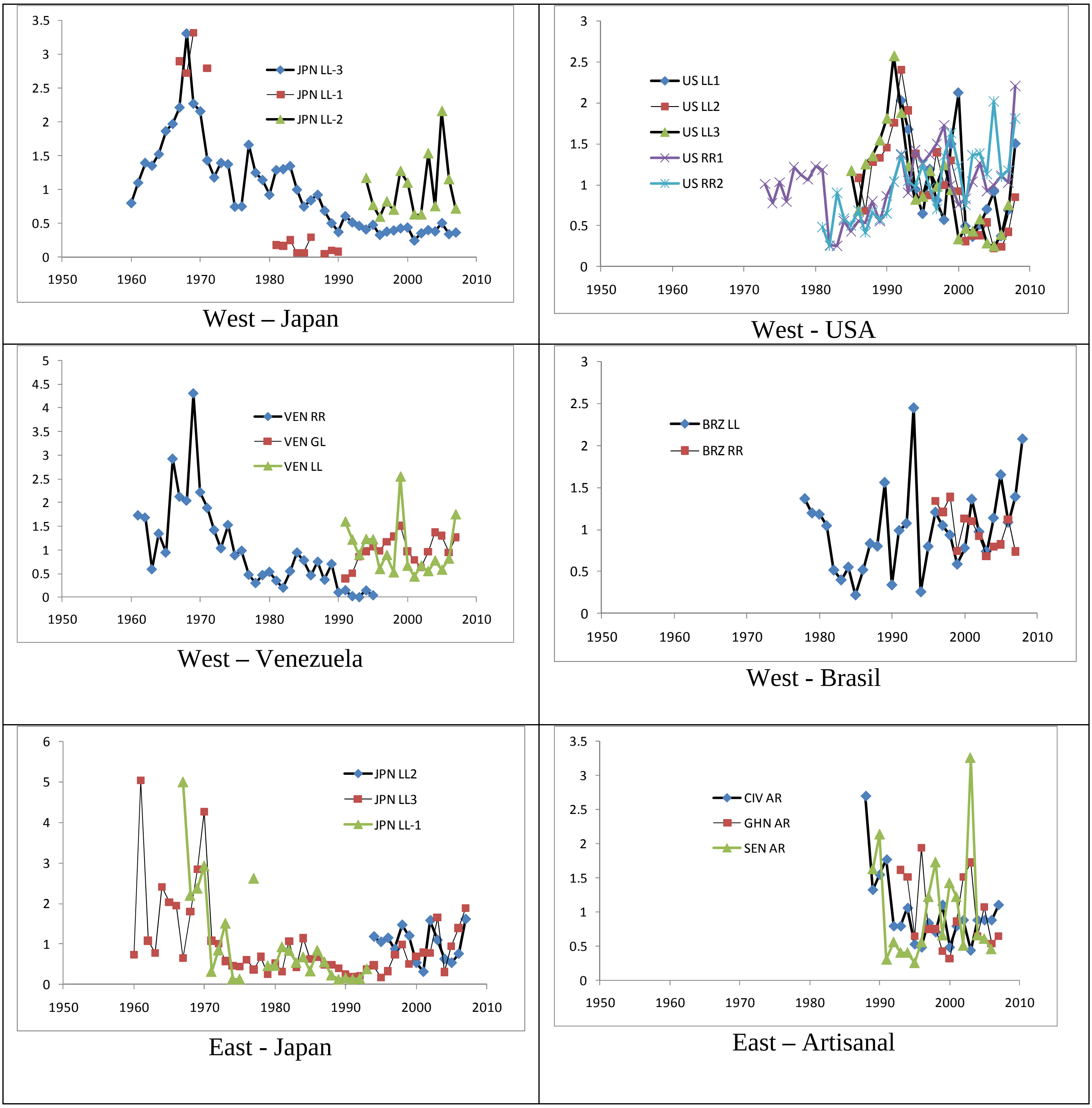
SAI-Figure 1. Geographic distribution of mean catches of sailfish by major gears and by decade. The dark line denotes the separation between stocks.



SAI-Figure 2. Conventional tag returns for Atlantic sailfish. Lines join the locations of release and recapture.



SAI-Figure 3. Task I catches of sailfish for each of the two Atlantic stocks, East and West.



SAI-Figure 4. Relative abundance indices obtained by standardizing CPUE data for various fleets. All indices were scaled to the mean of each series prior to graphing.

8.9 SWO-ATL-ATLANTIC SWORDFISH

The status of the North and South Atlantic swordfish stocks was assessed in September 2013, by means of applying statistical modelling to the available data up to 2011. Complete information on the assessment can be found in the Report of the 2013 ICCAT Swordfish Stock Assessment Meeting (SCRS/2013/019). Other information relevant to Atlantic swordfish is presented in the Report of the Sub-Committee on Statistics, included as **Appendix 8** to this SCRS Report, and recommendations pertinent to Atlantic swordfish are presented in Item 17.

SWO-ATL-1. Biology

Swordfish (*Xiphias gladius*) are members of the family Xiphiidae and are in the suborder Scombroidei. They can reach a maximum weight in excess of 500 kg. They are distributed widely in the Atlantic Ocean and Mediterranean Sea. In the ICCAT Convention area, the management units of swordfish for assessment purposes are a separate Mediterranean group, and North and South Atlantic groups separated at 5°N. This stock separation is supported by recent genetic analyses. However, the precise boundaries between stocks are uncertain. Swordfish feed on a wide variety of prey including groundfish, pelagic fish, deep-water fish, and invertebrates. They are believed to feed throughout the water column, and from recent electronic tagging studies, undertake extensive diel vertical migrations.

Swordfish mostly spawn in the western warm tropical and subtropical waters throughout the year, although seasonality has been reported in some of these areas. They are found in the colder temperate waters during summer and fall months. Young swordfish grow very rapidly, reaching about 140 cm LJFL (lower-jaw fork length) by age three, but grow slowly thereafter. Females grow faster than males and reach a larger maximum size. Tagging studies have shown that some swordfish can live up to 15 years. Swordfish are difficult to age, but about 50% of females were considered to be mature by age five, at a length of about 180 cm. However, the most recent information indicates a smaller length and age at maturity.

New length-weight relationships proposed for both the North and South Atlantic were proposed in 2013, these will be considered interim until the analysis are finished.

In 2013 the Committee reviewed the analysis of the horizontal movements evidencing seasonal patterns with fish generally moving south by winter and returning to the temperate foraging grounds in spring. Broader areas of mixing between some eastern and western areas were also suggested. These new results obtained by pop-up satellite tags fully confirm the previous knowledge that was available from fishery data: deep longline catch swordfish during the day-time as a by-catch, while shallow longliners target swordfish at night in very shallow waters.

SWO-ATL-2. Fishery indicators

Due to the broad geographical distribution of Atlantic swordfish (**SWO ATL-Figure 1**) in coastal and off-shore areas (mostly ranging from 50ºN to 45ºS), this species is available to a large number of fishing countries. **SWO ATL-Figure 2** shows total estimated catches for North and South Atlantic swordfish. Directed longline fisheries from Canada, EU-Spain, and the United States have operated since the late 1950s or early 1960s, and harpoon fisheries have existed at least since the late 1800s. Other directed swordfish fisheries include fleets from Brazil, Morocco, Namibia, EU-Portugal, South Africa, Uruguay, and Venezuela. The primary by-catch or opportunistic fisheries that take swordfish are tuna fleets from Chinese Taipei, Japan, Korea and EU-France. The tuna longline fishery started in 1956 and has operated throughout the Atlantic since then, with substantial catches of swordfish that are produced as a by-catch of tuna fisheries. The largest proportion of the Atlantic catches is made using surface-drifting longline. However, many additional gears are used, including traditional gillnets off the coast of western Africa.

The Committee was presented with an update of the possible geographic redistribution of north Atlantic swordfish. The presentation used area specific CPUE information (rather than flag specific) to demonstrate that several area specific residual patterns had significant relationships with the Atlantic Multidecadal Oscillation (AMO). These relationships of the eastern Atlantic were opposite to those in the western Atlantic. This pattern mimicked very closely the spatial mapping of the AMO as well as that of the North Atlantic Oscillation (NAO). Including the AMO as a covariate to area specific catchability within the assessment model helped reduce the conflicting directions of the various CPUE trends. Further analysis and hypothesis testing was recommended to determine if the relationship was due to a swordfish temperature preference, a change in prey distribution, or perhaps both. To support this hypothesis testing the Group encouraged a group of swordfish scientists to work towards uniting the available North Atlantic swordfish CPUE data into a single dataset so that a more refined, area specific CPUE analysis could be conducted.

For both the North and South Atlantic many of the indices of abundance were affected by changes in gear technology and management that could not be accounted for in the CPUE standardization, and therefore had to be split. Splitting the indices reduces the abundance signal and, to the degree possible, continuity of the indices can be maintained, which will increase the reliability of the assessment results.

Total Atlantic

The total Atlantic estimated catch (landings plus dead discards) of swordfish (North and South, including reported dead discards) in 2013 (19,767 t) is 81% of the reported catch in 2012 (24,329 t). As a small number of countries have not yet reported their 2013 catches and because of unknown unreported catches, this value should be considered provisional and subject to further revision.

The trends in mean fish weight taken in the North and South Atlantic fisheries are shown in **SWO-ATL-Figure 3**.

North Atlantic

For the past decade, the North Atlantic estimated catch (landings plus dead discards) has averaged about 12,150 t per year (**SWO-ATL-Table 1** and **SWO-ATL-Figure 4**). The catch in 2013 (11,980 t) represents a 41% decrease since the 1987 peak in North Atlantic landings (20,236 t). These reduced landings have been attributed to ICCAT regulatory recommendations and shifts in fleet distributions, including the movement of some vessels in certain years to the South Atlantic or out of the Atlantic. In addition, some fleets, including at least the United States, EU-Spain, EU-Portugal and Canada, have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catch rates of these species previously considered as by-catch in some fleets. Recently, socio-economic factors may have also contributed to the decline in catch.

Available catch per unit effort (CPUE) series were evaluated by the Committee and certain indices were identified as suitable for use in assessment models (Japan, Portugal, Morocco, Canada, Spain and USA). Trends in standardized CPUE series by fleets contributing to the production model are shown in **SWO-ATL-Figure 5**. Most of the series have an increasing trend since the late 1990s, but the U.S. catch rates remained relatively flat. There have been some recent changes in United States regulations that may have impacted catch rates, but these effects remain unknown. The combined index is shown in **SWO-ATL-Figure 6**, rescaled to the final fishery specific indices.

The most frequently occurring ages in the catch include ages 2 and 3 (**SWO-ATL-Figure 6**).

South Atlantic

The historical trend of catch (landings plus dead discards) can be divided in two periods: before and after 1980. The first one is characterized by relatively low catches, generally less than 5,000 t (with an average value of 2,300 t). After 1980, landings increased continuously up to a peak of 21,930 t in 1995, levels that are comparable to the peak of North Atlantic harvest (20,236 t in 1987). This increase of landings was, in part, due to progressive shifts of fishing effort to the South Atlantic, primarily from the North Atlantic, as well as other waters. Expansion of fishing activities by southern coastal countries, such as Brazil and Uruguay, also contributed to this increase in catches. The reduction in catch following the peak in 1995 resulted from regulations and was partly due to a shift to other oceans and target species. In 2013, the 7,787 t reported catches were about 64 % lower than the 1995 reported level (**SWO-ATL-Figure 4**). The SCRS received reports from Brazil and Uruguay that those CPCs have reduced their fishing effort directed towards swordfish in recent years. Uruguay recently received increased albacore quotas that may allow increased effort for swordfish in the near future.

Six data sets of relative abundance indices (Brazil, Japan, Spain, Uruguay, South Africa and Chinese Taipei) were made available to the Committee. These CPUE indices were standardized using various analytical approaches. The standardized CPUE series presented show different trends and high variability which indicates that at least some are not depicting trends in the abundances of the stock. The available indices are illustrated in Figure **SWO-ATL-Figure 6**. Two combined indices were produced (**SWO-ATL-Figure 7**), one excluding Brazil and the other excluding both Brazil and Chinese Taipei data series.

Discards

Since 1991, several fleets have reported dead discards (see **SWO-ATL-Table 1**). The volume of Atlantic-wide reported discards since then has ranged from 143 t (in 2013) to 1,139 t (in 2000) per year. The Committee expressed concern due to the low percentage of fleets that have reported annual dead discards (in t) in recent years.

SWO-ATL-3. State of the stocks

North Atlantic

Two stock assessment platforms were used to provide estimates of stock status for the North Atlantic swordfish stock, non-equilibrium surplus production model (ASPIC) and Bayesian Surplus Production Model (BSP2).

Results from the North Atlantic base case ASPIC model are shown in **SWO-ATL-Figure 8**. The estimated relative biomass trend shows a consistent increase since 1997. The bias corrected deterministic outcome indicates that the stock is at or above B_{MSY} (**SWO-ATL-Figure 9**). The relative trend in fishing mortality shows that the level of fishing peaks in 1995, followed by a decrease until 2001, followed by small increase in the 2002-2005 period and downward trend since then (**SWO-ATL-Figure 8**). Fishing mortality has been below F_{MSY} since 2000. The estimate of stock status in 2011 is relatively similar to the estimated status in the 2009 assessment, and suggests that there is a greater than 90% probability that the stock is at or above B_{MSY}. However, it is important to note that for the first time since 2002 the reported catches in 2012 (13,972 t) exceeded the TAC of 13,700 t. The most recent estimate of stock productivity is very consistent with previous estimates. The absolute biomass trajectory showed a consistent upturn from the estimated 1997 value, and the biomass values for the most recent years are near the level estimated in the mid 1980s (**SWO-ATL-Figure 10**). The high value in 1963 is not well fit as in prior evaluations. Trends in both fishing mortality and biomass are consistent with those produced by the BSP2 model, with the latter model estimating larger stock biomass and lower fishing mortality across the entire time series (**SWO-ATL-Figure 10**). Estimates of stock status from the BSP2 model are consistent with ASPIC results (**SWO-ATL-Figure 11**).

The stock is considered rebuilt, consistent with the 2009 evaluation. Compared with the 2009 ASPIC base case model, the trajectory of biomass and F ratios are similar until the late 1990s, thereafter the current model predicted slightly lower fishing mortality rates and higher relative biomass, but certainly within the estimated 80% confidence bounds (**SWO-ATL-Figure 12**).

South Atlantic

In 2009, evaluation of the status of the South Atlantic swordfish stock was assessed using a 'Catch only' model. During the 2013 stock assessment two platforms were used to provide stock status advice for the South Atlantic swordfish stock (i.e. ASPIC and BSP2).

The results of both models indicated that there was a conflicting signal for several of the indices used and substantial conflict between the landings history and the indices. Consequently the Committee had low confidence in the estimation of the absolute productivity level of the stock or on MSY-related benchmarks. Both models had similar difficulties estimating these quantities but both offered useful status advice. Consequently each platform provided a reference model on which the stock status was based.

Both models had similar trajectories of fishing mortality and biomass (**SWO-ATL-Figures 13** and **14**) but differed in their absolute levels and their status relative to benchmarks (**SWO-ATL-Figure 15**). Hence the two models differ in their view of current stock status, with ASPIC estimating the stock to be overfished (B_{2011}/B_{MSY} =0.98) but not undergoing overfishing (F_{2011}/F_{MSY} =0.84), and BSP, neither overfished (B_{2011}/B_{MSY} =1.38), nor overfishing (F_{2011}/F_{MSY} =0.47). Though, it should be noted that there is considerable uncertainty around any of these point estimates.

The groups choose to base stock status determination on a combination of model output and ancillary information, of which two pieces of information are informative. First, total removals (1950-2011) for the South Atlantic stock have been only 73% of the total removals for the North Atlantic stock for the same time period. Second the mean weight for the South (**SWO-ATL-Figure 16**) is larger than for the North. Assuming similar production dynamics, both indicators would suggest a lower exploitation rate for the South stock than for the North. Hence, while the Committee does not believe it can estimate the absolute productivity of the stock without improved scientific information, the Committee believes that the stock is not overfished.

SWO-ATL-4. Outlook

North Atlantic

Based on the currently available information to the Committee, the ASPIC base model was projected to the year 2021 under constant TAC scenarios of 8 to 20 thousand tones. Projections used reported catch as of September 5, 2013 for 2012. For those CPCs whose reported catch was not yet available, their catch was assumed to be the average of the last three years (2009-2011), giving a total catch of 14,038 t. Median trajectories for biomass and fishing mortality rate for all of the future TAC scenarios are plotted in **SWO-ATL-Figure 17**. Results from the 2013 assessment indicated that there is a greater than 90% probability that the northern swordfish stock has rebuilt to or above B_{MSY} (**SWO-ATL-Figure 9**), therefore the Commission's rebuilding plan goal has been achieved.

Future TACs above 15,000 t are projected to result in 50% or lower probabilities of the stock biomass remaining above B_{MSY} over the next decade (**SWO-ATL-Table 2**) as the resulting probability of F exceeding F_{MSY} for these scenarios would trend above 50% within four years. A TAC of 13,700 t would have an 83% probability of maintaining the stock and fishing mortality at a level consistent with the Convention objective over the next decade. Projections with BSP also used similar specifications for 2012 and 2013 yields and projected over the same time frame. Both models provide very consistent advice that TAC levels of 13,700 t would maintain the stock at a level consistent with the Convention objectives over the next decade.

South Atlantic

The Committee considered that the ASPIC and BSP estimated benchmarks were unreliable due to the conflicting signal between the catch data and the CPUE time series available to the Committee. Hence, it is unknown whether it is possible to obtain substantially higher yields from the stock as BSP suggests or whether the stock is fully exploited as suggested by ASPIC. Until improved scientific information is available in the form of more consistent indices, tagging studies to estimate fishing mortality or abundance or other improved information, this uncertainty may remain.

SWO-ATL-5. Effect of current regulations

In 2006, the Committee provided information on the effectiveness of existing minimum size regulations. New catch regulations were implemented on the basis of Rec. 06-02, which entered into effect in 2007 (Rec. 08-02 extended the provisions of Rec. 06-02 to include 2009). Rec. 09-02 came into effect in 2010 and extended most of the provisions of Rec. 06-02 for one year only. Rec. 10-02 came into effect in 2011, and again extended those provisions for one year only, but with a slight reduction in total allowable catch (TAC).

For the South Atlantic, the most recent recommendation can be found in Rec. 13-03, which establishes a three year management plan for that stock.

Catch limits

The total allowable catch in the North Atlantic during the 2007 to 2009 period was 14,000 t per year. The reported catch during that period averaged 11,811 t and did not exceed the TAC in any year. In 2010, the TAC was reduced to 13,700 t, compared with 2012 catches of 13,848 t. Reports for 2012 are considered provisional and subject to change.

The total allowable catch in the South Atlantic for the years 2007 through 2009 was 17,000 t. The reported catch during that period averaged 13,618 t, and did not exceed the TAC in any year. In 2010, the TAC was reduced to 15,000 t, compared with 2012 catch of 10,481 t. Reports for 2012 are considered provisional and subject to change.

Minimum size limits

There are two minimum size options that are applied to the entire Atlantic: 125 cm LJFL with a 15% tolerance, or 119 cm LJFL with zero tolerance and evaluation of the discards.

For the 2006-2008 period, the estimate of the percentage of swordfish reported landed (throughout the Atlantic) less than 125 cm LJFL was about 24% (in number) overall for all nations fishing in the Atlantic (28% in the northern stock and 20% in the southern stock). If this calculation is made using reported landings plus estimated dead discards, then the percentage less than 125 cm LJFL would be of the same order given the relatively small amount of discards reported. These estimates are based on the overall catch at size, which have high levels of substitutions for a significant portion of the total catch.

SWO-ATL-6. Management recommendations

North Atlantic

For continuity of advice relative to previous assessments, ASPIC results are provided in **SWO-ATL-Table 2**, which shows the ranges of total catch limits and associated probabilities associated with stock status by year. The current TAC of 13,700 t has an 83% probability of maintaining the North Atlantic swordfish stock in a rebuilt condition by 2021 almost maintaining the level of biomass. This TAC would be in accordance with [Rec. 11-13], adopted by the Commission that indicates that ‘For stocks that are not overfished and not subject to overfishing (i.e. stocks in the green quadrant of the Kobe plot), management measures shall be designed to result in a high probability of maintaining the stock within this quadrant’. However, the Committee acknowledges that without better direction from the Commission with regard to what constitutes a ‘high probability’, it cannot provide more specific advice. TACs up to 14,300 t would still have a higher than 50% probability of maintaining the stock in a rebuilt condition by 2021 but would be expected to lead to greater biomass declines.

South Atlantic

Considering the unquantified uncertainties and the lack of signal in the data for the southern Atlantic swordfish stock, and until sufficiently more research has been conducted to reduce the high uncertainty in stock status, the Committee did not have sufficient confidence in the assessment results to change the previous recommendation to limit catches to no more than 15,000 t.

ATLANTIC SWORDFISH SUMMARY

	North Atlantic	***South Atlantic***
Maximum Sustainable Yield[1]	13,660 t (13,250-14,080)[3]	Unknown
Current (2013) TAC	13,700 t	15,000 t
Current (2013) Yield[2]	11,980 t	7,787 t
Yield in last year used in assessment (2011)	12,834 t[4]	11,055 t[4]
B_{MSY}	65,060 (54,450-76,700)	Unknown
F_{MSY}	0.21 (0.17-0.26)	Unknown
Relative Biomass (B_{2011}/B_{MSY})	1.14 (1.05-1.24)	Unknown, but likely above 1[5]
Relative Fishing Mortality (F_{2011}/F_{MSY}[1])	0.82 (0.73-0.91)	Unknown, but likely below 1[5]
Stock Status	Overfished: NO Overfishing: NO	Overfished: NO[5] Overfishing: NO
Management Measures in Effect	Country-specific TACs [Rec. 13-02]; 125/119 cm LJFL minimum size	Country-specific TACs [Rec. 13-03]; 125/119 cm LJFL minimum size

[1] Base Case production model (Logistic) results based on catch data 1950-2011.
[2] Provisional and subject to revision.
[3] Point estimate, 80% bias corrected confidence intervals are shown.
[4] As of 5 September 2013.
[5] This determination is based on the models and the ancillary information (e.g. catch trends, mean weight trends).

SWO-ATL-Table 1. Estimated catches (t) of Atlantic swordfish (*Xiphias gladius*) by gear and flag.

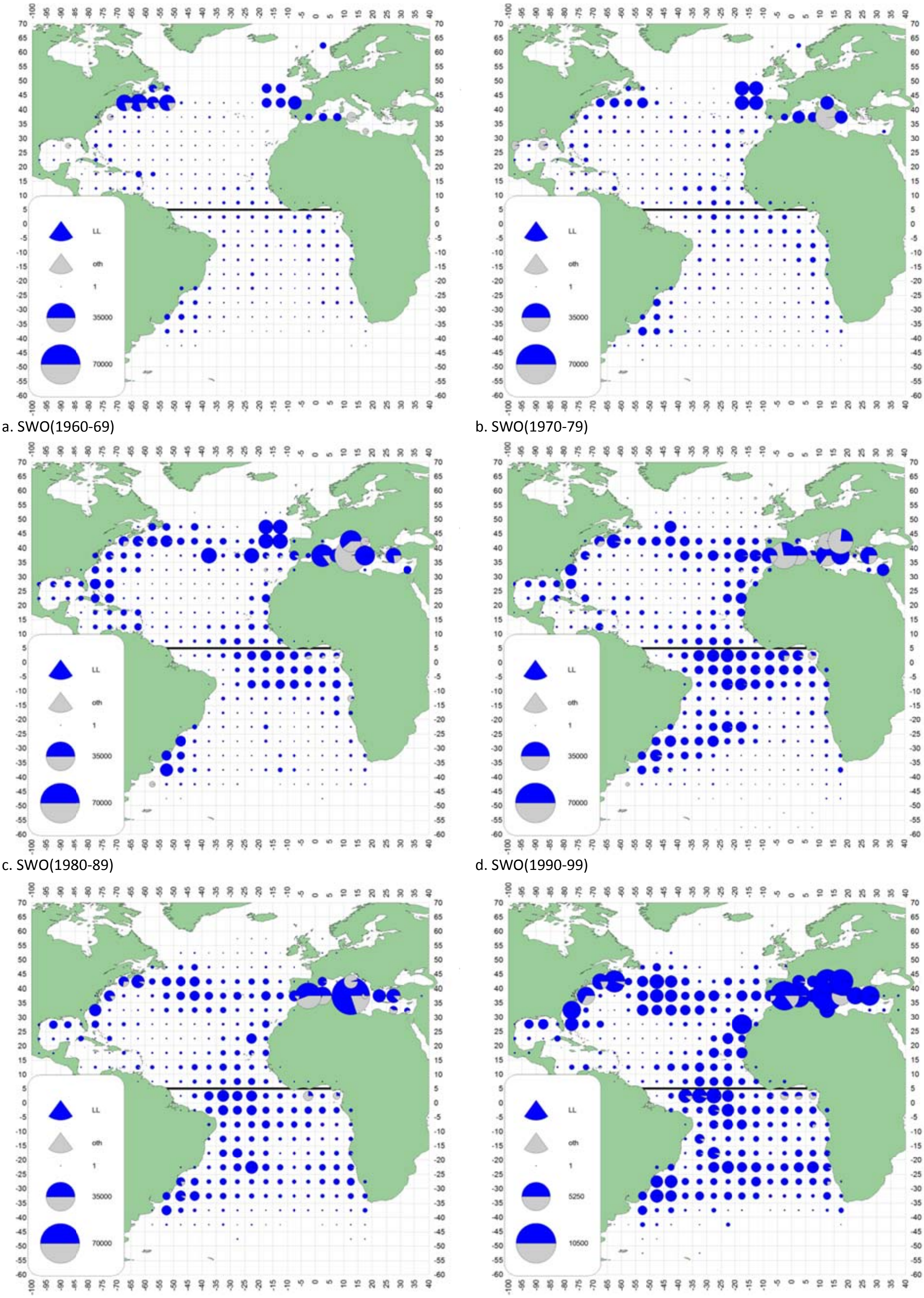
			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL			34305	32976	28826	29207	32868	34459	38803	33511	31567	26251	27123	27180	25139	23758	24075	25252	25643	25718	27932	23596	24761	24209	23918	24329	19767
	ATN		17250	15672	14934	15394	16738	15501	16872	15222	13025	12223	11622	11453	10011	9654	11442	12175	12480	11473	12302	11050	12081	11553	12523	13848	11980
	ATS		17055	17304	13893	13813	16130	18958	21930	18289	18542	14027	15502	15728	15128	14104	12633	13077	13162	14245	15630	12546	12679	12655	11395	10481	7787
Landings	ATN	Longline	15348	14026	14208	14288	15641	14315	15764	13808	12181	10939	10666	9837	8676	8799	10333	11406	11527	10840	11475	10341	11439	10964	11610	12914	11293
		Other surf.	1902	1646	511	723	689	478	582	826	393	800	426	478	433	240	487	449	620	409	546	465	485	437	511	559	546
	ATS	Longline	16398	16705	13287	13176	15547	17387	20806	17799	18239	13748	14823	15448	14302	13576	11712	12485	12915	13723	14967	11761	12106	11920	10833	10242	7672
		Other surf.	657	599	606	637	583	1571	1124	489	282	269	672	278	825	527	920	591	248	522	572	779	574	587	488	214	112
Discards	ATN	Longline	0	0	215	383	408	708	526	562	439	476	525	1137	896	607	618	313	323	215	273	235	151	148	392	364	140
		Other surf.	0	0	0	0	0	0	0	26	12	9	4	1	6	8	5	7	10	8	8	9	7	5	9	10	
	ATS	Longline	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	0	0	91	6	0	147	74	26	3
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	ATN	Barbados	0	0	0	0	0	0	0	33	16	16	12	13	19	10	21	25	44	39	27	39	20	13	23	21	16
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	112	106	184	141	142
		Brazil	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285	1203	1558	1404	1348	1334	1300	1346	1551	1489	1505
		China PR	0	0	0	0	73	86	104	132	40	337	304	22	102	90	316	56	108	72	85	92	92	73	75	59	96
		Chinese Taipei	17	270	577	441	127	507	489	521	509	286	285	347	299	310	257	30	140	172	103	82	89	88	192	166	115
		Cuba	87	47	23	27	16	50	86	7	7	7	7	0	0	10	3	3	2	2	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	30	0	7	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	
		EU.Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.España	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3996	4595	3968	3957	4586	5376	5521	5448	5564	4366	4949	4147	4889	5622	4084
		EU.France	0	75	75	75	95	46	84	97	164	110	104	122	0	74	169	102	178	92	46	14	15	35	16	94	3
		EU.Ireland	0	0	0	0	7	0	0	15	15	132	81	35	17	5	12	1	1	3	2	2	1	1	2	5	2
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
		EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032	1320	900	949	778	747	898	1054	1203	882	1427
		EU.United Kingdom	0	0	0	0	2	3	1	5	11	0	2	1	0	0	0	0	0	0	0	0	2	0	0	0	0
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	10	3	36	48	0	82	48	17	90	1	0	18
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	0	0	0	0	
		Grenada	5	1	2	3	13	0	1	4	15	15	42	84	0	54	88	73	56	30	26	43	0	0	0	0	
		Iceland	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	0	575	705	656	889	935	778	1062	523	639	326
		Korea Rep.	320	51	3	3	19	16	16	19	15	0	0	0	0	0	0	0	51	65	175	157	3	0	0	0	64
		Liberia	35	3	0	7	14	26	28	28	28	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
		Maroc	222	91	110	69	39	36	79	462	267	191	119	114	523	223	329	335	334	341	237	430	724	963	782	770	1062
		Mexico	0	0	0	0	6	14	0	22	14	28	24	37	27	34	32	44	41	31	35	34	32	35	38	40	33
		NEI (ETRO)	112	529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (MED)	190	185	43	35	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	1	4	44	5	0	8	0	22	28	0	17	36	9
		Rumania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
		Senegal	1	0	6	6	0	0	0	0	0	0	0	0	0	0	0	108	108	0	38	0	28	11	1	44	43
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	3	0	3	23	0	4	3	1	0	1	0	22	22	7	7	7	0	51	7	34	13	11	8	4
		Sta. Lucia	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3	0	0	2	0	0	0	0	0
		Trinidad and Tobago	79	66	71	562	11	180	150	158	110	130	138	41	75	92	78	83	91	19	29	48	30	21	16	14	16
		U.S.A.	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2384	2513	2380	2160	1873	2463	2387	2730	2274	2551	3393	2834
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	0	0	0	0	0	0	1	1	5	5	3	3	2	0	0	1	1	0	3	4	3	3	3	1	1
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	7	0	3	0	0	4	0	
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	29	14	0	0	0	10	23	15	
		Venezuela	4	9	75	103	73	69	54	85	20	37	30	44	21	34	45	53	55	22	30	11	13	24	18	25	24
	ATS	Angola	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	
		Argentina	175	230	88	88	14	24	0	0	0	0	38	0	5	10	8	0	0	0	0	0	0	1	0	0	
		Belize	0	0	0	0	0	0	1	0	0	0	17	8	0	0	0	0	0	0	120	32	111	121	207	197	136
		Benin	26	28	28	26	28	25	24	24	10	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	

		Brazil	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910	2920	2998	3785	4430	4153	3407	3386	2926	3033	2833	1312
		Cambodia	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	0	0	0	0	0	29	534	344	200	423	353	278	91	300	473	470	291	296	248	316	196
		Chinese Taipei	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1164	1254	745	744	377	671	727	612	410	424	379	582
		Cuba	830	448	209	246	192	452	778	60	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	7	8	18	13	14	20	19	26	18	25	26	20	19	19	43	29	31	39	17	159	100	114	145	82	110
		EU.Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.España	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741	4527	5483	5402	5300	5283	4073	5183	5801	4700	4852	4184
		EU.Lithuania	0	0	0	0	0	794	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	0	0	0	1	0	0	380	389	441	384	381	392	393	380	354	345	493	440	428	271	367	232	263	184	125
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	0	0	3	0	0	0	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	
		Ghana	156	146	73	69	121	51	103	140	44	106	121	117	531	372	734	343	55	32	65	177	132	116	60	54	1
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Honduras	0	0	0	3	0	0	6	4	5	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	790	685	833	924	686	480	1090	2155	1600	1340	1314	1233	1162	466
		Korea Rep.	776	50	147	147	198	164	164	7	18	7	5	10	0	2	24	70	36	94	176	223	10	0	0	42	47
		Mixed flags (FR+ES)	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (ETRO)	856	439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	22	0	0	0	0	730	469	751	504	191	549	832	1118	1038	518	25	417	414	85	129
		Nigeria	0	0	0	3	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	29	105	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	6	1	8	1	1	4	58	41	49	14	35	15	35
		S. Tomé e Príncipe	207	181	179	177	202	190	178	166	148	135	129	120	120	120	120	126	147	138	138	183	188	193	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	138	195	180	264	162	178
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	
		South Africa	0	0	5	9	4	1	4	1	1	240	143	328	547	649	293	295	199	186	207	142	170	145	97	50	171
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	7	16	4	3	2	2
		Togo	2	3	5	5	8	14	14	64	0	0	0	0	0	0	0	9	10	2	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	0	0	171	396	160	179	142	43	200	21	15	0	0	0	0	0	0	0	0	0
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	0	0	0	0	0	0	0	0	0	5
		Uruguay	414	302	156	210	260	165	499	644	760	889	650	713	789	768	850	1105	843	620	464	370	501	222	179	40	103
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	26	6	3	0	3	1	3	
Discards	ATN	Canada	0	0	0	0	0	0	0	0	5	52	35	50	26	33	79	45	106	38	61	39	9	15	8	111	**0**
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		Japan	0	0	0	0	0	0	0	0	0	0	0	598	567	319	263	0	0	0	0	0	0	0	0	0	
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	170	46	19
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		U.S.A.	0	0	215	383	408	708	526	588	446	433	494	490	308	263	282	275	227	185	220	205	148	138	223	217	121
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATS	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	6	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	3
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	70	23	**0**
		U.S.A.	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	0	0	0	0	0	0	0	0	

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

SWO-ATL-Table 2. Estimated probabilities (%) that both the fishing mortality is below F_{MSY} and spawning stock biomass is above SSB_{MSY} for North Atlantic Swordfish from ASPIC base model.

TAC	2014	2015	2016	2017	2018	2019	2020	2021
13000	88	91	92	92	92	92	93	93
13200	88	91	91	92	92	91	91	91
13400	88	90	90	89	89	89	89	89
13600	88	88	88	88	87	87	86	85
13700	88	88	88	87	85	84	84	83
13800	88	87	86	85	83	82	82	81
13900	88	86	84	83	82	80	79	77
14000	88	84	82	80	79	77	75	74
14100	88	82	80	78	76	74	72	69
14200	88	81	79	76	73	71	67	63
14300	88	80	76	73	70	65	61	56
14400	88	78	74	71	65	60	54	47
14600	88	74	69	63	56	47	40	33
14800	88	70	62	51	43	34	29	22
15000	88	64	55	42	32	25	17	13



a. SWO(1960-69)

b. SWO(1970-79)

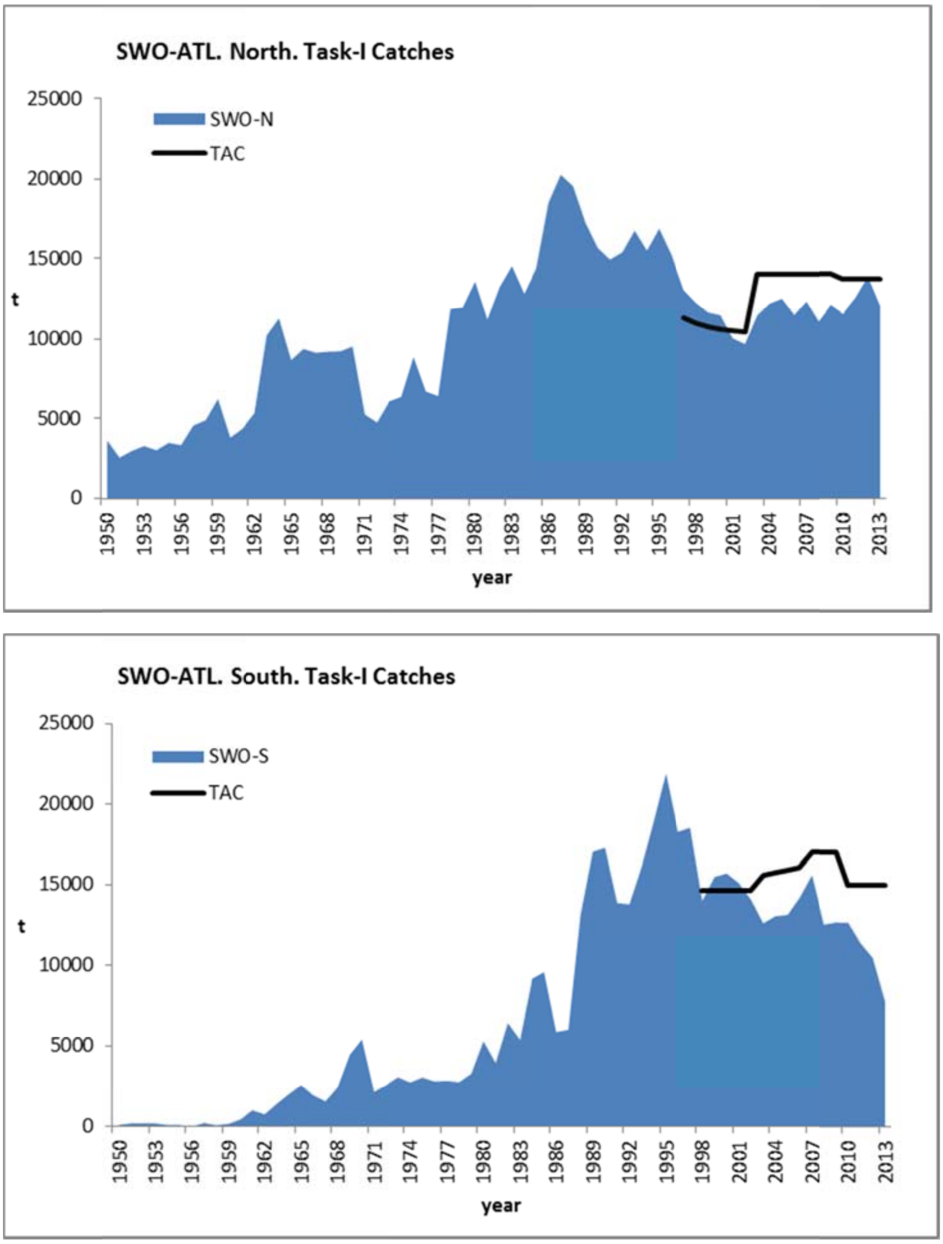
c. SWO(1980-89)

d. SWO(1990-99)

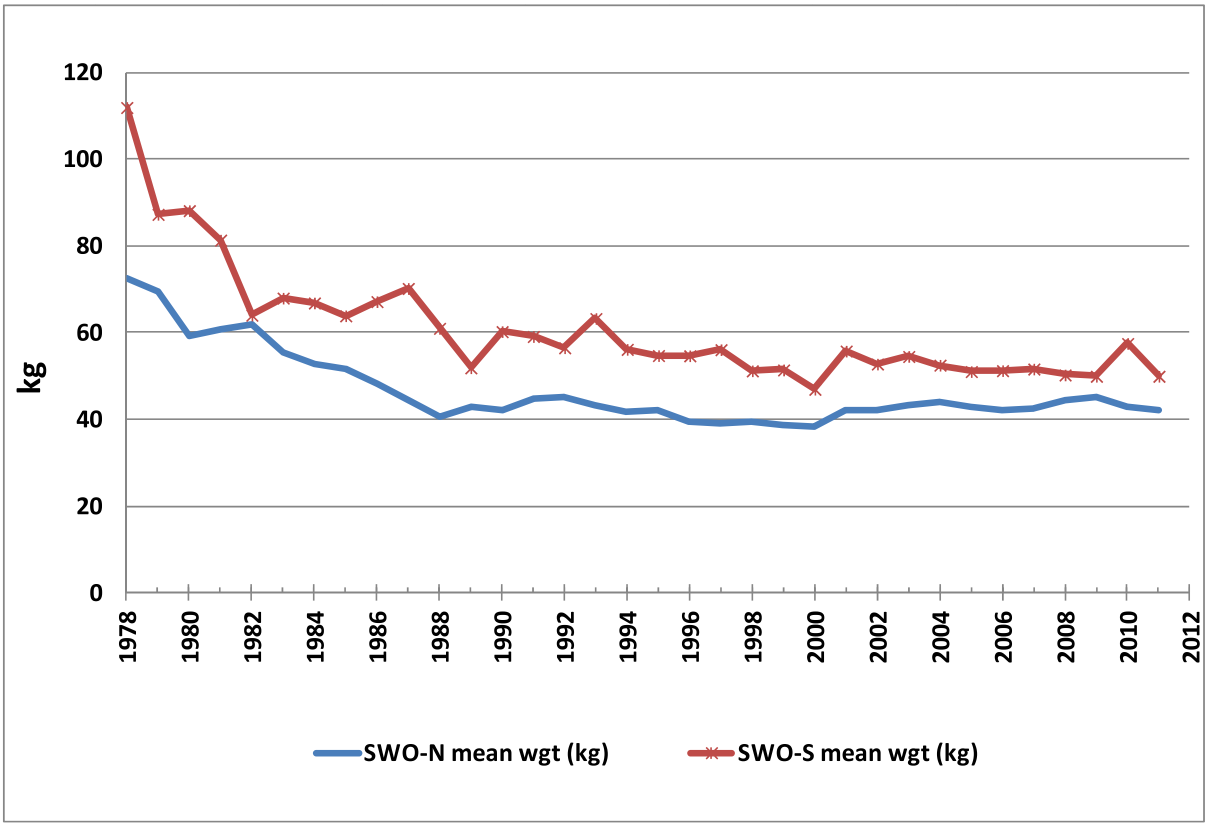
e. SWO (2000-09)

f. SWO(2010-12)

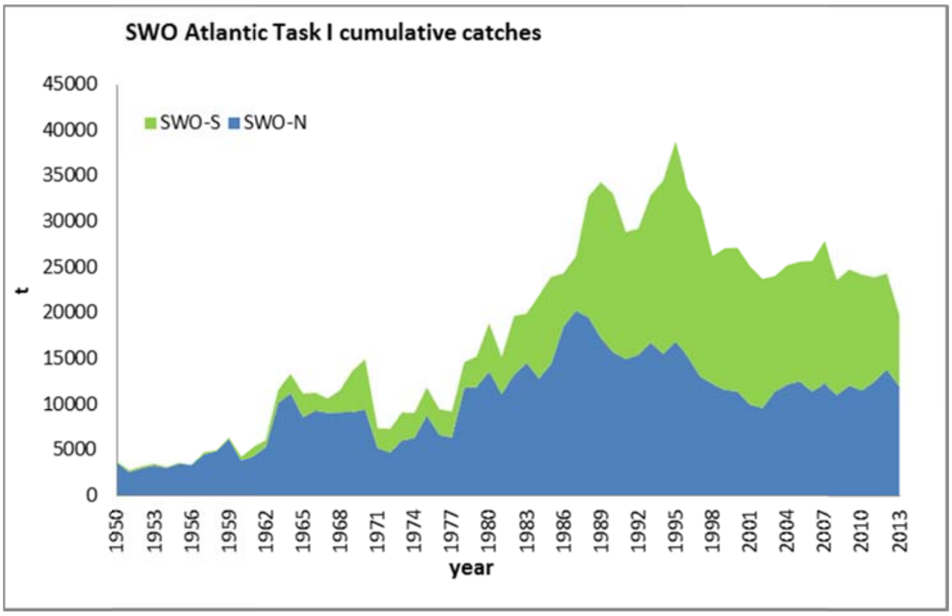
SWO-ATL-Figure 1. Geographic distribution of swordfish cumulative catch (t) by gear, in the Convention area, shown on a decadal scale. The maps (a-e) are scaled to the maximum catch observed during 1960-2009. Map f is scaled to the maximum catch observed from 2010-2012.



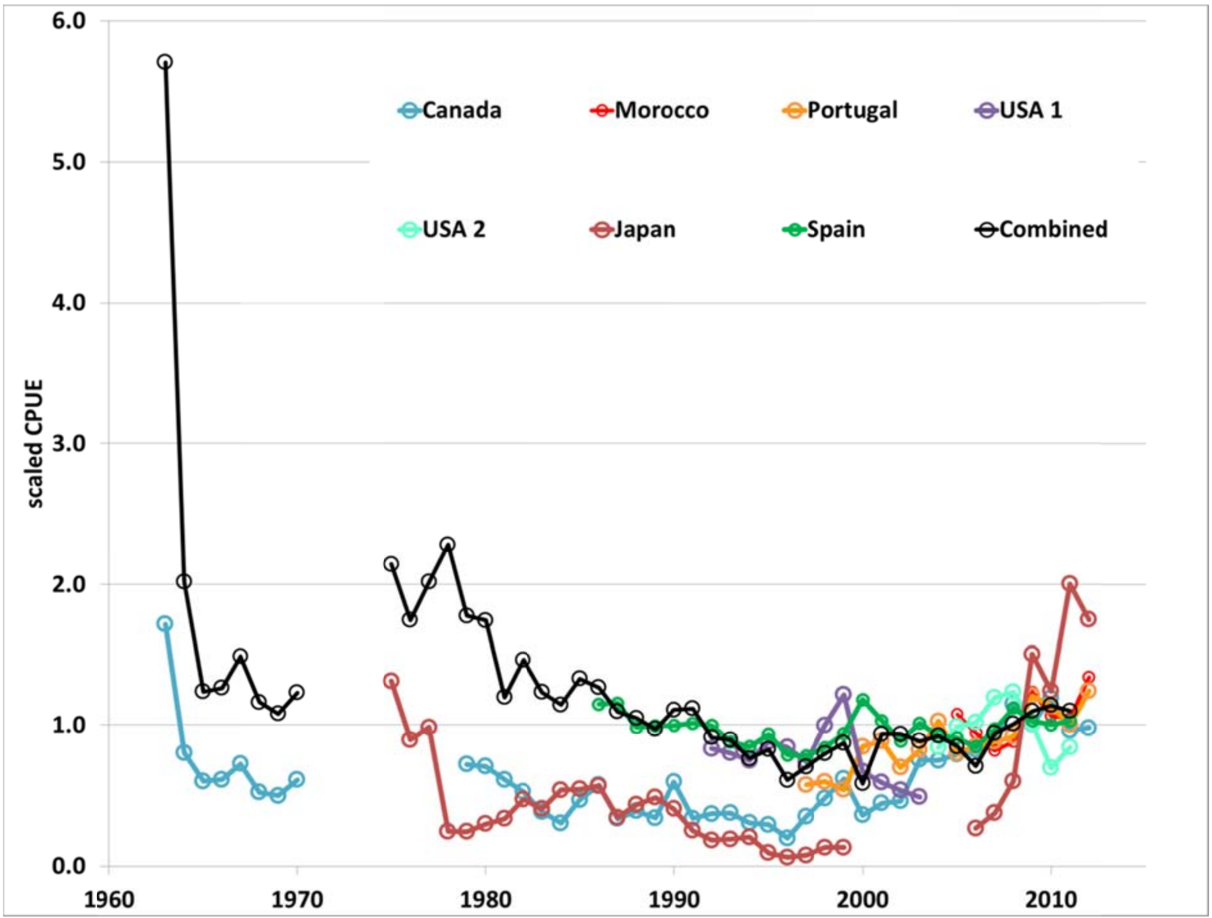
SWO-ATL-Figure 2. North and South Atlantic swordfish catches and TAC (t).



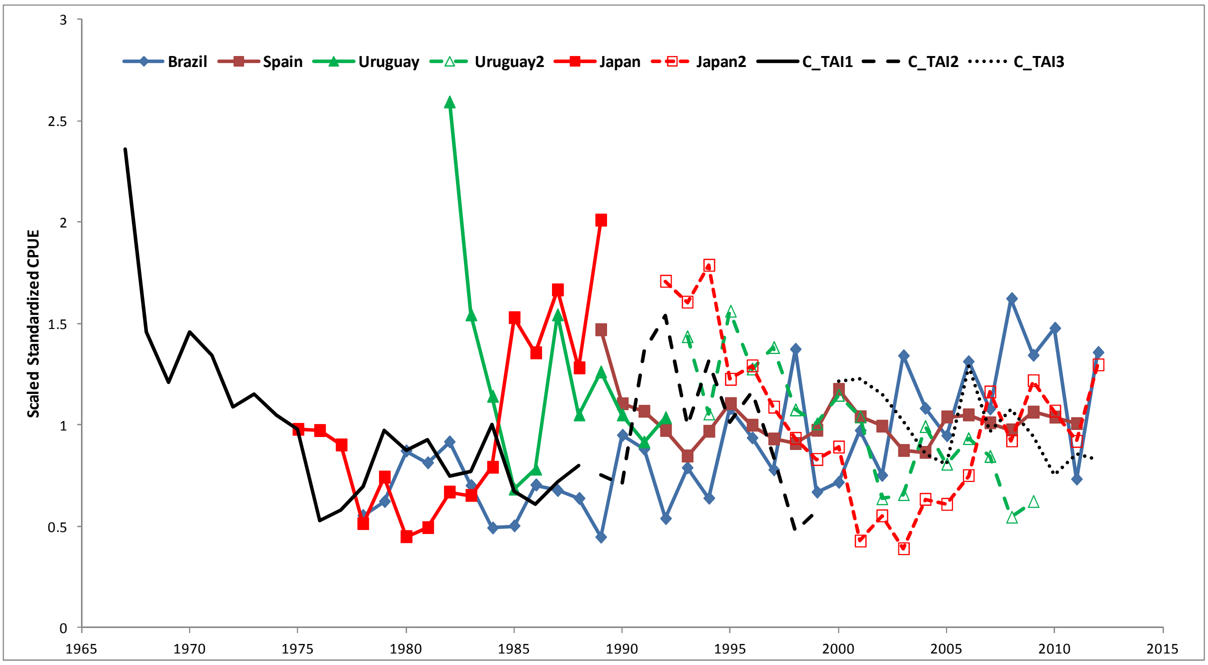
SWO-ATL-Figure 3. Trends in mean weight (kg) for the entire North and South Atlantic swordfish stocks. The information for 2010 is being reviewed and should be considered preliminary.



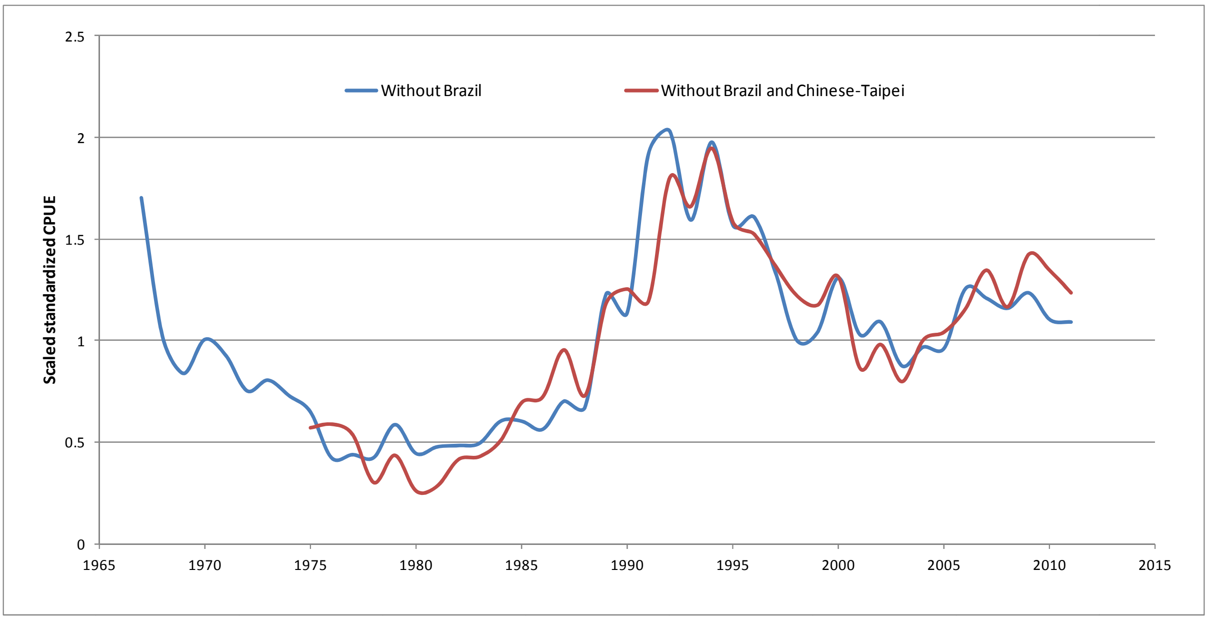
SWO-ATL-Figure 4. Swordfish reported catches (t) for North and South Atlantic, for the period 1950-2013.



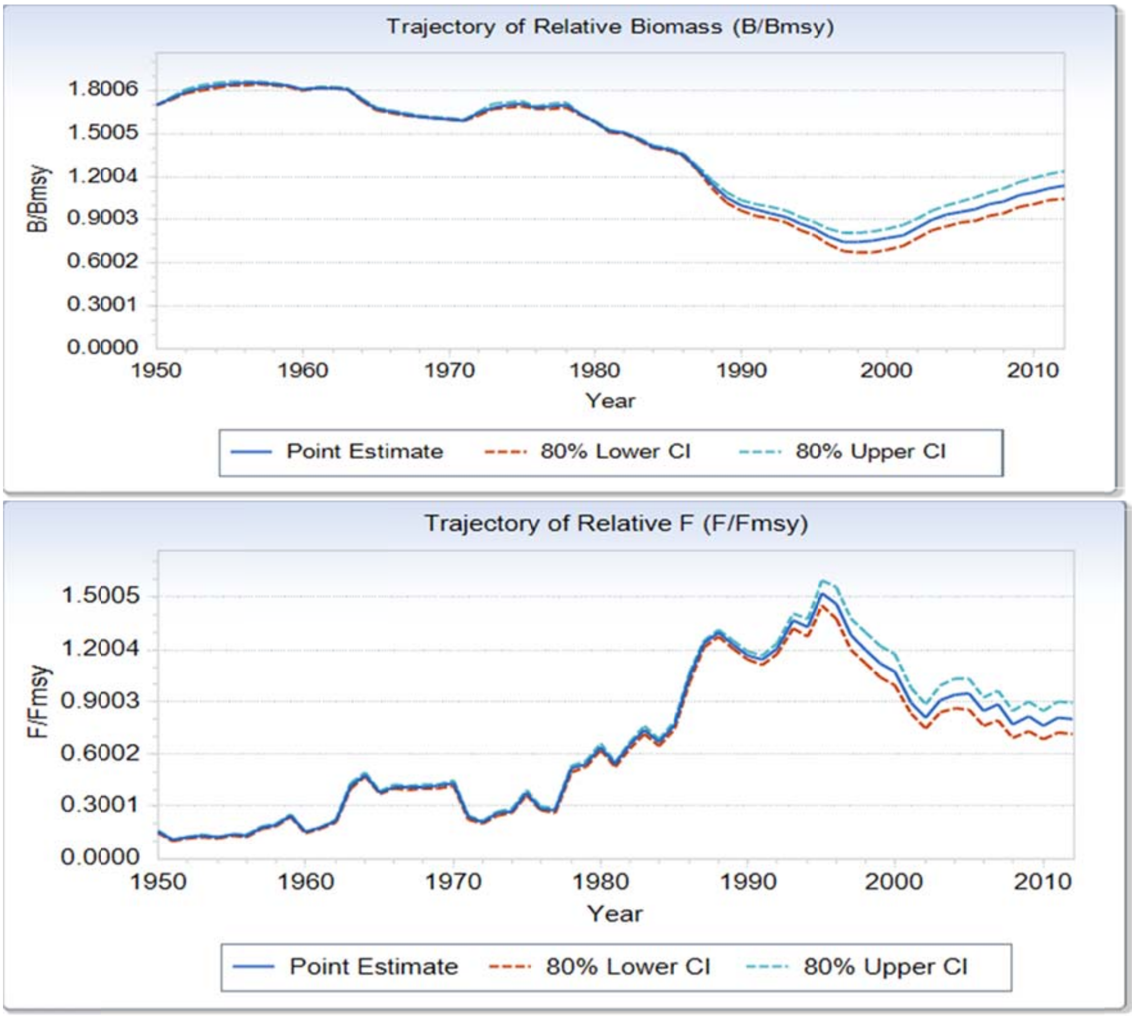
SWO-ATL-Figure 5. Standardized CPUEs series provided by CPCs for the North Atlantic swordfish and the combined index of the base production model. The CPUE series were scaled to their mean for the overlapping years.



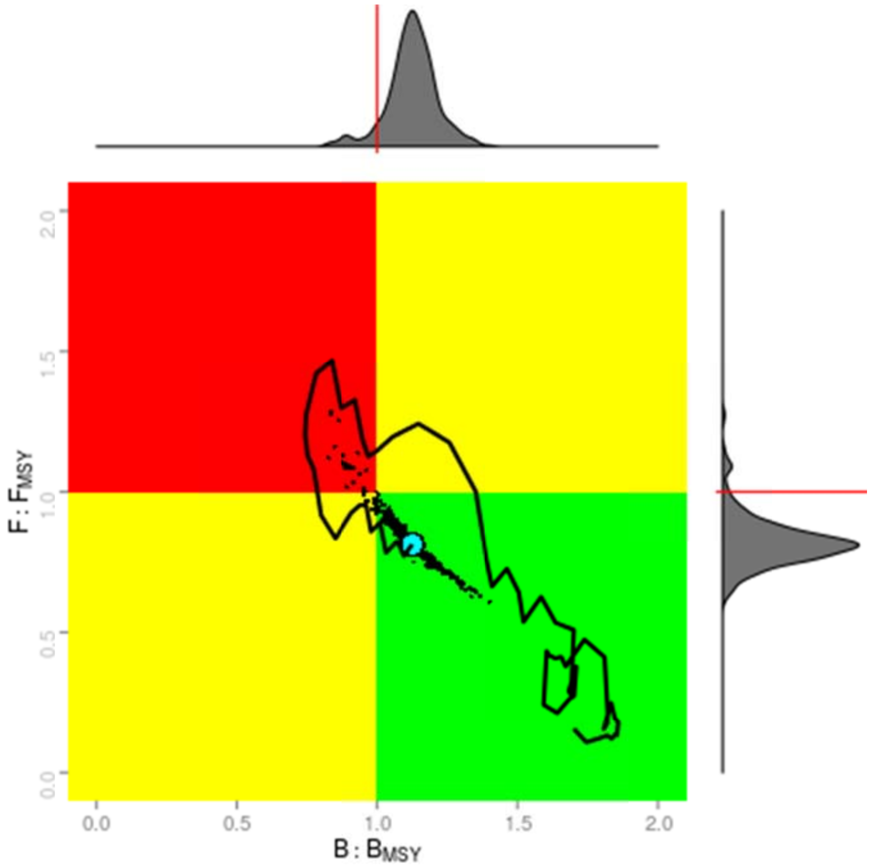
SWO-ATL-Figure 6. Standardized CPUEs series provided by CPCs for the for South Atlantic swordfish, The CPUE series were scaled to their mean for the overlapping years.

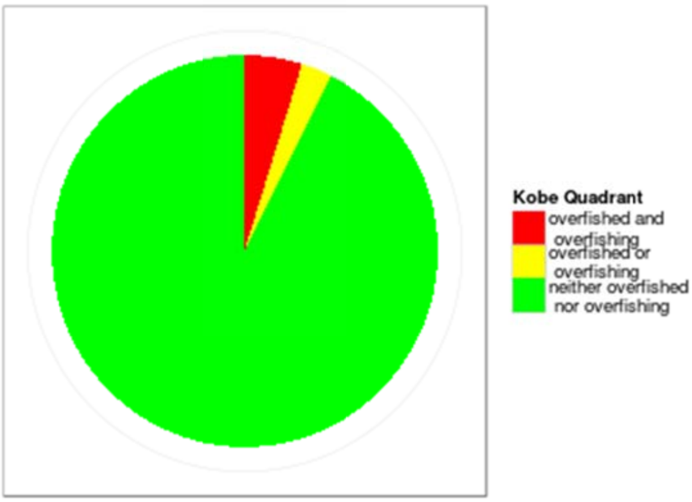


SWO-ATL-Figure 7. South Atlantic swordfish combined standardized CPUE indices.

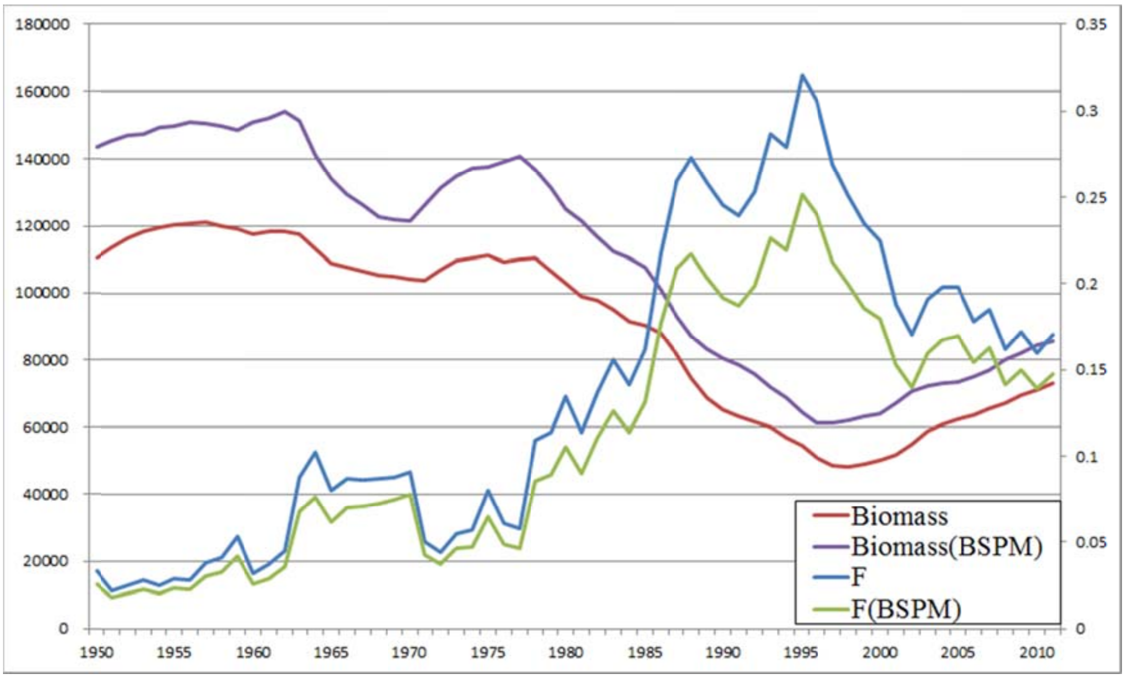


SWO-ATL-Figure 8. Results from the North Atlantic base case ASPIC model: trends in swordfish relative biomass (top) and fishing mortality (bottom) point estimates.

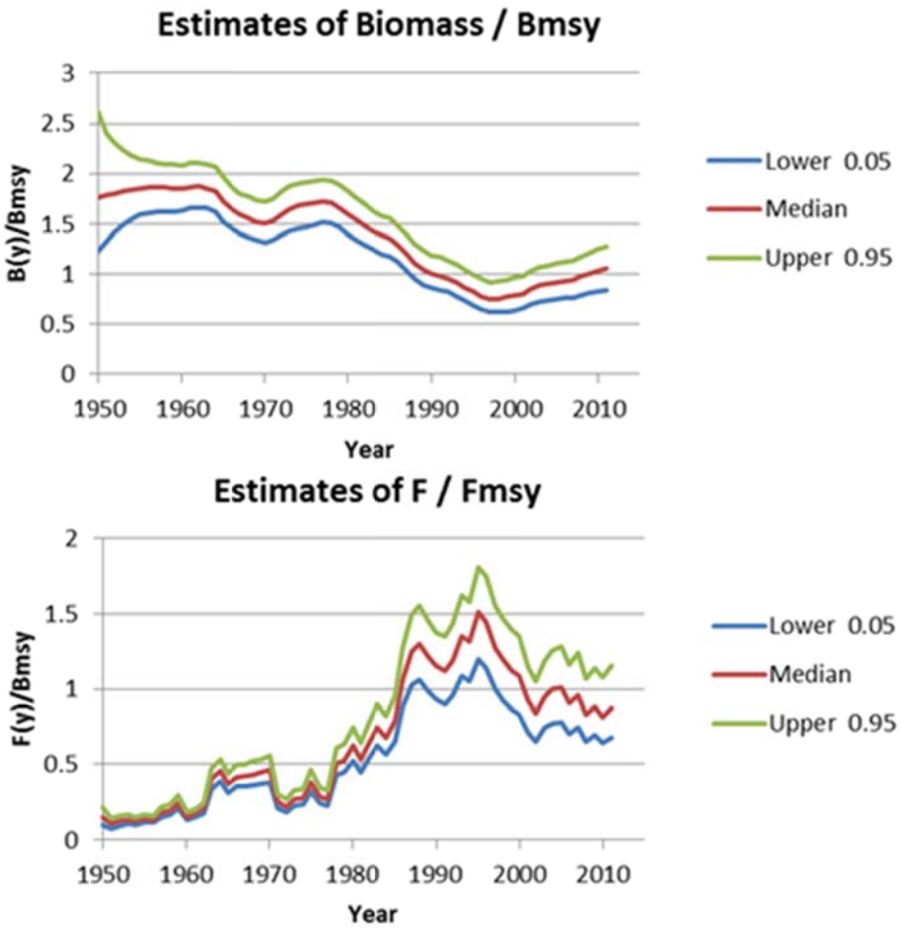




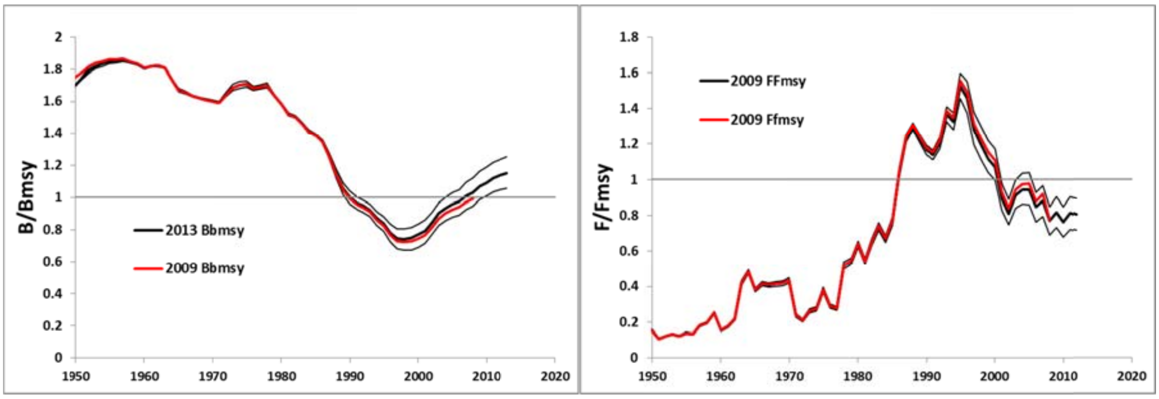
SWO-ATL-Figure 9. North Atlantic swordfish stock status trajectory (solid line) for the period 1950-2011, from the base ASPIC model (solid circle is the estimated median point). The pie chart represents the probabilities of stock being in the different color quadrants.



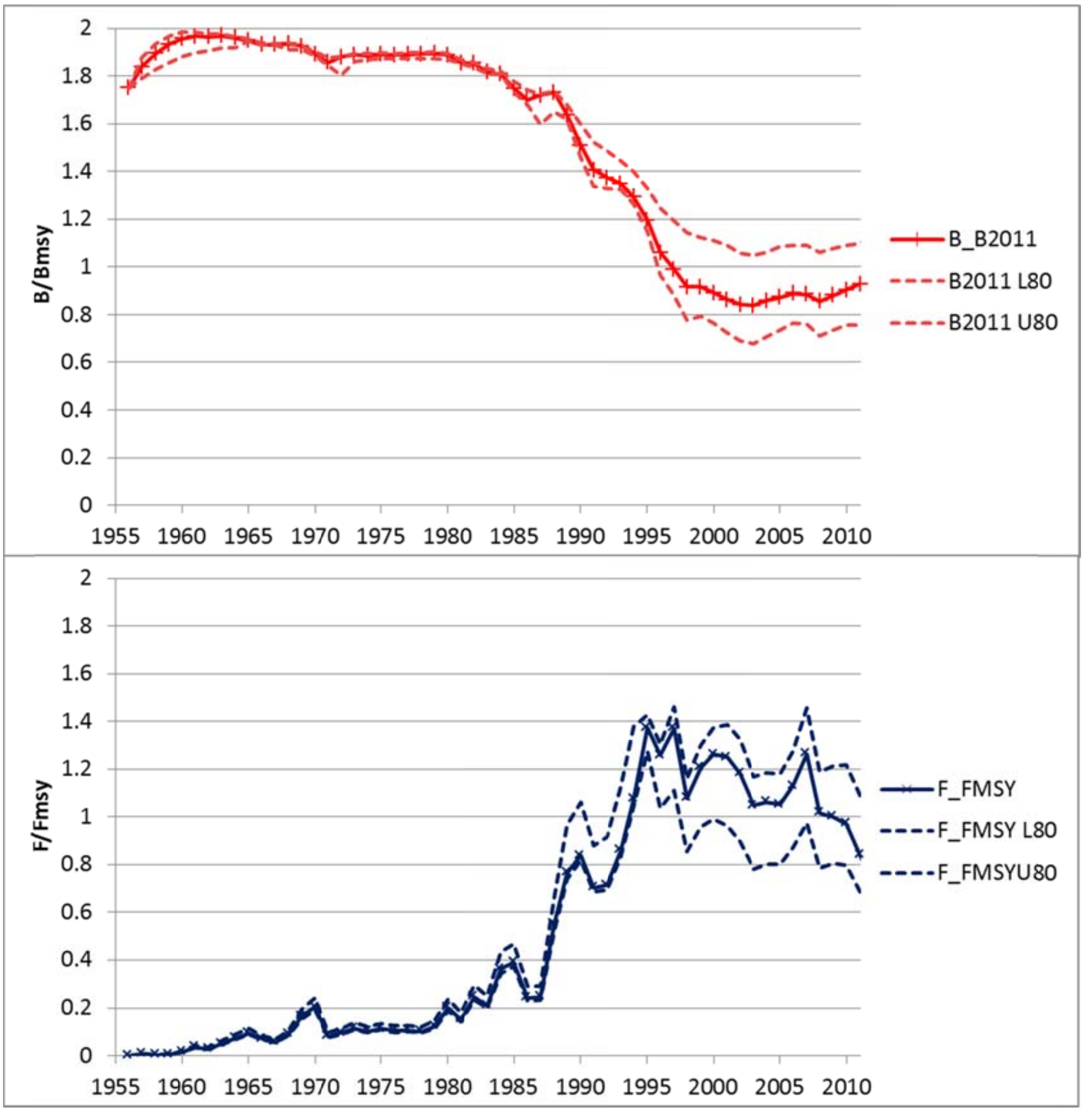
SWO-ATL-Figure 10. Trends in North Atlantic swordfish absolute biomass and fishing mortality estimates from the ASPIC and BSP2 base case models.



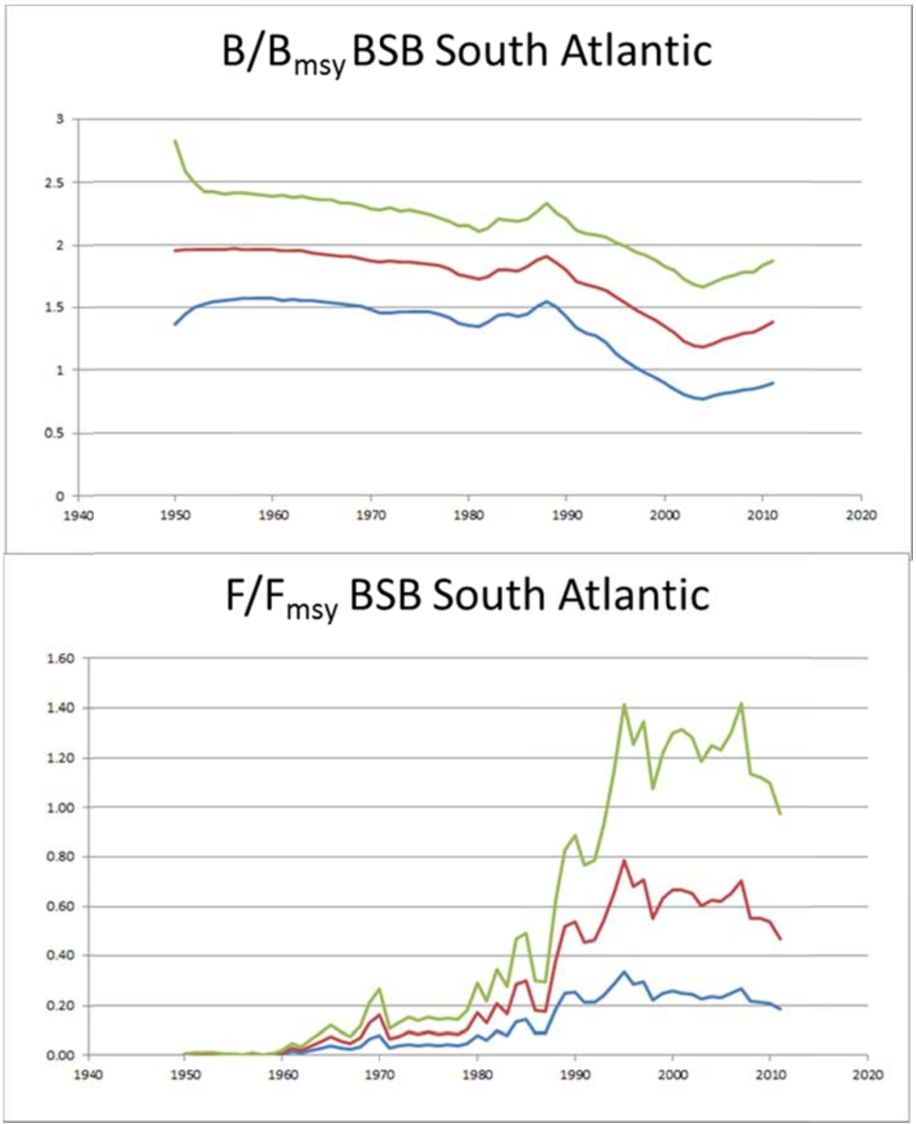
SWO-ATL-Figure 11. Plots of the ratios of i) stock biomass to B_{MSY} and ii) fishing mortality rate to F_{MSY} from the base case BSP for North Atlantic swordfish.



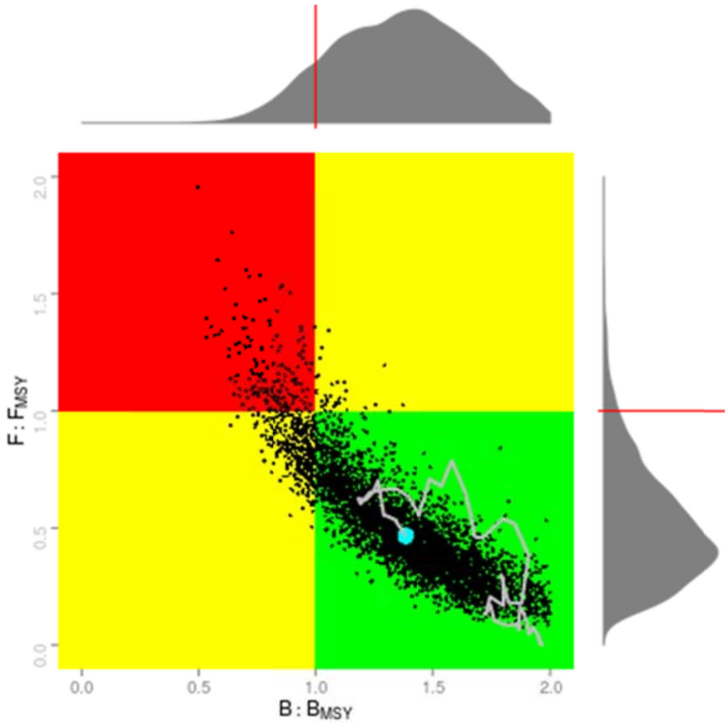
SWO-ATL-Figure 12. Comparison of the relative biomass (left) and fishing mortality (right) estimated by the North Atlantic ASPIC base case models in 2009 and 2013 assessments. Thin lines indicate the 80% confidence bounds for the 2013 estimates.



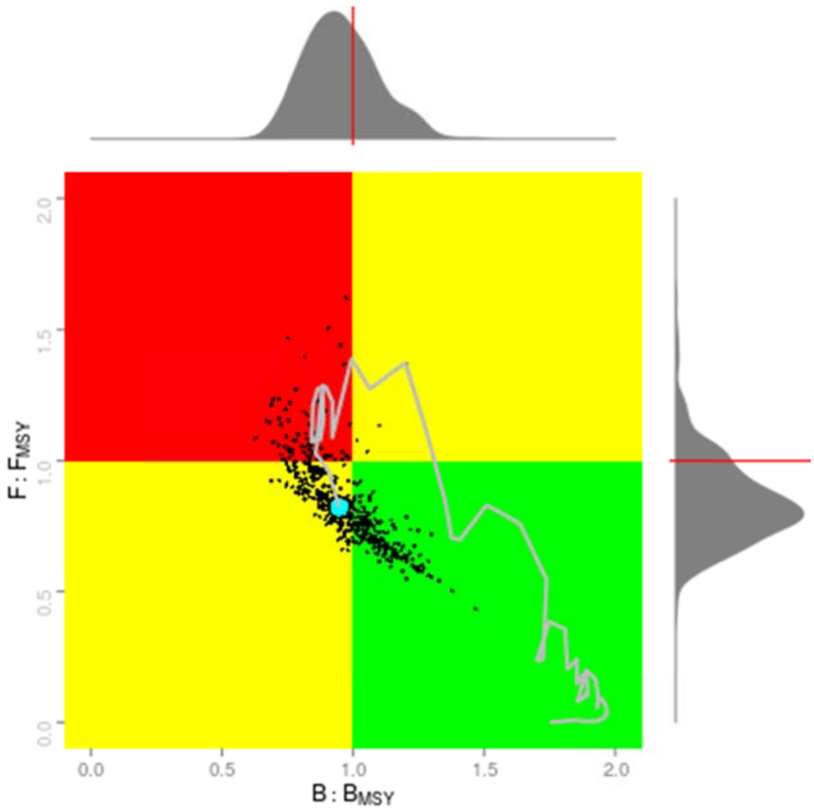
SWO-ATL-Figure 13. South Atlantic swordfish B/B_{MSY} and F/F_{MSY} estimated by ASPIC, dashed lines are the lower and upper 80 percentiles of the bootstrap runs.



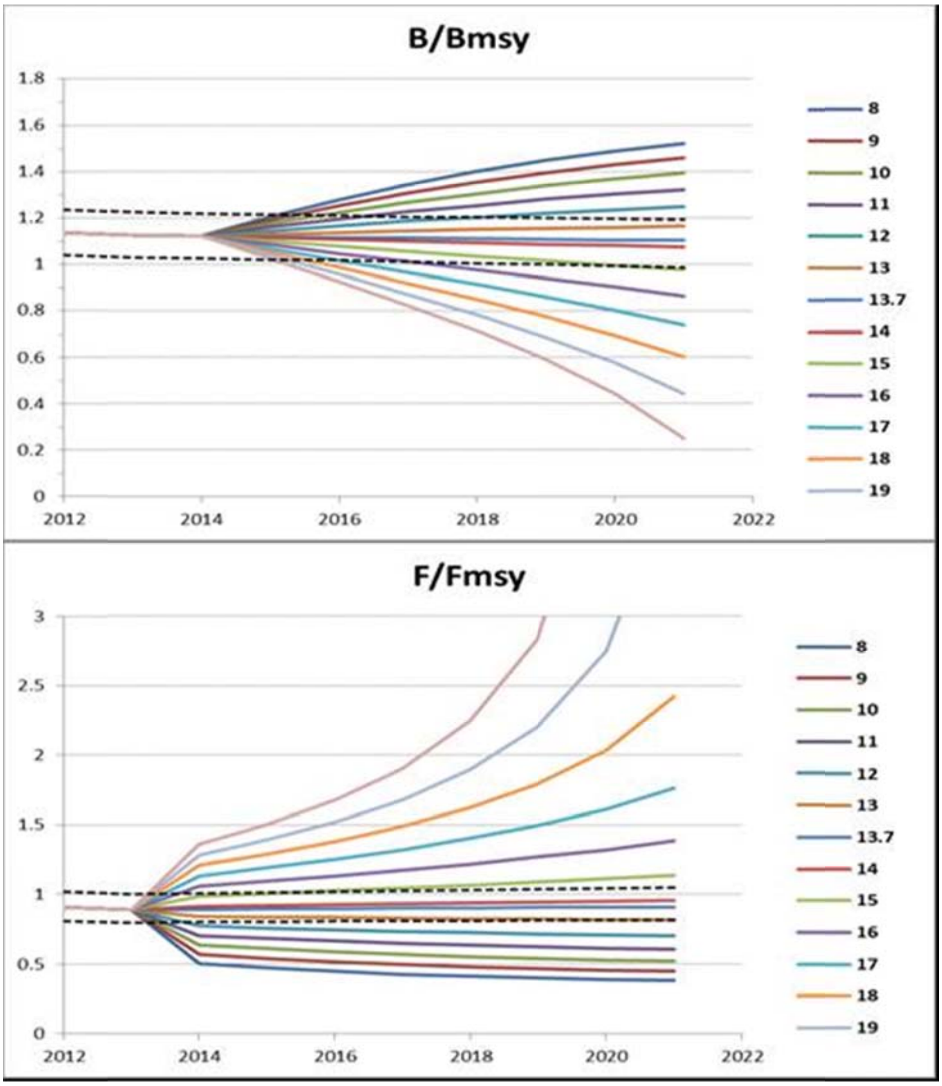
SWO-ATL-Figure 14. South Atlantic swordfish B/B_{MSY} and F/F_{MSY} estimated by BSP2. Posterior median and 90% intervals are plotted.



SWO-ATL-Figure 15. Kobe plots for the BSP reference model for southern Atlantic swordfish. The diamonds show the level of uncertainty and the line represents the trajectories of the status of the stocks of B/B_{MSY} and F/F_{MSY}, 1950-2011.



SWO-ATL-Figure 16. Kobe plots for the ASPIC reference model for southern Atlantic swordfish. The diamonds show the level of uncertainty and the line represents the trajectories of the status of the stocks of B/B_{MSY} and F/F_{MSY}, 1950-2011.



SWO-ATL-Figure 17. Median trends of the relative biomass (B/B_{MSY}) and fishing mortality (F/F_{MSY}) for the projected North Atlantic swordfish stock based on the ASPIC SP model base under different constant catch scenarios (thousand tons). The lines show the median value of bootstrap runs and the dashed lines are 80% confidence intervals around projection at 13,700 t in the projection time period and the observed catch in the historical time period. The TAC in 2012 was 13,700 t.

8.10 SWO-MED-MEDITERRANEAN SWORDFISH

In the last 15 years Mediterranean swordfish production has fluctuated without any specific trend at levels higher than those observed for much larger areas such as the North and South Atlantic. This situation supports the hypothesis that the biological and oceanographic conditions prevailing in the Mediterranean favour the high productivity of large pelagic fish. The most recent assessment was conducted in 2014, making use of catch and effort information through 2013. The present report summarizes assessment results and readers interested in more detailed information on the state of the stock should consult the report of the latest stock assessment session.

SWO-MED-1. Biology

Research results based on genetic studies have demonstrated that Mediterranean swordfish compose a unique stock separated from the Atlantic ones, although there is incomplete information on stock mixing and boundaries. However, mixing between stocks is believed to be low and generally limited to the region around the Strait of Gibraltar.

According to previous knowledge, the Mediterranean swordfish have different biological characteristics compared to the Atlantic stock. The growth parameters are different, and the sexual maturity is reached at younger ages than in the Atlantic. A study that was presented during the latest assessment session suggested that the growth pattern of swordfish in the Strait of Gibraltar was very similar to that obtained from past studies in various Mediterranean areas. Given the existing growth differences among Atlantic and Mediterranean swordfish, this suggests that the majority of fish caught in this area are most likely belonging to the Mediterranean stock. However, further studies are needed to identify the degree of mixing among stocks. Size at age estimates from a recently published growth study performed in the Aegean Sea were in general agreement with those predicted by the model adopted in ICCAT.

In the Mediterranean, mature females as small as 110 cm LJFL have been observed and the estimated size at which 50% of the female population is mature occurs at about 140 cm. According to the growth curves used by SCRS, these two sizes correspond to 2 and 3.5 year-old fish, respectively. Males reach sexual maturity at smaller sizes and mature specimens have been found at about 90 cm LJFL. Based on the fish growth pattern and the assumed natural mortality rate of 0.2, the maximum yield would be obtained through instantaneous fishing at age 6, while current catches are dominated, in terms of number, by fish less than 4 years old.

SWO-MED-2. Fishery indicators

Mediterranean swordfish landings showed an upward trend from 1965-1972, stabilized between 1973-1977, and then resumed an upward trend reaching a peak in 1988 (20,365 t; **SWO-MED-Table 1**, **SWO-MED-Figure 1**). The sharp increase between 1983 and 1988 may be partially attributed to improvement in the national systems for collecting catch statistics; thus earlier catches may be higher than those appearing in Task I tables. Since 1988, the reported landings of swordfish in the Mediterranean Sea have declined fluctuating mostly between 12,000 to 16,000 t. Those levels are relatively high and similar to those of bigger areas such as the North Atlantic. This could be related to higher recruitment levels in the Mediterranean than in the North Atlantic, different reproduction strategies (larger spawning areas in relation to the area of distribution of the stock) and the lower abundance of large pelagic predators (e.g. sharks) in the Mediterranean. Updated information on Mediterranean swordfish catch by gear type is provided in **SWO-MED-Table 1** and **SWO-MED-Figure 1**.

The currently reported Task-I catch for 2013 was 9155 t, which is the lowest annual catch since 1983. It should be noted that the total 2013 catch estimate that was used during the assessment was considerably higher (12,164 t) due to the unavailability of Italian catch data at that time and the assumptions made (average of the 2010-2012 period) regarding the missing Italian production in 2013. The biggest producers of swordfish in the Mediterranean Sea in recent years (2003-2013) are EU-Italy (41%), Morocco (14%), EU-Greece (9%), Tunisia (8%) and EU-Spain (10%). Also, Algeria, EU-Cyprus, EU-Malta and Turkey have fisheries targeting swordfish in the Mediterranean. Minor catches of swordfish have also been reported by Albania, Croatia, EU-France, Japan, and Libya. The Committee recognized that there may be additional fleets taking swordfish in the Mediterranean, for example, Egypt, Israel, Lebanon, Monaco and Syria, but the data are not reported to ICCAT or the FAO.

In recent years (2003-2013), the main fishing gears used are surface longlines (on average, representing 84% of the annual catch) and gillnets. Since 2012, gillnets have been eliminated following ICCAT recommendations for a general ban of driftnets in the Mediterranean. Minor catches are also reported from harpoon, trap and fisheries targeting other large pelagic species (e.g. albacore) from 2009-2010 a mesopelagic longline gear has been gradually introduced and nowadays has replaced the surface longline gear in almost all Italian swordfish fleets. This is particularly noteworthy, as these fisheries are among the largest within the stock area, and the changes have implications for the use of catch rates as indices of abundance in the stock assessments.

A study presented during the latest assessment session examined the effects of the introduction of this new mesopelagic longline in the Ligurian Sea fishery. The results showed a significant increase of swordfish mean size and nominal CPUE, with a decrease of the by-catch for the first two years (2010 and 2011). A substantial decline, both of mean size and CPUE values, was recorded in the 2012, and followed by a small recovery in 2013. The introduction of this new gear revealed that a fraction of the swordfish population, made up of large spawners, may be not fully available to the traditional surface longlines. This fishery, however, is confined to a rather small area and its catches represent a small part (<10%) of the total Italian catch. Therefore, it is unknown if the above findings are representative of the fleets using mesopelagic longlines.

Standardised CPUE series from various longline and gillnet fisheries targeting swordfish, which were presented during the 2014 stock assessment session, did not reveal any trend over time (**SWO-MED-Figure 2**). CPUE series, however, did not cover the earlier years of the reported landings. Similarly to CPUE, no trend over the past 25 years was identified regarding the mean fish weight in the catches (**SWO-MED-Figure 3**).

SWO-MED-3. State of the stocks

Two forms of assessment (production modelling – ASPIC, BSP and age-structured analysis - XSA) indicated that current SSB levels are much lower than those in the 80s, although no trend appears since then. However, the XSA, ASPIC and BSP models gave different estimates of the absolute abundance, which caused them to produce very different estimates of stock status. Given the lack of trend in the relative abundance indices that introduces uncertainty in production modeling estimates and the limitations of the examined approaches, it was considered that the XSA provides a more reliable assessment of stock status than the production models. This is also in line with the previous assessments that provided advice based on XSA results.

XSA results indicate that recruitment shows a slightly declining trend in the last decade, while stock biomass remains stable at levels that are about 1/3 of that in the mid 1980s (**SWO-MED-Figure 4**). Trends in F-at-age are shown in **SWO-MED-Figure 5**; there appears to have been a recent decline in F, particularly for ages 1 and 2.

Results of equilibrium yield analyses based on the XSA assessment in which we have more confidence indicated that the stock is overfished and subject to overfishing. Current (2013) SSB is less than 30% of B_{MSY} and F is almost twice the estimated F_{MSY} (**SWO-MED-Figure 6**). Results indicate that the stock is overfished throughout the whole period considered in the XSA assessment (1985-2013). Note, however, that there is considerable uncertainty about the stock status relative to the Convention objectives, mainly due to the lack of clear signal in the data, the lack of abundance indices before 1987 and the discrepancy between the assumed 2013 catch and the official Task-I data.

The Committee again noted the large catches of small size swordfish, i.e. less than 3 years old (many of which have probably never spawned) and the relatively low number of large individuals in the catches. Fish less than three years old usually represent 50-70% of the total yearly catches in terms of numbers and 20-35% in terms of weight (**SWO-MED-Figure 7**). A reduction of the volume of juvenile catches would improve yield per recruit and spawning biomass per recruit levels.

SWO-MED-4. Outlook

The assessment of Mediterranean swordfish indicates that biomass levels appear to be rather stable over the past 20 years. However, the stock is below the level which can support MSY and current fishing mortality exceeds $F_{MSY.}$ Overall results suggest that fishing mortality (and near-term catches) needs to be reduced to move the stock toward the Convention objective of biomass levels which could support MSY and away from levels which could allow a rapid stock decline. Based on the stock status estimates, a reduction of current F to the $F_{0.1}$ level would result in a substantial (about four times) long-term increase in SSB as the estimated equilibrium curves are very sensitive to F changes (**SWO-MED-Figure 8**). It should be noted, however, that current F (2013) may be overestimated as the official 2013 catch is considerably lower (~25%) than that assumed during the stock assessment. Given the uncertainties on optimum SSB level estimates and the rapid fishery expansion in the 1980s, which resulted in severe stock biomass declines, the SSB levels before the expansion of the fisheries may be also considered as a B_{MSY} proxy for the stock. These levels are around 30,000 t, about 30% lower than the currently estimated B_{MSY} value (~47,000 t).

Projections of 20% fishing mortality reductions based on highly-aggregated data derived from the age-structured assessment assuming either the current exploitation pattern or partial movement towards to that of the mesopelagic longline (i.e. shift towards bigger individuals) are forecast to be beneficial in moving the stock condition closer to the Convention objective, resulting in substantial SSB increases in the medium term. However, SSB will still not reach the highest level in the time series, i.e. the late 80s' levels. Slight SSB increases under either exploitation pattern are expected even under the current F. It should be noted that due to the earlier mentioned discrepancy (section 2) between the 2013 estimated catch used in the assessment and the officially reported catch, SSB projections may be biased. Therefore, future SSB levels are expected to be higher than those estimated. Further projections including various combinations of F reductions and gear selection changes can be accomplished online by means of a tool developed by the ICCAT Secretariat. Results of the projections are summarized in **SWO-MED-Figures 9** and **10**.

SWO-MED-5. Effect of current regulations

ICCAT imposed a Mediterranean-wide one month fishery closure for all gears targeting swordfish in 2008, followed by a two-month closure since 2009. Through Recommendations 11-03 and 13-04 the Commission has adopted additional management measures intended to bring the stock back to levels that are consistent with the ICCAT Convention objective. Those measures include an additional one month closure accompanied by minimum landing size regulations, a fishing license control system, and specifications on the technical characteristics of the longline gear. Several countries have also adopted additional fishery restrictions at the national level. The EU introduced a driftnet ban in 2002 and in 2003 ICCAT adopted a recommendation for a general ban of this gear in the Mediterranean [Rec. 03-04]. Rec. 04-12 forbids the use of various types of nets and longlines for sport and recreational fishing for tuna and tuna-like species in the Mediterranean.

After the adoption of the aforementioned Recommendations, reported catches have decreased significantly from the 2000s´ level, being the catches in 2012 and 2013 the minimum values of the last three decades. In addition, reported catches of juvenile swordfish of less than 90 cm has also decreased on average 54% in the last two years compared with the levels of the decade of 2000s. Apart from the seasonal closures, the introduction of the mesopelagic LL by some fleets in place of surface longline effort, may have contributed to the observed decrease of catches of juveniles.

SWO-MED-6. Management recommendations

Assessment provided signals of decreasing fishing mortality trends since 2010 and it is likely that this is mainly due to the management measures adopted by the Commission. Given that there is considerable uncertainty about the stock status and the shortness of the time series with which to fully evaluate the effectiveness of the most recent management measures, the Committee recommends to maintain the current management measures of Mediterranean swordfish as adopted in [Rec. 13-04] until additional data permits a conclusion as to whether or not they are sufficient to allow the stock to rebuild to a level in line with the Convention objectives.

However, it has been noted that the recently adopted management measures may have increased discard levels of undersized swordfish; therefore it is recommended to closely monitor the fishery and that every component of the Mediterranean swordfish mortality be adequately reported to ICCAT by the CPCs. Moreover, as it has been noted that the number of vessels in the ICCAT records of vessels authorized to catch Mediterranean swordfish is generally higher than the vessels that are active in each CPC, the Committee recommends that the implications of this potential excess capacity should be considered by the Commission.

MEDITERRANEAN SWORDFISH SUMMARY

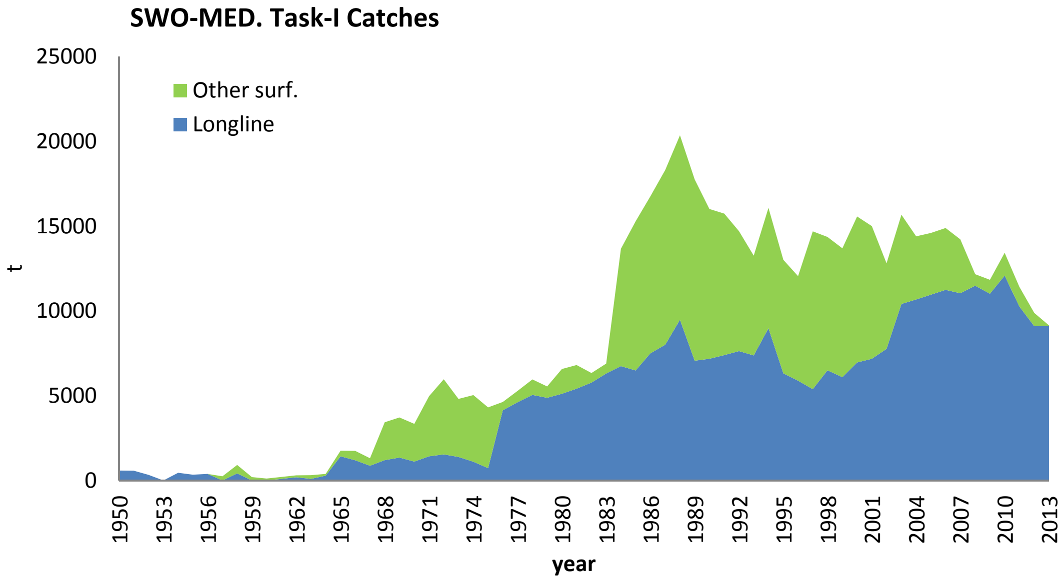
Maximum Sustainable Yield	~15,000 [1]
Current (2013) Yield	9,155 t [2]
Current (2013) Replacement Yield	9,540 t[1]
Relative Biomass (B_{2013}/B_{MSY})	0.27 [1]
Relative Fishing Mortality	
F_{2013}/F_{MSY}	1.82 [1]
$F_{2013}/F_{0.1}$	2.97 [1]
Management Measures in Effect:	Driftnet ban [Rec. 03-04] Three month fishery closure, gear specifications (number and size of hooks and length of gear), MLS regulations, and a license registry [Rec. 13-04]. [3]

[1] Highly uncertain estimates based on the XSA and equilibrium analyses.
[2] As of September 2014.
[3] Certain additional fishery restrictions are implemented at the national level.

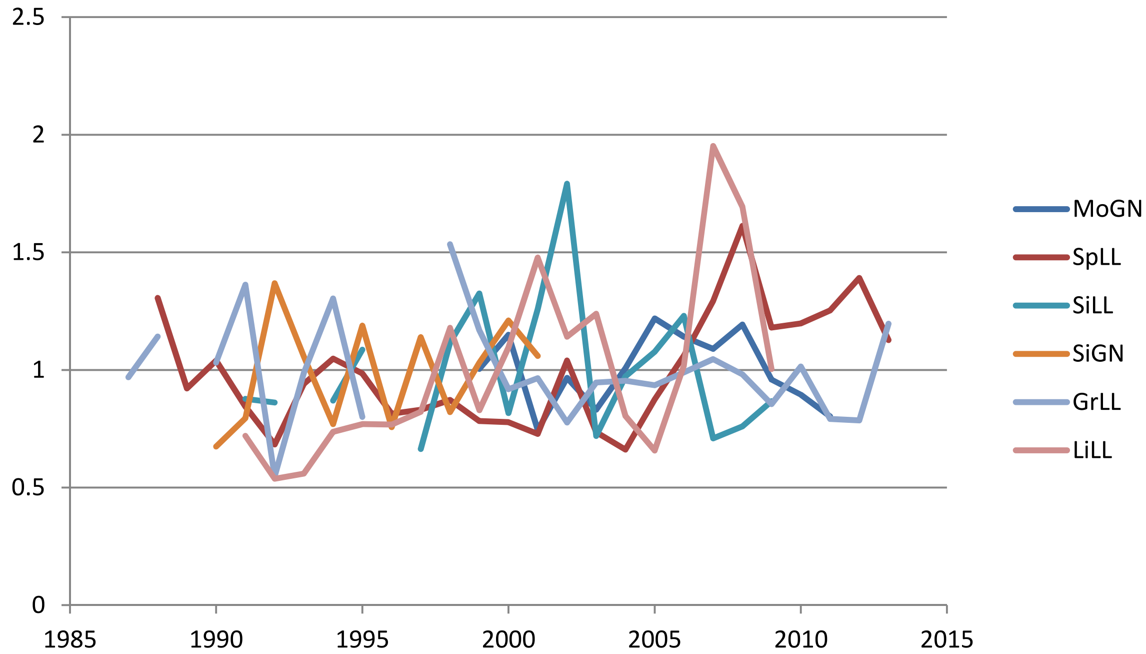
SWO-MED-Table 1. Estimated catches (t) of swordfish (*Xiphias gladius*) in the Mediterranean by gear and flag.

		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL	MED	17762	16018	15746	14709	13265	16082	13015	12053	14693	14369	13699	15569	15006	12814	15674	14405	14600	14893	14227	12164	11840	13430	11423	9888	9155
Landings	Longline	7065	7184	7393	7631	7377	8985	6319	5884	5389	6496	6097	6963	7180	7767	10415	10667	10848	11228	11028	11465	11020	12083	10261	9107	9106
	Other surf.	10697	8834	8353	7078	5888	7097	6696	6169	9304	7873	7602	8606	7826	5047	5259	3729	3639	3649	3179	672	819	1347	1162	782	49
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	113	16	19	27	0	0	0	0	
Landings	Albania	0	0	0	0	0	0	0	13	13	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Algerie	590	712	562	395	562	600	807	807	807	825	709	816	1081	814	665	564	635	702	601	802	468	624	216	387	403
	Chinese Taipei	0	0	0	0	1	1	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	EU.Croatia	0	0	0	0	0	0	0	0	0	10	20	0	0	0	0	0	0	0	0	4	3	6	6	4	10
	EU.Cyprus	139	173	162	56	116	159	89	40	51	61	92	82	135	104	47	49	53	43	67	67	38	31	35	35	51
	EU.España	1337	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498	1226	951	910	1462	1697	2095	2000	1792	1744	1591	1692
	EU.France	0	0	0	0	0	0	0	0	0	0	0	0	12	27	0	19	0	0	14	14	16	78	81	12	61
	EU.Greece	1120	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1230	1120	1311	1358	1887	962	1132	1494	1306	877	1731
	EU.Italy	13009	9101	8538	7595	6330	7765	7310	5286	6104	6104	6312	7515	6388	3539	8395	6942	7460	7626	6518	4549	5016	6022	5274	4574	2862
	EU.Malta	122	135	129	85	91	47	72	72	100	153	187	175	102	257	163	195	362	239	213	260	266	423	532	503	460
	EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	13	115	8	1	120	14	16	0	0	0	0	0	0	
	Japan	1	2	1	2	4	2	4	5	5	7	4	2	1	1	0	2	4	0	3	1	1	0	0	0	
	Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
	Libya	0	0	0	0	0	0	0	0	0	11	0	8	6	0	10	2	0	14	0	0	0	0	0	0	
	Maroc	97	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379	3300	3253	2523	2058	1722	1957	1587	1610	1027	802	770
	NEI (MED)	979	1360	1292	1292	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Syria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	28	0	0	0	9	4
	Tunisie	159	176	181	178	354	298	378	352	346	414	468	483	567	1138	288	791	791	949	1024	1011	1012	1016	1013	1014	1014
	Turkey	209	243	100	136	292	533	306	320	350	450	230	370	360	370	350	386	425	410	423	386	301	334	190	80	97
Discards	EU.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	113	16	19	27	0	0	0	0	

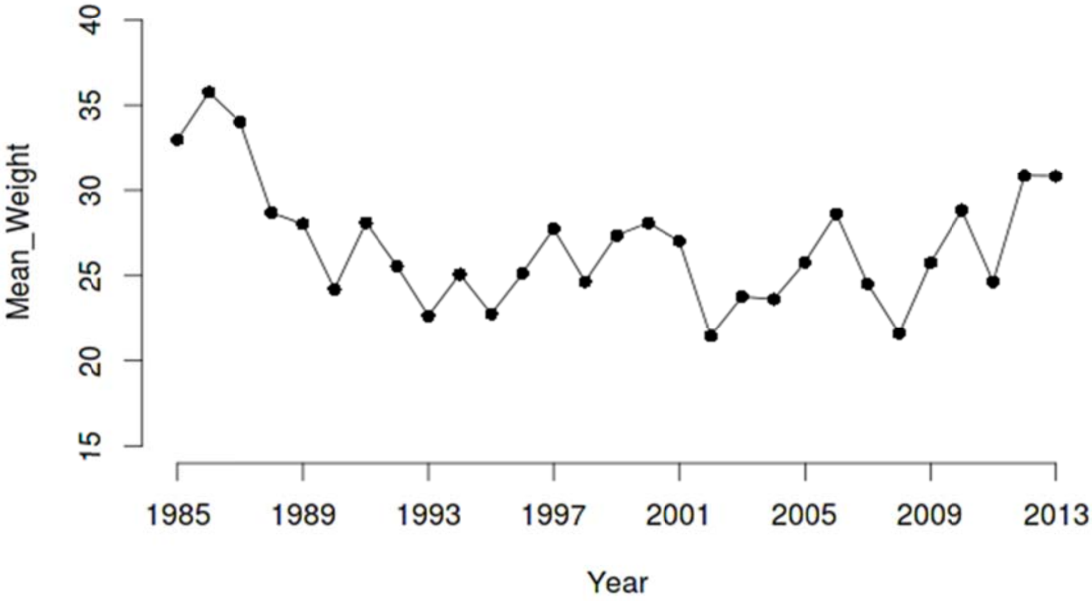
Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.



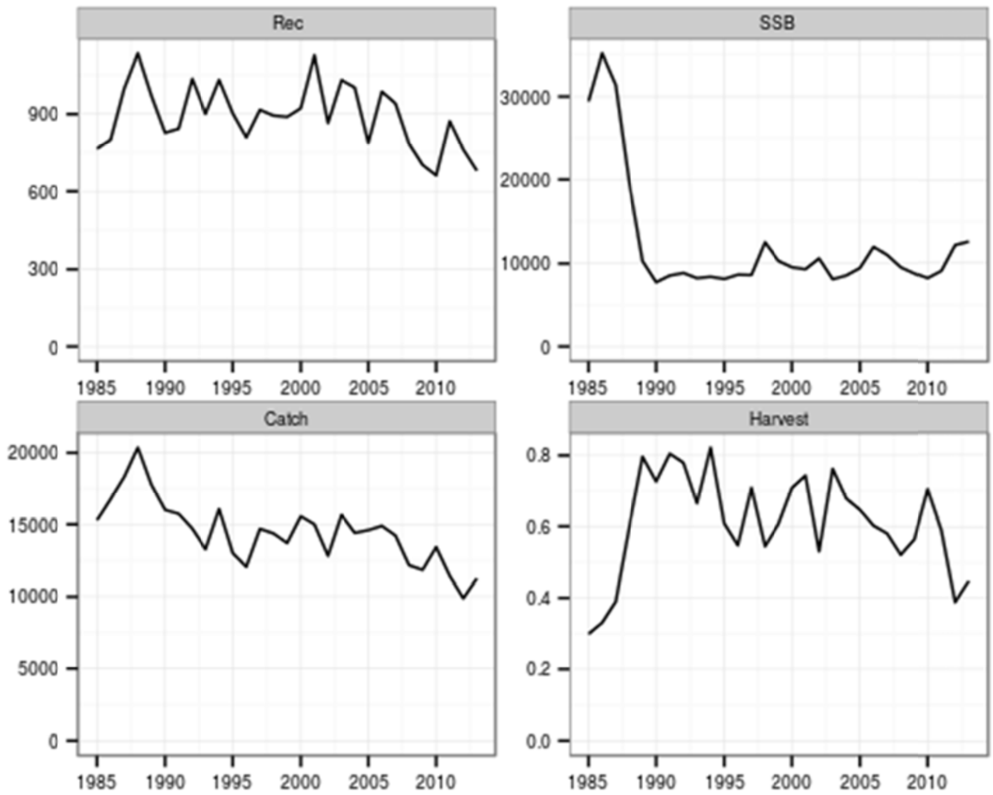
SWO-MED-Figure 1. Cumulative estimates of Task-I swordfish catches (t) in the Mediterranean by major gear types, for the period 1950-2013.



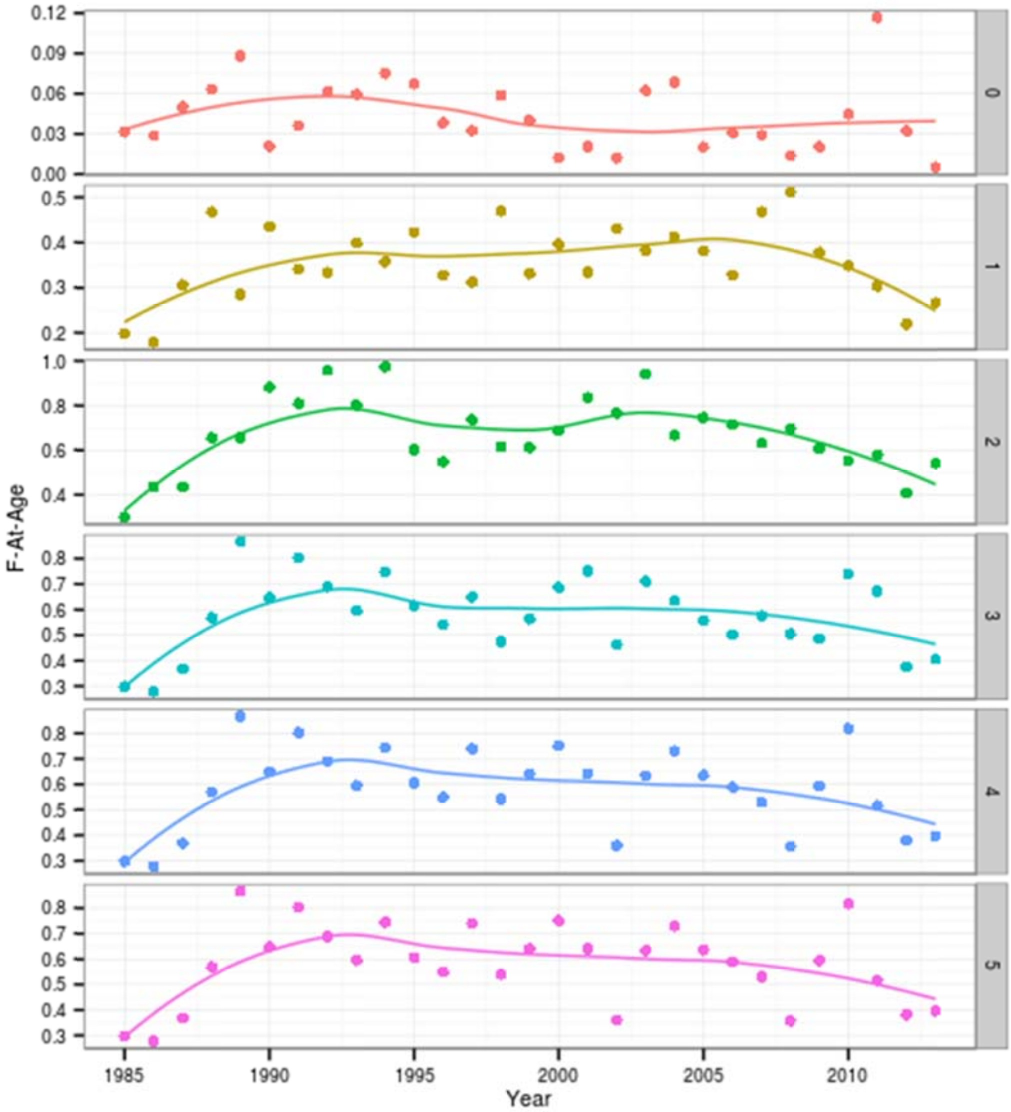
SWO-MED-Figure 2. Time series of standardized CPUE rates scaled to the corresponding mean value for the Spanish longliners (SpLL), Sicilian longliners (SiLL), Greek longliners (GrLL), Moroccan gillnetters (MoGN), Sicilian gillnetters (SiGN) and Ligurian longliners (LiLL).



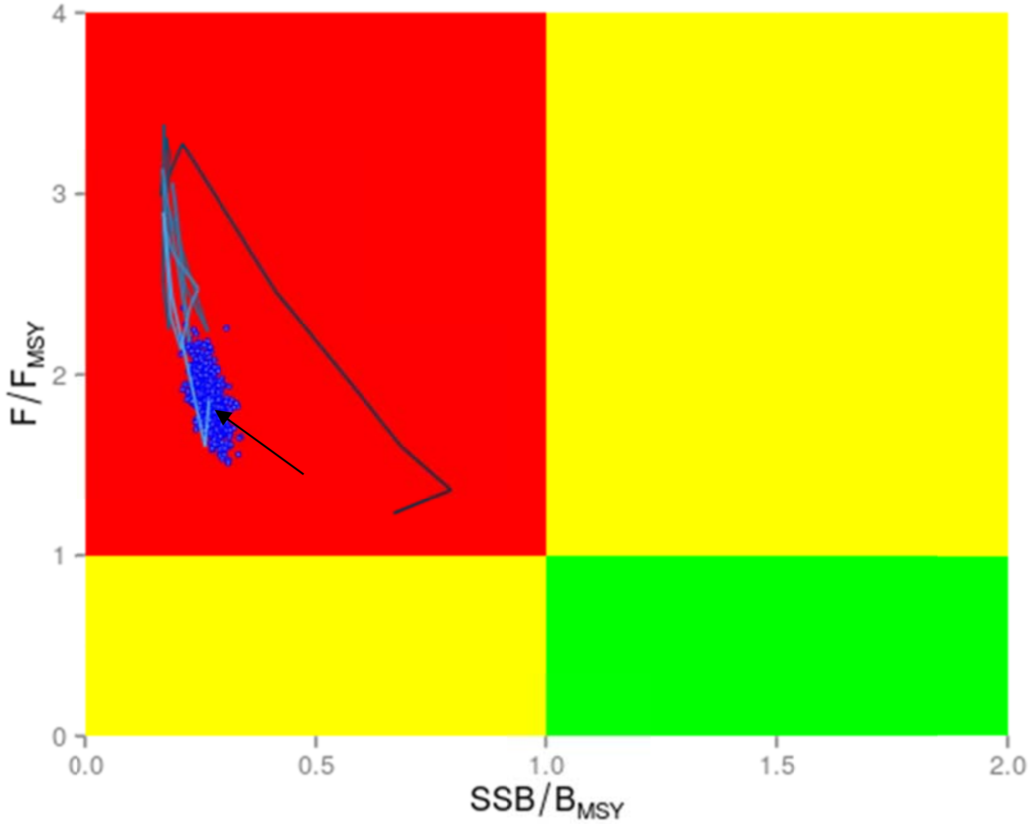
SWO-MED-Figure 3. Time series of mean fish weight (kg) in the catches.



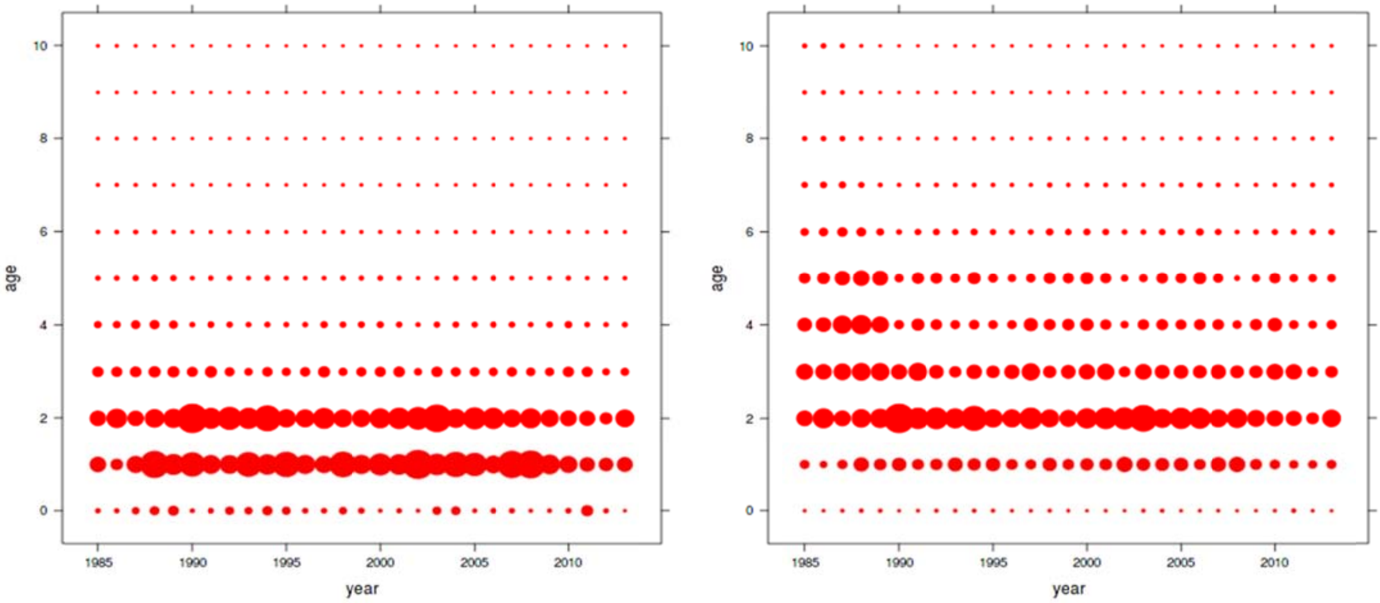
SWO-MED-Figure 4. XSA estimates of historic time series of recruitment (thousands of fish), SSB (t), catch (t) and average fishing mortality (harvest) of ages 2-4.



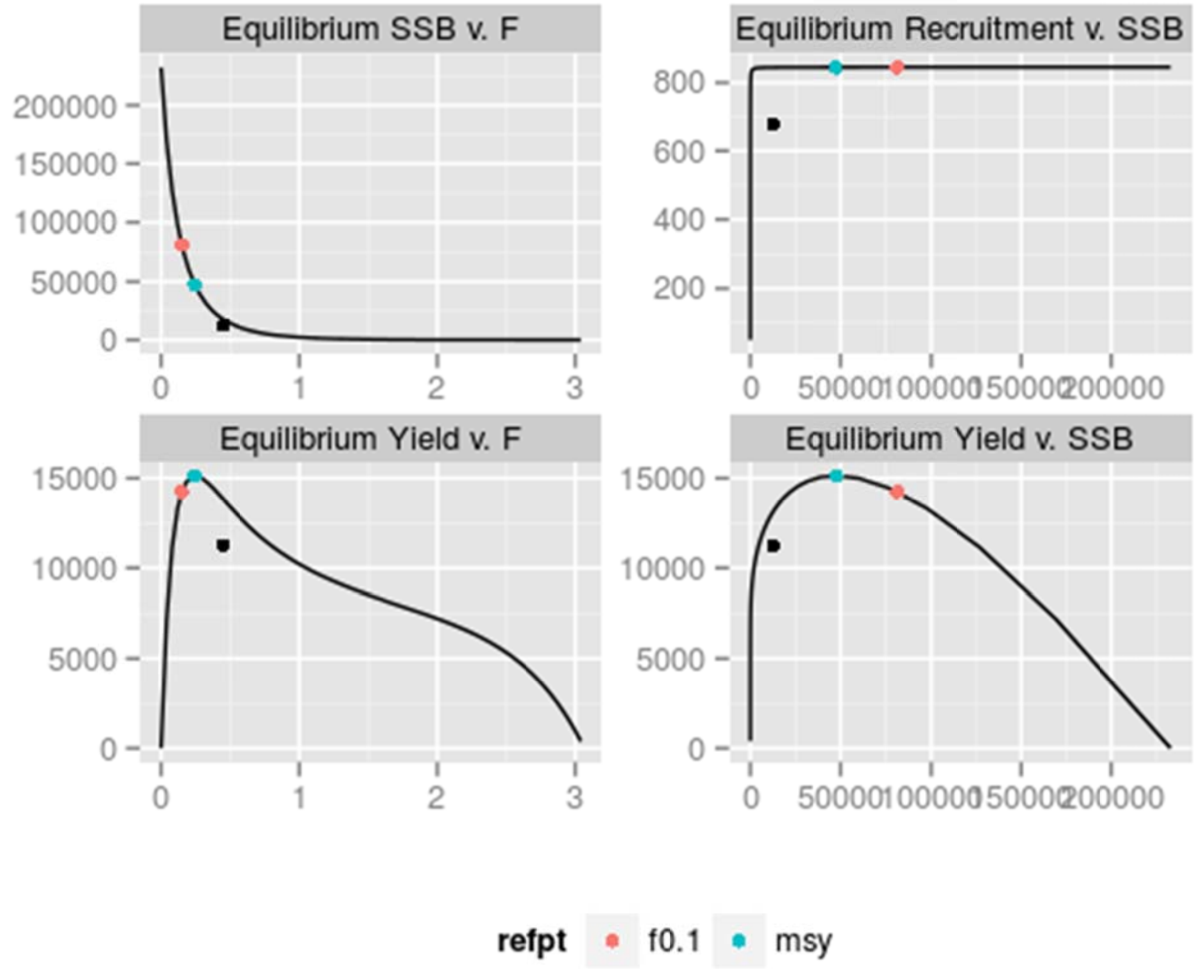
SWO-MED-Figure 5. XSA estimates of F-at-age; lines represent lowess smoothers.



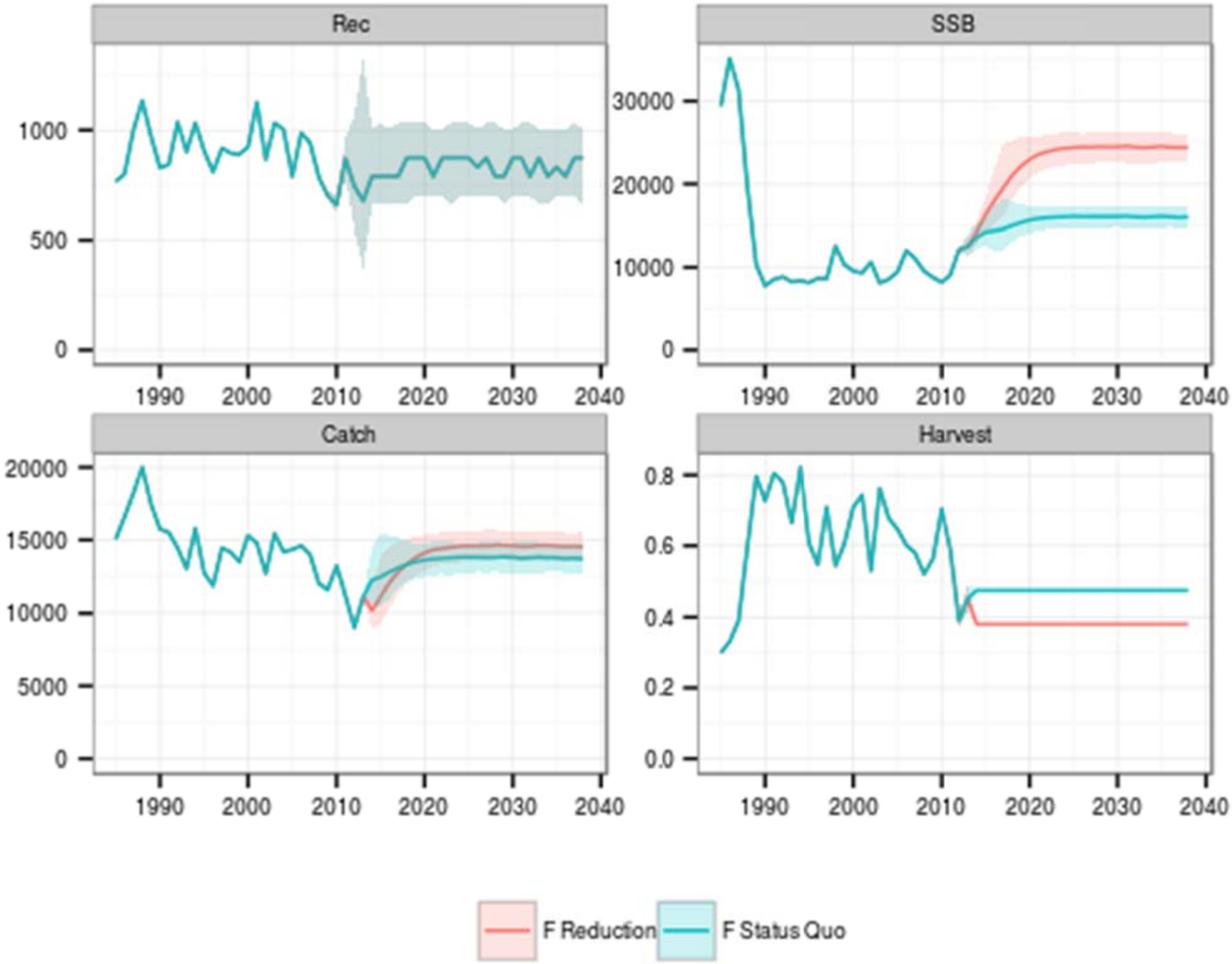
SWO-MED-Figure 6. Time trends for stock status (B/B_{MSY} and F/F_{MSY}) derived from the XSA. The arrow indicates the ratio estimates for the last assessment year (2013).



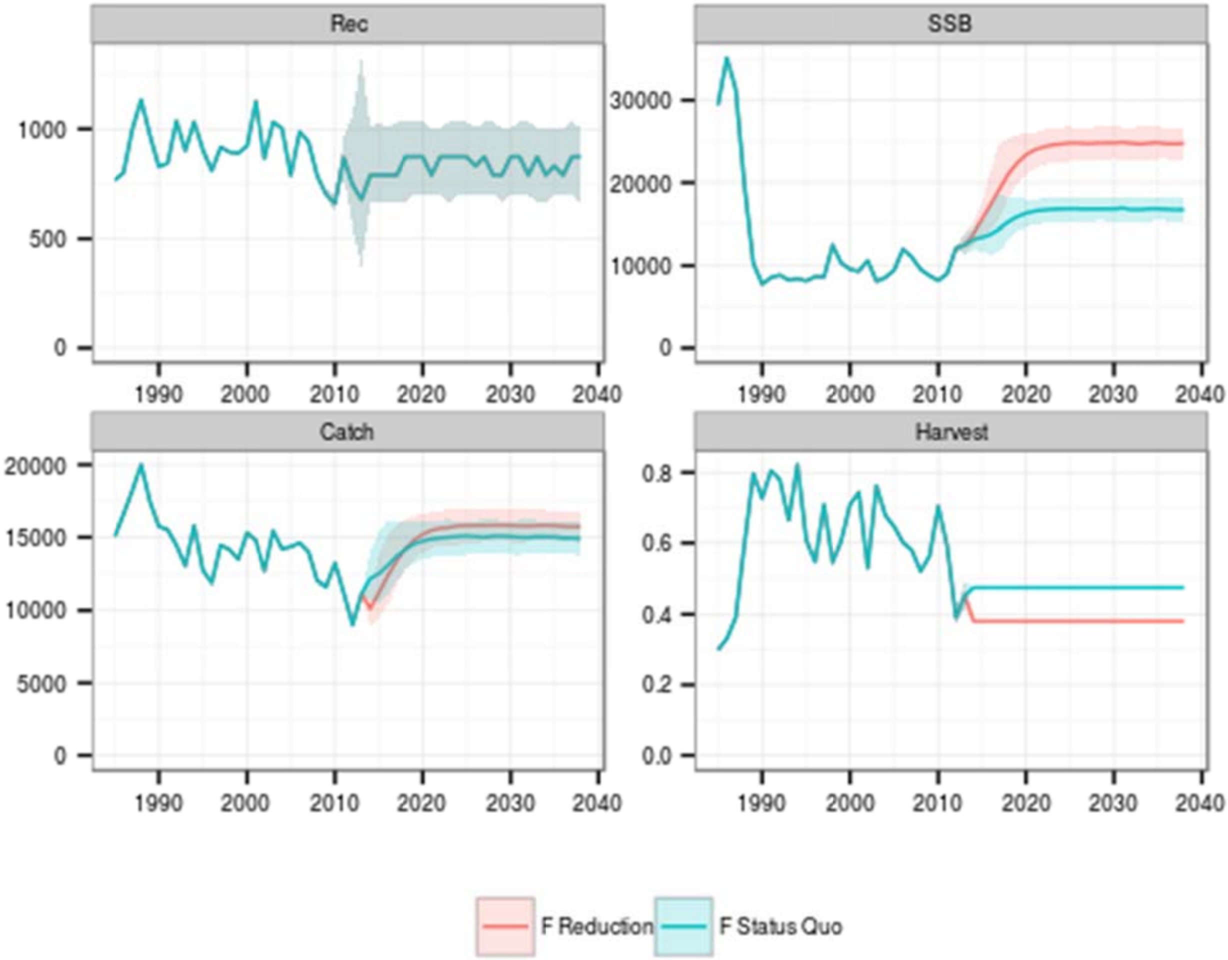
SWO-MED-Figure 7. Proportion of catch numbers (left) and catch weight (right) at age by year.



SWO-MED-Figure 8. Equilibrium curves based on expected weight, maturity, M, selection pattern and SRR estimates. Black dots indicate the corresponding estimates for the last assessment year (2013) obtained from the XSA assessment.



SWO-MED-Figure 9. Projections based on the current selection pattern and two different F (harvest) levels: status quo (blue) and 80% of current (red). Estimates are based on the XSA assessment.



SWO-MED-Figure 10. Projections based on a mixed selection pattern (50:50 current and mesopelagic) and two different F (harvest) levels: status quo (blue) and 80% of current (red). Estimates are based on the XSA assessment.

8.11 SBF – SOUTHERN BLUEFIN TUNA

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) is charged with assessing the status of southern bluefin tuna. Each year the SCRS reviews the CCSBT report in order to know the research on southern bluefin tuna and the stock assessments carried out. The reports are available from the CCSBT.

8.12 SMT - SMALL TUNAS

SMT-1. Generalities

Small tunas include the following species:

- BLF Blackfin tuna (*Thunnus atlanticus*)
- BLT Bullet tuna (*Auxis rochei*)
- BON Atlantic bonito (*Sarda sarda*)
- BOP Plain bonito (*Orcynopsis unicolor*)
- BRS Serra Spanish mackerel (*Scomberomorus brasiliensis*)
- CER Cero (*Scomberomorus regalis*)
- FRI Frigate tuna (*Auxis thazard*)
- KGM King mackerel (*Scomberomorus cavalla*)
- KGX Scomberomorus unclassified (*Scomberomorus* spp.)
- LTA Little tunny (*Euthynnus alletteratus*)
- MAW West African Spanish mackerel (*Scomberomorus tritor*)
- SSM Atlantic Spanish mackerel (*Scomberomorus maculatus*)
- WAH Wahoo (*Acanthocybium solandri*)
- DOL Dolphinfish (*Coryphaena hippurus*)

Knowledge on the biology and fishery of small tunas is very fragmented in several areas. Furthermore, the quality of the knowledge is very different according to the species concerned. This is due in large part because many of these species are often perceived to have little economic importance compared to other tunas and tuna-like species, and owing to the difficulties in conducting sampling of the landings from artisanal fisheries, which constitute a high proportion of the fisheries exploiting small tuna resources. The large industrial fleets often discard small tuna catches at sea or sell them on local markets mixed with other by-catches, especially in Africa (Chavance *et al.* 2011). The amount caught is rarely reported in logbooks; however observer programs from purse seine fleets have recently provided estimates of catches of small tunas (Amandé *et al.* 2010).

Small tuna species have a very high relevance from a socio-economic point of view, because they are important for many coastal communities in all areas and are a main source of food. The socio-economic value is often not evident because of the underestimation of the total figures, due to the above-mentioned difficulties in data collection. Several statistical problems are also caused by misidentification. The small tuna species can reach high levels of catches and values in some years.

Scientific collaboration between ICCAT, Regional Fisheries Organizations (RFOs) and countries in the various regions is imperative to advance understanding of the distribution, biology and fisheries of these species.

SMT-2. Biology

These species are widely distributed in the tropical and subtropical waters of the Atlantic Ocean and several are also distributed in the Mediterranean Sea and the Black Sea. Some species extend their range even to colder waters, like the North and South Atlantic Ocean (Nottestad *et al.* 2013). They often form large schools with other small sized tunas or related species in coastal and high seas waters.

Generally, the small tuna species have a varied diet with a preference for small pelagics (e.g., clupeids, mullets, carangids, etc.). Small tunas are the prey of large tunas, marlins, sharks and marine mammals and at the same time they are the predators of small pelagics. A recent document (SCRS/2013/207) on the feeding habit of dolphin fish off the Brazilian coast was presented to the Group. These species feed also on crustaceans, mollusks and cephalopods. Many of these species are also prey of large tunas, marlins and sharks. The reproduction period varies according to species and areas and spawning generally takes place near the coast in oceanic areas, where the waters are warmer. A recent study conducted on the eastern coast of Tunisia has shown that the spawning area of the bullet tuna (*Auxis rochei)* is offshore at the limit of the continental shelf and related to the high abundance of the Zooplankton (SCRS/2013/198). The growth rate currently estimated for these species is very rapid for the first two or three years, and then slows as these species reach size-at-first maturity. Information on the migration patterns of small tuna species is very limited, due to low tagging of these species.

In general, there is a lack of information on biological parameters for these species, especially for West Africa and the Caribbean and South America. A recent study based on the histological analysis and the gonado-somatique index of female gonads found that the spawning season of the West African Spanish mackerel extends from April to July in the Gulf of Guinea (Diaha, *et al.* 2013).

Some recent data regarding the size, the seasonal and spatial distribution of the relative abundance of blackfin tunas and dolphin fish from the Venezuelan artisanal longline fishery targeting billfish and dolphin fishes were presented to the Committee (Arocha *et al.* 2013) (SCRS/2013/112). New size information on the Atlantic Bonito taken by the Moroccan artisanal fleets was presented to the group (SCRS/2014/181).

SMT-3. Description of the fisheries

Small tunas are exploited mainly by coastal fisheries and artisanal fisheries, although substantial catches are also made as target species and as by-catch by purse seine, mid-water trawl (i.e. pelagic fisheries of West Africa-Mauritania), handline and small scale gillnets. Unknown quantities of small tuna also comprise the incidental catches of some longline fisheries. The increasing importance of FAD fisheries in the eastern Caribbean and in other areas has improved the efficiency of artisanal fisheries in catching small tunas. Various species are also caught by the sport and recreational fisheries.

Despite the scarce monitoring of various fishing activities in some areas, all the small tuna fisheries have a high socio-economic relevance for most of the coastal countries concerned and for many local communities, particularly in the Mediterranean Sea, in the Caribbean region and in West Africa. The standardized CPUE from the Moroccan artisanal gillnet fishery fishing for Atlantic bonito in the Atlantic did not show any trend from 2004 to 2010 (SCRS/2012/179).

New information on small tuna catches and effort were presented to the Group from two observer programs' activities in Venezuela: the National Observer Program in 2013 (SCRS/2014/159) on industrial fleets, and the artisanal off-shore longline fleets (SCRS/2014/085) that target tuna and tuna-like species. Important small tuna catches (in numbers and weight) observed consisted of blackfin tuna (BLF) and dolphinfish (DOL), and to a lesser degree, wahoo (WAH).

In the framework of the ICCAT SMTYP, new data from the Moroccan artisanal and coastal fleets fishing for small tunas in the South Atlantic off Moroccan coasts were presented. The results from this study showed that these species are caught by different gears, mainly gillnet. The catches and the fishing effort directed at small tunas have substantially fluctuated during the last decade, depending on the availability of these resources and the changes in the oceanographic conditions (SCRS/2014/182).

SMT-Table 1 shows historical landings of small tunas for the 1989 to 2013 period although the data for the last years are preliminary. This table does not include species reported as "mixed" or "unidentified", as was the case in the previous years, since these categories include large tuna species. There are more than 10 species of small tunas, but only five of these account for about 88% of the total reported catch by weight. These five species are: Atlantic bonito *(Sarda sarda)*, frigate tuna *(Auxis thazard)* which may include some catches of bullet tuna *(Auxis rochei)*, little tunny *(Euthynnus alletteratus)*, king mackerel *(Scomberomorus cavalla)*, and Atlantic Spanish mackerel *(Scomberomorus maculatus)* (**SMT-Figure 2**). In 1980, there was a marked increase in reported landings compared to previous years, reaching a peak of about 145,560 t in 1988 (**SMT-Figure 1**). Reported landings for the 1989-1995 period decreased to approximately 91,764 t, and then an oscillation in the values in the following years, with a minimum of 61,705 t in 2008 and a maximum of 132,433 t in 2005. Overall trends in the small tuna catch may mask declining trends for individual species because annual landings are often dominated by the landings of a single species. These fluctuations seem to be related to unreported catches, as these species generally comprise part of the by-catch and are often discarded, and therefore do not reflect the real catch.
A preliminary estimate of the total nominal landings of small tunas in 2013 is 91182 t. The Small Tunas Species Group pointed out the relative importance of small tuna fisheries in the Mediterranean and the Black Sea, which account for about 28% of the total reported catches in the ICCAT area.

Despite the recent improvements in the statistical information provided to ICCAT by several countries, the Committee also noted that uncertainties remain regarding the accuracy and completeness of reported landings in all areas. There is a general lack of information on the mortality of these species as by-catch, exacerbated by the confusion regarding species identification.

However, after the adoption of the ICCAT Small Tunas Research Programme in 2012, new historical catch, effort and size data from the main artisanal fisheries in the west of Africa (Senegal, Côte d'Ivoire and Morocco) were recovered and made available to the Secretariat (SCRS/2013/164, 175 and 176). A revision of the Task I data for the period 2005-2012 related to small tunas from Cape Verde was accepted by the Committee (SCRS/2013/190). Furthermore, document SCRS/2013/197 presents preliminary analysis of the nominal catch of small tunas along the Tunisian coasts during the period 1995-2010.

In 2014, an inventory of the bibliographic and biological data on small tunas was made by Côte d'Ivoire. The results from this study identified clearly the gaps in the biological data and highlighted the constraints with which that study was faced (SCRS/2014/144).

SMT-4. State of the stocks

There is little information available to determine the stock structure of many small tuna species. The Committee suggests that countries be requested to submit all available data to ICCAT as soon as possible, in order to be used in future meetings of the Committee.

Generally, current information does not allow the Committee to carry out an assessment of stock status of the majority of the species. Some analyses will be possible in future if data availability improves with the same trend of the latest years. Nevertheless, few regional assessments have been carried out. Assessments of stocks of small tunas are also important because of their position in the trophic chain. It may therefore be best to approach assessments of small tunas from the ecosystem and regional perspective since these species have limited movements as compared to the major tuna species.

SMT-5. Outlook

While there are some improvements in the availability of catch and biological data for small tuna species, particularly in the Mediterranean and the Black Sea, in 2011 the SCRS recommended a research plan for small tunas, which was adopted by the Commission in 2012. Small tuna species are of great economic value to local communities and thus the Committee should recognize the work being carried out in Senegal, Côte d'Ivoire and Morocco.

Biological information and catch and effort statistics for these species remain incomplete for many of the coastal and industrial fishing countries. Given that many of these species are of high socio-economic importance to coastal communities, the Committee therefore recommends that further studies be conducted on small tuna species due to the small amount of information available.

Additional work proposed under the SMTYP to address the deficiencies in Task I, Task II and biological data was initiated in 2014. This work will be ongoing.

The Committee notes that the tropical tunas tagging programme will also tag small tunas and may contribute to the collection of biological data of these species if financing is sufficient.

S***MT-6. Effect of current regulations***

There are no ICCAT regulations in effect for small tunas. Several regional and national regulations are in place.

SMT-7. Management recommendations

No management recommendations have been made.

SMT-Table 1. Reported landings (t) of small tuna species, by area and flag.

			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
BLF	TOTAL A+M		2834	3888	4202	4353	3535	2719	4051	4488	3027	3238	3185	2465	4034	4756	1303	1926	1031	1937	1927	1669	1442	1548	1533	1529	1230
	Landings		2834	3888	4202	4353	3535	2719	4051	4488	3027	3238	3185	2465	4034	4756	1303	1926	1031	1937	1927	1669	1442	1548	1533	1529	1230
	Discards		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Landings	Brazil	120	335	130	49	22	38	153	649	418	55	55	38	149	1669	1	118	91	242	233	266	10	9	46	124	102
		Cuba	318	487	318	196	54	223	156	287	287	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Curaçao	70	70	60	60	65	60	50	45	45	45	45	45	45	45	0	0	0	0	0	0	0	0	0	0	
		Dominica	4	19	10	14	15	19	30	0	0	0	79	83	54	78	42	20	38	47	29	37	45	41	37	39	37
		Dominican Republic	564	520	536	110	133	239	892	892	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.España	0	0	0	307	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.France	855	865	1210	1170	1140	1330	1370	1040	1040	1040	1040	1040	1040	1040	0	0	0	0	0	0	0	32	19	26	22
		Grenada	134	293	195	146	253	189	123	164	126	233	94	164	223	255	335	268	306	371	291	290	291	291	291	291	291
		Jamaica	0	0	0	0	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	12	0	10	9	10	10	12	6	7	6	9	5	4
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	15	38	11	7	53	19	20	18	22	17	15	23	24	24	0	0	0	0	0	0	0	0	0	0	
		Sta. Lucia	1	17	14	13	16	82	47	35	40	100	41	45	108	96	169	96	126	182	151	179	165	203	229	192	147
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5
		U.S.A.	87	81	112	127	508	492	582	447	547	707	617	326	474	334	414	675	225	831	422	649	619	622	417	599	419
		UK.Bermuda	14	13	8	6	5	7	4	5	4	6	6	5	4	5	9	4	5	8	7	6	7	9	8	11	11
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1
		Venezuela	652	1150	1598	2148	1224	21	624	758	498	1034	1192	696	1902	1210	319	732	225	237	777	231	293	331	473	237	191
	Discards	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
BLT	TOTAL A+M		7110	11994	8777	5714	3420	5300	4301	5909	3070	3981	2646	3924	5821	6050	3800	6224	4442	4090	5711	6837	5557	7952	8835	5601	9443
		Algerie	0	0	174	270	348	306	230	237	179	299	173	225	230	481	0	391	547	586	477	1134	806	970	1119	1236	577
		Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	141
		EU.Croatia	0	0	24	21	52	22	28	26	26	26	26	0	0	0	0	0	0	0	0	0	0	8	13	9	20
		EU.España	2581	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493	495	1009	845	1101	3083	3389	726	3812	3227	1620	5372
		EU.France	0	0	8	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Greece	1400	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120	246	226	180	274	157	620	506	169	420	420	420
		EU.Italy	509	494	432	305	379	531	531	229	229	229	462	462	462	2452	1463	1819	866	0	0	342	732	574	653	613	892
		EU.Malta	18	21	20	10	9	1	2	3	6	1	3	1	1	0	2	8	4	11	14	12	7	11	23	3	85
		EU.Portugal	0	0	0	0	0	0	0	0	0	28	263	494	208	166	231	300	791	867	849	322	436	654	387	55	38
		Maroc	1177	2452	1289	1644	170	1726	621	1673	562	1140	682	763	256	621	246	326	50	199	35	83	336	525	237	194	237
		Russian Federation	0	0	2171	814	70	100	0	0	0	1672	0	420	1053	468	128	102	139	22	5	23	48	67	119	366	703
		Serbia & Montenegro	0	0	13	1	0	0	2	6	6	6	7	8	8	0	0	0	0	0	0	0	0	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Syria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	75	87	81	84	83	83
		Tunisie	660	985	985	35	20	13	14	13	32	93	45	15	2300	932	989	1760	0	0	0	0	0	0	0	0	
		Turkey	0	0	35	0	324	77	0	0	0	0	316	316	316	316	0	284	1020	1031	993	836	1873	1081	2552	907	863
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	723	3634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
		Yugoslavia Fed.	42	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BON	TOTAL		29626	28908	33334	21992	30528	21719	21219	25134	24518	45253	37313	27151	27637	24581	14424	15829	78767	40093	14179	14961	21169	20864	23401	43514	23409
	Landings ATL		17671	6811	8079	6881	4531	6037	6030	7939	10441	15523	9143	5179	5400	8864	3307	4581	4391	8342	5542	4920	11149	8280	10373	5531	5734
	MED		11955	22097	25255	15111	25997	15682	15189	17195	14078	29730	28170	21972	22237	15717	11117	11248	74376	31751	8637	10042	10019	12584	13029	37983	17675
	Discards ATL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landings ATL	Angola	168	128	102	4	49	20	9	39	32	0	2	118	118	118	0	0	138	0	931	0	1962	1997	131	267	1373
		Argentina	1327	1207	1794	1559	434	4	138	108	130	12	68	19	235	1	129	269	110	0	0	0	220	59	6	33	
		Barbados	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	
		Benin	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brazil	273	226	71	86	142	142	137	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	171	0	3
		Cuba	26	28	0	0	0	0	0	0	0	230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Curaçao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	539	539	539	539
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	755	0	0	26
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	16	16	9	4	0	0	0	
		EU.Bulgaria	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.España	57	18	8	39	5	3	2	2	1	0	12	12	10	5	23	9	2	15	14	13	36	45	57	7	44
		EU.Estonia	859	187	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.France	427	430	820	770	1052	990	990	610	610	610	24	32	0	18	0	0	0	0	122	59	25	208	241	102	56
		EU.Germany	0	53	0	0	0	0	0	714	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	
		EU.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	56	125	91	108	100
		EU.Latvia	1164	221	7	4	0	3	19	301	887	318	0	416	396	639	0	0	0	0	0	0	0	0	0	0	
		EU.Lithuania	762	162	11	10	0	0	0	0	0	0	0	0	0	793	0	0	0	0	0	0	0	0	0	0	

			EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	344	539	539	0	2047	104	1075
			EU.Poland	0	0	0	0	0	0	0	225	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Portugal	80	202	315	133	145	56	78	83	49	98	98	162	47	61	40	50	38	318	439	212	124	476	461	321	184
			EU.United Kingdom	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0	0	35	0	0	30	71	113	4	0
			Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	0	0	0	0	0	0	0	0	0	
			Georgia	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Germany Democratic Rep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ghana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Grenada	0	0	0	0	0	0	0	24	6	14	16	7	10	10	0	0	0	0	0	0	0	0	0	0	
			Jamaica	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Maroc	566	492	794	1068	1246	584	699	894	1259	1557	1390	2163	1700	2019	928	989	1411	1655	1053	1419	2523	109	145	235	89
			Mexico	338	215	200	657	779	674	1144	1312	1312	1632	1861	1293	1113	1032	1238	1066	654	1303	1188	1113	1063	1046	1080	1447	1534
			Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Panama	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
			Rumania	111	8	212	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Russian Federation	0	0	948	29	0	0	0	0	0	4960	0	0	574	1441	461	16	79	316	259	52	368	1042	2293	848	125
			Senegal	774	525	597	345	171	814	732	1012	1390	2213	2558	286	545	621	195	183	484	2304	1020	1380	4029	1677	2876	1453	514
			Sierra Leone	10	10	4	6	0	0	0	0	0	0	0	11	245	44	0	0	0	0	0	0	0	0	0	0	
			South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	18	0	16	23	27	15	6	20	0	
			Sta. Lucia	0	3	3	3	4	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
			Togo	256	177	172	107	311	254	145	197	197	197	197	0	0	0	0	1583	1215	2298	0	0	0	0	0	0	
			Trinidad and Tobago	0	0	0	0	17	703	169	266	220	30	117	117	56	452	188	280	81	7	16	38	68	68	14	9	16
			U.S.A.	278	299	469	498	171	128	116	156	182	76	83	142	120	139	44	70	68	40	97	47	50	46	66	46	52
			U.S.S.R.	7363	706	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
			UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ukraine	985	0	0	25	0	0	0	342	2786	1918	1114	399	231	1312	30	0	0	0	0	0	0	0	0	0	
			Uruguay	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Venezuela	1783	1514	1518	1454	5	1661	1651	1359	1379	1659	1602	2	0	61	13	0	16	18	19	12	38	10	21	7	4
		MED	Albania	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Algerie	1528	1307	261	315	471	418	506	277	357	511	475	405	350	597	0	609	575	684	910	1042	976	1009	355	353	614
			EU.Bulgaria	0	17	17	20	8	0	25	33	16	51	20	35	35	35	0	0	0	0	0	0	0	16	8	96	6
			EU.Croatia	0	0	49	128	6	70	0	0	0	25	120	0	0	0	0	0	0	0	0	0	0	59	41	31	56
			EU.Cyprus	0	0	0	0	0	0	0	0	0	0	0	14	0	10	10	6	4	3	0	0	0	0	0	0	
			EU.España	609	712	686	228	200	344	632	690	628	333	433	342	349	461	544	272	215	429	531	458	247	518	574	442	1763
			EU.France	0	1	10	5	6	0	0	0	0	0	0	0	0	27	0	0	0	0	15	34	20	23	13	12	21
			EU.Greece	2534	2534	2690	2690	2690	1581	2116	1752	1559	945	2135	1914	1550	1420	1538	1321	1390	845	1123	587	476	531	810	810	810
			EU.Italy	1369	1244	1087	1288	1238	1828	1512	2233	2233	2233	4159	4159	4159	4579	2091	2009	1356	0	0	1323	1131	964	1197	472	1245
			EU.Malta	0	0	0	0	0	0	0	2	7	2	2	1	0	1	0	1	1	11	7	7	3	6	1	3	2
			Egypt	358	598	574	518	640	648	697	985	725	724	1442	1442	1128	1128	0	0	0	0	0	0	0	0	0	0	
			Libya	0	0	0	71	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Maroc	28	69	69	31	25	93	37	67	45	39	120	115	5	61	85	78	38	89	87	142	131	57	12	1	0
			NEI (MED)	342	311	311	311	300	300	300	300	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Rumania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Serbia & Montenegro	0	0	45	0	3	2	6	10	12	12	14	17	17	0	0	0	0	0	0	0	0	0	0	0	
			Tunisie	422	488	305	643	792	305	413	560	611	855	1350	1528	1183	1112	848	1251	0	0	0	0	0	0	0	0	
			Turkey	4667	14737	19151	8863	19548	10093	8944	10284	7810	24000	17900	12000	13460	6286	6000	5701	70797	29690	5965	6448	7036	9401	10019	35764	13158
			U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Yugoslavia Fed.	98	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Discards	ATL	UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOP	TOTAL			1116	473	608	641	630	791	703	2196	481	177	868	1207	1012	923	736	581	217	32	1047	533	449	289	375	686	660
		ATL		1109	436	507	465	378	615	588	2064	254	47	651	1062	858	786	713	573	215	32	875	426	442	275	335	664	641
		MED		7	37	101	176	252	176	115	132	227	130	217	145	154	137	23	8	2	0	172	107	6	14	40	22	19
		ATL	Benin	1	1	1	1	1	1	1	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	1	2	11	23	7	8	2
			Maroc	1058	369	486	423	348	598	524	2003	246	28	626	1048	830	780	706	503	132	0	634	391	273	199	213	642	555
			Mauritania	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Senegal	0	16	20	41	29	16	63	60	5	18	24	14	28	6	7	70	78	29	240	33	158	53	115	14	84
		MED	Algerie	0	0	87	135	198	153	92	119	224	128	216	135	145	128	0	0	0	0	0	0	0	0	9	7	3
			EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
			Libya	0	0	0	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Maroc	7	37	14	1	14	23	23	13	3	2	1	10	9	9	20	7	1	0	172	107	6	14	30	15	16
			Tunisie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	
BRS	TOTAL	A+M		10778	7698	8856	6051	8049	7161	7006	8435	8004	7923	5754	4785	4553	7750	5137	3410	3712	3587	2253	3305	2681	2871	2214	613	1427
			Brazil	5927	2767	1437	1149	842	1149	1308	3047	2125	1516	1516	988	251	3071	2881	814	471	1432	563	1521	1042	1281	1162	0	581
			EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Grenada	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	

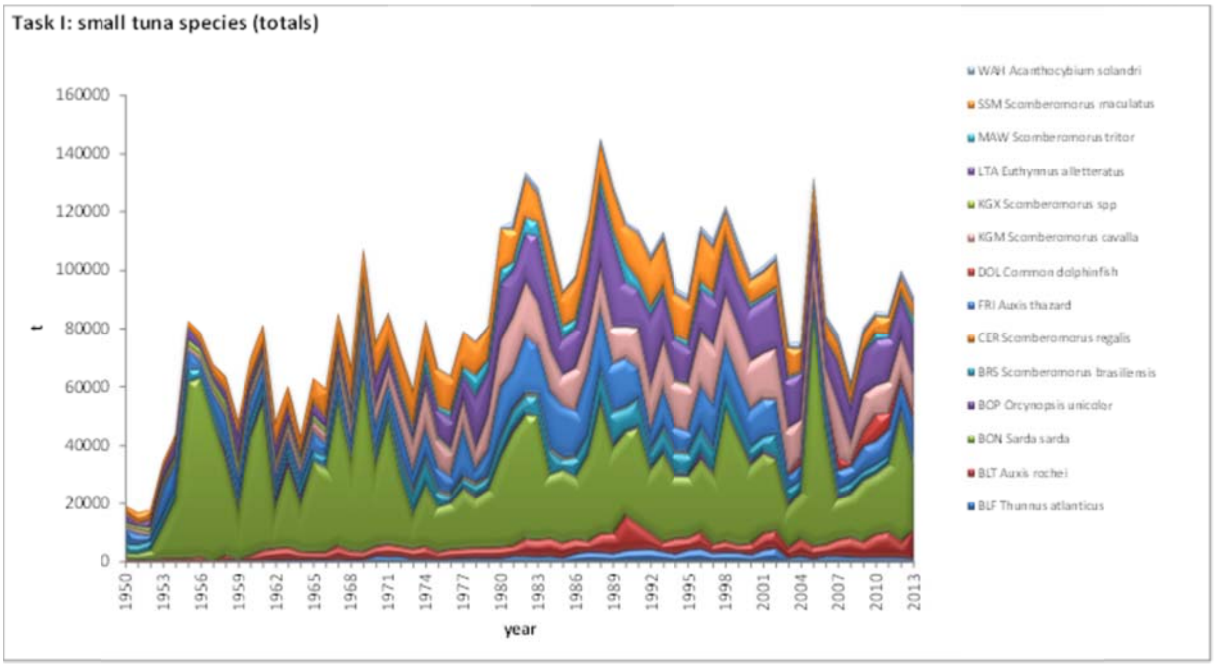
			Guyana	0	0	0	0	0	0	0	211	571	625	1143	308	329	441	389	494	521	377	277	312	141	92	116	124	151
			Trinidad and Tobago	2864	2471	2749	2130	2130	2130	1816	1568	1699	2130	1328	1722	2207	2472	1867	2103	2720	1778	1414	1472	1498	1498	936	489	695
			Venezuela	1987	2460	4670	2772	5077	3882	3882	3609	3609	3651	1766	1766	1766	1766	0	0	0	0	0	0	0	0	0	0	
CER	TOTAL	A+M		234	225	375	390	450	490	429	279	250	250	0	3	5	1	2	1	1	1	0	0	0	0	1	0	0
			Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
			Dominican Republic	59	50	45	79	50	90	29	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.France	175	175	330	310	400	400	400	250	250	250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			St. Vincent and Grenadines	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	3	5	1	2	0	1	0	0	0	0	0	1	0	0
FRI	TOTAL	ATL		16411	16738	10356	6367	12678	8407	7535	13809	14954	14197	13004	12905	12762	11627	4521	5451	4416	7492	6460	5756	8591	8062	9257	9989	12696
			Angola	70	28	1	0	4	6	21	29	12	31	2	38	38	38	0	0	0	0	95	0	63	19	59	39	48
			Argentina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Benin	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Brazil	700	592	746	291	608	906	558	527	215	162	166	106	98	1117	860	414	532	603	202	149	313	204	347	259	302
			Cape Verde	105	75	135	82	115	86	13	6	22	191	154	81	171	278	264	344	467	606	575	824	1707	711	853	1811	2461
			Curaçao	0	0	0	0	0	0	0	590	1157	1030	1159	1122	989	710	505	474	0	150	106	485	364	0	235	238	481
			Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	170	135	0	0	0	3	38	2837
			EU.Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.España	1877	2240	541	228	362	297	386	947	581	570	23	17	722	438	635	34	166	73	278	631	1094	950	877	1708	1170
			EU.Estonia	0	0	198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.France	3008	3872	0	121	63	105	126	161	147	146	0	91	127	91	0	168	47	6	98	24	24	91	147	246	229
			EU.Latvia	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Lithuania	0	0	290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	150	90	0	164	5	85
			EU.Portugal	4	26	3	0	0	0	0	0	1	31	5	9	28	5	4	6	0	3	3	1	0	0	0	0	
			EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	26	0	
			Germany Democratic Rep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ghana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2572	2134	1496	2786	3604	2295	2469	2382
			Grenada	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
			Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	74	81	78	48	63	
			Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	
			Guinée Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	94	332	503
			Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Maroc	599	1045	1131	332	274	122	645	543	2614	2137	494	582	418	441	184	542	61	48	135	179	9	19	862	554	55
			Mixed flags (FR+ES)	1350	1728	3633	4017	9674	3107	1919	7177	6063	6342	8012	9864	9104	7748	1623	1722	1527	1739	1072	614	1131	873	1002	937	970
			NEI (ETRO)	155	237	1	4	32	68	70	180	120	309	491	291	420	186	71	180	166	9	0	0	0	0	0	0	
			Panama	0	0	243	57	118	341	328	240	91	0	0	0	0	0	0	394	975	970	1349	411	439	425	339	463	504
			Rumania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Russian Federation	0	0	1078	627	150	405	456	46	500	761	477	0	0	300	50	56	63	6	1	12	113	270	912	113	217
			S. Tomé e Príncipe	32	35	41	39	33	37	48	79	223	197	209	200	200	200	200	234	215	290	0	275	282	290	286	288	287
			Senegal	784	1084	311	201	342	319	309	0	0	0	7	0	4	0	13	288	151	83	119	383	15	217	201	341	16
			Trinidad and Tobago	0	0	0	0	17	0	56	199	368	127	138	245	0	0	0	414	0	0	0	0	0	0	0	0	
			U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			U.S.S.R.	5054	2739	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ukraine	0	0	0	0	0	0	0	0	0	0	36	48	0	43	0	0	0	0	0	0	0	0	0	0	
			Venezuela	2670	3037	1762	368	886	2609	2601	3083	2839	2164	1631	210	444	32	113	182	42	165	52	48	54	215	508	85	150
DOL	TOTAL	A+M		306	260	291	188	174	334	334	307	295	363	349	234	303	347	564	2632	2772	1295	4753	1042	5009	9070	5450	1691	2607
			Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2159	2311	761	4270	472	4400	7990	4379	641	241
			EU.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	73	73	0	85	166	146
			EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	700
			EU.Malta	306	260	291	188	174	334	334	307	295	363	349	234	303	347	507	473	447	517	274	399	395	530	349	181	385
			FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	
			St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	56	118	72	96	84	90
			Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	515
			Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
			U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	479	503	578	472
			UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
			Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	14	16	0	0	24	0	38	40	42
KGM	TOTAL	A+M		12153	10420	13241	14691	16331	14777	14930	17782	19660	16394	17717	16161	15360	17258	15863	12830	11766	8185	17936	7344	12533	9742	10868	12762	11992
			Antigua and Barbuda	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Argentina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Brazil	2102	2070	962	979	1380	1365	1328	2890	2398	3595	3595	2344	1251	2316	3311	247	202	316	33	0	0	1	1	0	
			Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Dominica	0	0	0	0	0	0	0	0	0	0	36	35	2	0	0	0	0	0	0	0	0	0	0	0	
			Dominican Republic	29	33	34	47	52	0	0	0	589	288	230	226	226	226	0	0	0	0	0	0	0	0	0	0	
			Grenada	0	0	0	0	0	0	0	2	4	28	14	9	4	5	0	0	0	0	0	0	0	0	0	0	
			Guyana	0	0	0	0	0	0	0	0	270	440	398	214	239	267	390	312	245	168	326	174	91	59	75	90	99

			Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	
			Mexico	2300	2689	2147	3014	3289	3097	3214	4661	4661	3583	4121	3688	4200	4453	4369	4564	3447	4201	3526	3113	3186	3040	3130	3090	3335
			St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	9	0	0	
			Sta. Lucia	0	0	0	0	0	0	0	1	4	0	0	9	1	1	0	1	1	1	2	0	1	3	4	1	1
			Trinidad and Tobago	541	432	657	0	1192	0	471	1029	875	746	447	432	410	1457	802	578	747	661	567	1043	1001	1001	720	393	495
			U.S.A.	5681	4127	8213	9344	9616	7831	7360	7058	8720	7373	6453	6780	6603	6061	6991	7129	7123	2837	13482	3013	8247	5630	6939	9187	8062
			UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
			Venezuela	1500	1069	1228	1308	801	2484	2558	2140	2139	340	2424	2424	2424	2424	0	0	0	0	0	0	0	0	0	0	
KGX	TOTAL	A+M		105	131	225	266	301	508	512	824	156	251	1	229	48	0	15	0	1	26	16	0	2	20	16	6	9
			Barbados	68	51	45	51	55	36	42	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	
			Colombia	37	25	7	12	21	148	111	539	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Cuba	0	0	0	0	0	0	0	0	0	236	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	9
			EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	26	16	0	2	20	7	2	0
			Gabon	0	0	0	0	0	140	145	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Jamaica	0	0	0	0	0	0	0	0	155	0	0	44	48	0	0	0	0	0	0	0	0	0	0	0	
			Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Puerto Rico	0	0	0	53	84	86	134	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Russian Federation	0	0	0	0	0	0	0	0	0	14	0	0	0	0	15	0	0	0	0	0	0	0	0	0	
			St. Vincent and Grenadines	0	0	0	0	0	0	0	1	1	1	1	138	0	0	0	0	0	0	0	0	0	0	1	0	
			Sta. Lucia	0	55	79	150	141	98	80	50	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	
			Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ukraine	0	0	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LTA	TOTAL			30046	15152	13086	24202	16554	14175	12829	14254	16307	17555	15382	18283	18667	19453	16713	15786	12254	9463	14533	11998	14284	15925	14984	15159	17001
		ATL		28011	12535	10771	22447	15296	12978	10934	12138	14706	14641	12506	14989	15803	16810	16029	14348	11212	7857	12847	9739	12184	13755	12222	11844	13942
		MED		2035	2617	2315	1755	1258	1197	1894	2116	1601	2914	2876	3294	2863	2643	684	1439	1042	1605	1687	2259	2100	2170	2763	3315	3059
		ATL	Angola	1225	285	306	14	175	121	117	235	75	406	118	132	132	132	0	0	2	0	4365	0	128	1759	3455	1905	1404
			Argentina	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Benin	43	66	61	49	53	60	58	58	196	83	69	69	69	69	0	0	0	0	0	0	0	0	0	0	
			Brazil	74	685	779	935	985	1225	1059	834	507	920	930	615	615	615	0	320	280	0	0	0	0	0	22	581	301
			Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Cape Verde	18	65	74	148	17	23	72	63	86	110	776	491	178	262	143	137	121	203	640	500	855	185	102	131	131
			Cuba	113	88	63	33	13	15	27	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Curaçao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	38	38	76	57
			Côte D'Ivoire	4900	2800	100	142	339	251	253	250	114	108	0	108	0	0	0	0	270	298	404	1677	1041	1359	5	1062	1433
			Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.España	11	55	81	1	0	0	10	55	27	110	6	2	22	8	1	489	50	16	0	38	35	136	168	71	52
			EU.Estonia	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.France	195	0	74	13	8	54	59	22	215	21	696	631	610	613	0	10	27	12	0	1	50	35	5	30	27
			EU.Germany	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Latvia	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Lithuania	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	69	8	0	18	1	9
			EU.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Portugal	91	2	61	73	45	72	72	218	320	171	14	50	0	2	16	19	21	24	43	10	6	5	14	4	18
			EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	15	23	38	31
			Gabon	0	0	0	0	0	0	0	182	0	18	159	301	213	57	173	0	0	0	0	0	0	0	0	0	
			Germany Democratic Rep	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ghana	12511	323	201	11608	359	994	513	113	2025	359	306	707	730	4768	8541	7060	5738	783	1335	745	1692	1465	1001	1274	1138
			Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Maroc	14	367	57	370	44	43	230	588	195	189	67	101	87	308	76	91	33	0	40	2	63	5	57	10	11
			Mauritania	50	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Mixed flags (FR+ES)	900	1152	2422	2678	4975	2071	1279	3359	2836	2936	3846	4745	4238	3334	1082	1148	1018	1159	715	410	1181	795	988	1783	1386
			NEI (ETRO)	0	0	0	0	8	20	0	0	0	0	0	0	0	33	2	0	0	0	0	0	0	0	0	0	
			Panama	0	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			Rumania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Russian Federation	0	0	617	306	265	189	96	49	0	88	0	0	0	74	13	0	0	0	0	0	0	268	11	208	399
			S. Tomé e Príncipe	36	52	46	48	41	40	43	40	50	39	37	33	33	33	33	178	182	179	0	183	188	193	191	384	287
			Senegal	5767	4363	3484	4011	4724	4536	3613	1972	4174	4715	1607	3546	5176	2866	4394	3508	2699	3826	3885	5108	5683	6371	4910	2769	5912
			South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
			St. Vincent and Grenadines	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Sta. Lucia	0	0	0	0	0	0	0	0	2	2	2	0	1	10	1	0	0	1	0	0	0	0	0	0	1
			Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			U.S.A.	129	173	228	597	1286	1142	1312	2230	2015	1546	1623	1209	1451	1366	1492	1382	765	1351	1401	963	1244	1120	1201	1507	1341
			U.S.S.R.	543	667	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

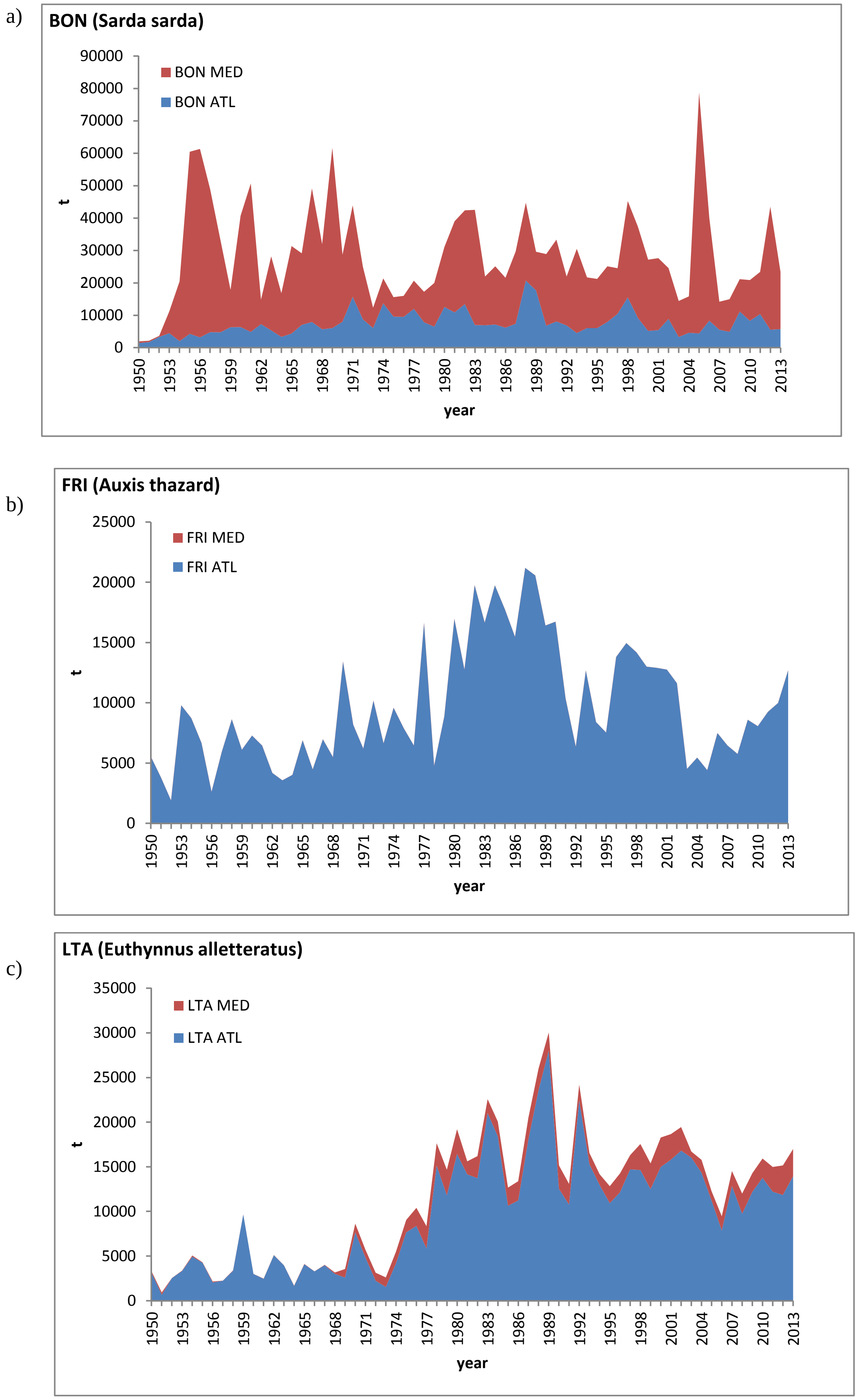
			UK.Bermuda	14	8	10	11	5	6	6	7	6	5	4	2	1	5	4	5	7	5	5	4	3	4	5	6	3
			Venezuela	1374	1294	1963	1409	1889	2115	2115	1840	1840	2815	2247	2247	2247	2254	50	0	0	0	0	30	0	2	8	4	1
		MED	Algerie	0	0	522	585	495	459	552	554	448	384	562	494	407	148	0	158	116	187	96	142	119	131	98	6	157
			EU.Croatia	0	0	2	3	2	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	28	25	44
			EU.Cyprus	20	23	25	21	11	23	10	19	19	19	16	19	19	19	0	0	0	0	6	5	4	0	0	0	
			EU.España	0	0	0	0	0	0	15	18	9	15	0	8	82	32	0	41	262	116	202	212	86	299	488	441	470
			EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	0	0
			EU.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	132	0	0	112	69	72	183	148	165	206	206	206
			EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	16	24	38	34	0	0	486	243	365	304	669	557
			EU.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3	2	5	3	7	5	21	9
			Israel	124	129	108	126	119	119	215	119	119	119	119	119	119	119	0	0	0	0	0	0	0	0	0	0	
			Libya	0	0	0	0	0	0	0	0	45	52	0	5	4	4	0	0	0	0	0	0	0	0	0	0	
			Maroc	0	16	0	0	0	0	1	0	1	14	8	0	0	3	1	0	9	0	331	19	24	1	0	0	**0**
			NEI (MED)	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Palestine	0	0	0	0	0	0	0	90	59	61	60	60	60	129	0	0	0	0	0	0	0	0	0	0	
			Serbia & Montenegro	0	0	5	0	28	21	35	22	18	20	18	16	16	0	0	0	0	0	0	0	0	0	0	0	
			Syria	121	127	110	156	161	156	155	270	350	417	390	370	370	330	0	0	0	0	193	133	163	148	155	304	229
			Tunisie	1566	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	960	657	633	0	0	0	0	0	0	0	0	
			Turkey	0	0	0	0	0	0	0	0	0	500	750	750	750	750	0	568	507	1230	785	1074	1309	1046	1437	1645	1386
			Yugoslavia Fed.	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MAW	TOTAL	A+M		2808	6629	3652	2423	1723	1138	1808	2831	1415	1482	909	1219	828	1345	550	283	443	210	435	422	459	2079	1103	1021	2905
			Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	1650	249	221	1247
			Benin	334	211	214	202	214	194	188	188	362	511	205	205	205	205	0	0	0	0	0	0	0	0	0	0	
			Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90
			EU.Estonia	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
			EU.Latvia	0	208	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			EU.Lithuania	0	0	52	4	0	0	0	0	0	0	0	0	0	298	0	0	0	0	0	0	0	0	0	0	
			EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	10	0	
			Gabon	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Germany Democratic Rep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ghana	1457	1500	2778	899	466	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Russian Federation	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
			S. Tomé e Príncipe	4	6	5	3	5	6	6	8	7	8	5	6	6	6	6	21	12	13	0	91	94	96	95	191	143
			Senegal	623	2432	520	1225	1019	938	1614	2635	1046	878	700	987	617	794	532	262	431	196	435	329	278	331	749	610	1426
			U.S.S.R.	390	2272	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Ukraine	0	0	0	90	0	0	0	0	0	0	0	21	0	42	12	0	0	0	0	0	0	0	0	0	
SSM	TOTAL	A+M		13845	12782	15318	16285	16317	14490	13697	16571	15403	8641	9837	8220	8383	9414	9793	8119	10470	6282	6102	5900	6197	5974	5931	5185	5459
			Colombia	112	76	37	95	58	69	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Cuba	746	665	538	611	310	409	548	613	613	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Dominican Republic	1401	1290	728	735	739	1330	2042	2042	231	191	125	158	158	158	0	0	0	0	0	0	0	0	0	0	
			EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	
			EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	265	0	0	0	0	0	0	0	0	0	0	
			Grenada	1	3	0	0	1	2	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
			Mexico	7242	8194	8360	9181	10066	8300	7673	11050	11050	5483	6431	4168	3701	4350	5242	3641	5723	3856	3955	4155	4251	4128	4026	3321	3581
			Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	1	27	0	0	0	0	0	0	0	0	0	0	0
			Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			U.S.A.	4343	2554	5655	5663	5143	4380	3363	2866	3509	2968	3282	3893	4524	4613	4552	4477	4747	2425	2147	1746	1946	1846	1896	1864	1877
WAH	TOTAL	A+M		1527	1498	1721	1834	2670	2143	2408	2515	3085	2488	2957	2020	2296	2202	2049	2580	2141	2133	2725	1937	2152	1758	1739	2572	2346
	Landings		All gears	1527	1498	1721	1834	2670	2143	2408	2515	3085	2488	2957	2020	2296	2202	2049	2580	2141	2133	2725	1937	2152	1758	1739	2572	2346
	Discards			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landings		Antigua and Barbuda	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Aruba	80	70	60	50	50	125	40	50	50	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0	
			Barbados	51	51	60	51	91	82	42	35	52	52	41	41	0	0	34	45	26	41	36	27	17	30	29	22	21
			Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Brazil	92	52	64	71	33	26	1	16	58	41	0	0	0	0	405	519	449	111	75	76	70	19	357	213	73
			Cape Verde	631	458	351	350	326	361	408	503	603	429	587	487	578	500	343	458	494	1058	978	702	745	470	470	445	445
			Curaçao	280	280	250	260	270	250	230	230	230	230	230	230	230	230	0	0	0	0	0	0	0	0	0	0	
			Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	95
			Dominica	0	38	43	59	59	59	58	58	58	58	50	46	11	37	10	6	8	15	14	16	10	13	13	0	
			Dominican Republic	3	6	9	13	7	0	0	0	325	112	31	35	35	35	0	0	0	0	0	0	0	0	0	0	
			EU.España	18	23	28	32	22	20	15	25	25	29	28	32	38	46	48	305	237	110	66	38	73	53	87	35	50
			EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	0	
			EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	4	3	9	8	10	2
			Grenada	57	54	77	104	96	46	49	56	56	59	82	51	71	59	44	0	0	0	0	0	0	0	0	0	
			Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
			Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	0	0	

	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	240	120	86	111	99	210	330
	S. Tomé e Príncipe	20	28	34	27	36	39	46	80	52	56	62	52	52	52	52	94	88	76	0	131	235	241	238	479	359
	Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	7	0	0	0	0	0	0	0	
	Senegal	0	0	0	0	64	0	0	1	0	0	5	0	0	0	5	0	1	1	0	0	2	6	0	11	24
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	St. Vincent and Grenadines	4	28	33	33	41	28	16	23	10	65	52	46	311	17	40	60	0	241	29	24	31	40	31	5	4
	Sta. Lucia	0	77	79	150	141	98	80	221	223	223	310	243	213	217	169	238	169	187	0	171	195	199	0	0	148
	Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	588	415
	Trinidad and Tobago	0	0	118	1	0	0	0	0	1	1	1	2	1	9	7	6	6	7	6	6	5	5	7	9	9
	U.S.A.	110	82	134	203	827	391	764	608	750	614	858	640	633	846	789	712	558	89	1123	495	522	358	240	399	244
	UK.Bermuda	63	74	67	80	58	50	93	99	105	108	104	61	56	91	87	88	83	86	124	117	101	81	100	88	75
	UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	4
	UK.Sta Helena	17	18	12	17	35	26	25	23	0	0	0	0	0	0	0	0	0	0	0	0	29	19	31	12	16
	UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Venezuela	101	159	302	333	514	542	540	487	488	360	467	4	17	13	9	7	16	13	33	9	25	28	23	38	32
Discards	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included in the table.

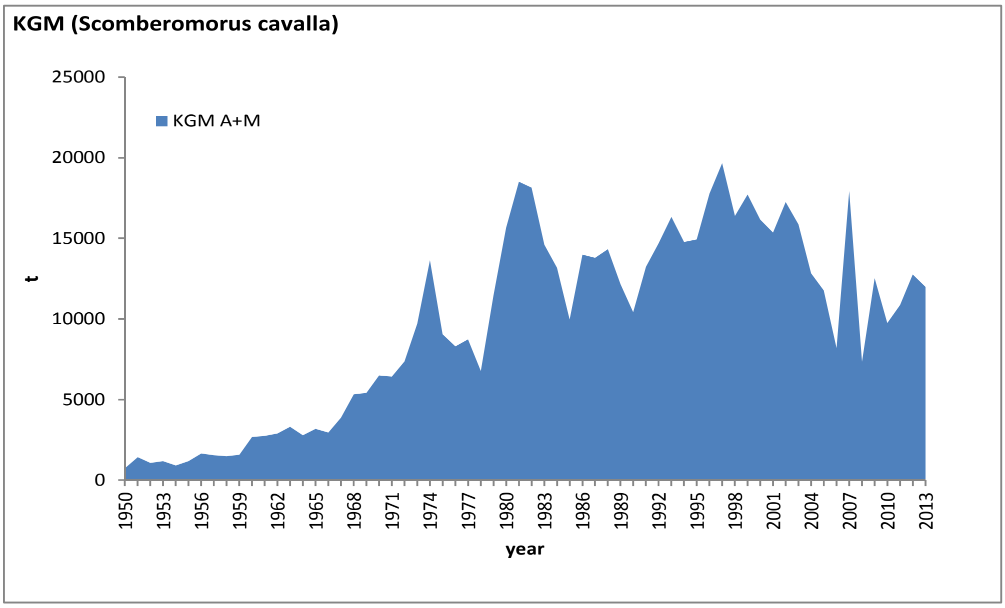


SMT-Figure 1. Estimated landings (t) of small tunas (combined) in the Atlantic and Mediterranean, 1950-2013. The data for the last three years are incomplete.

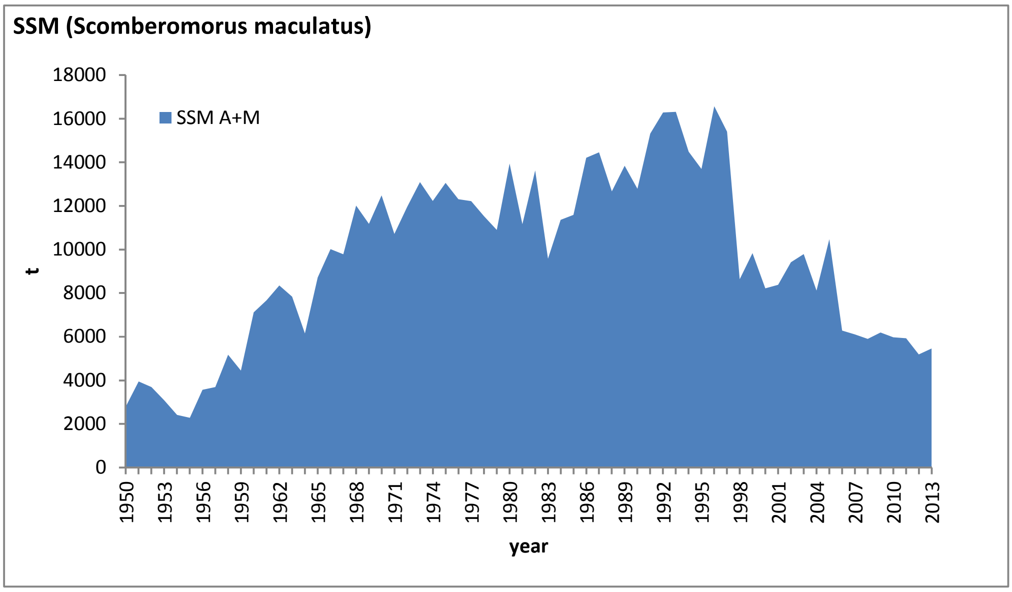


SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2013. The data for the last years are incomplete.

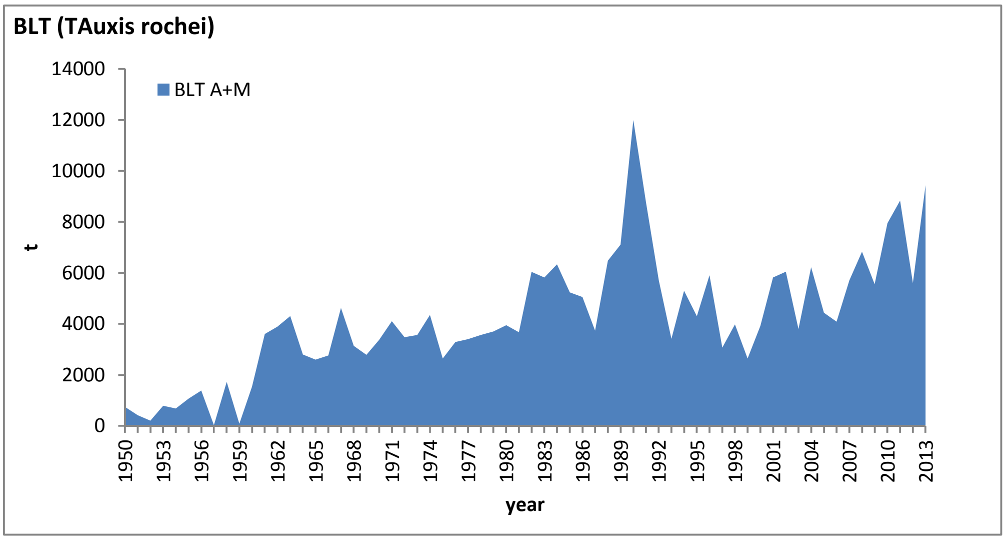
d)



e)

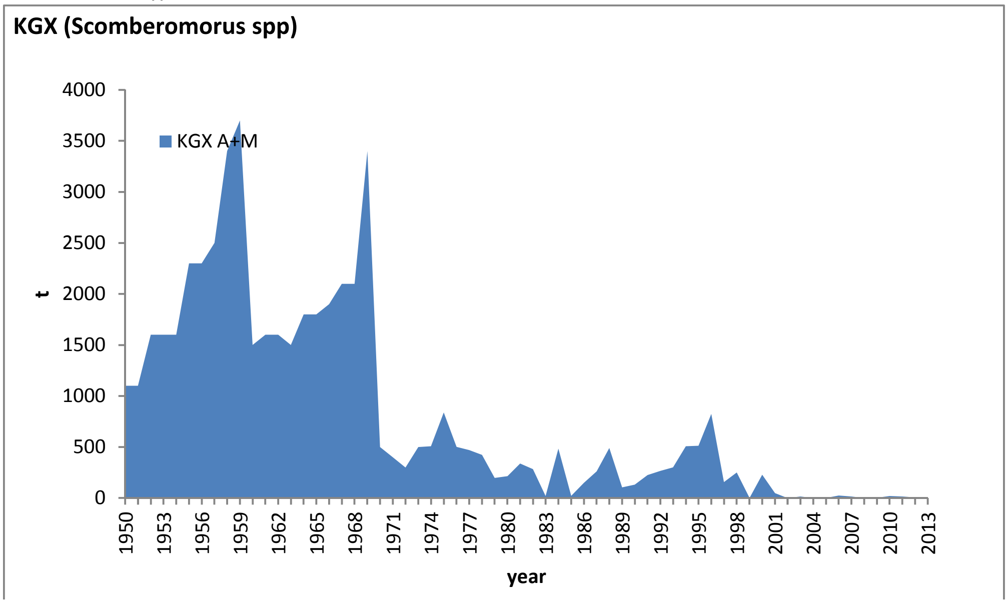


f)

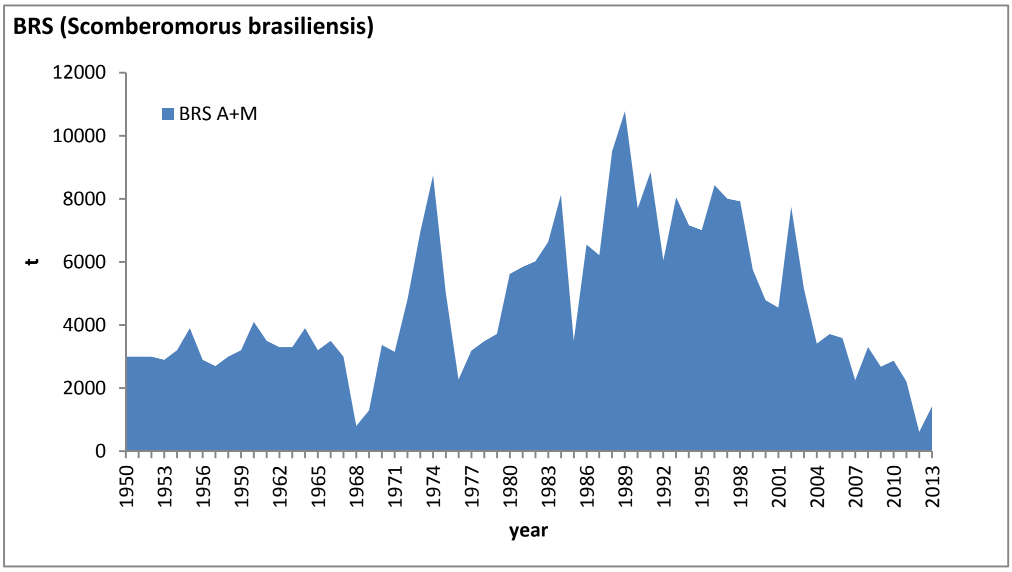


SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2013. The data for the last years are incomplete.

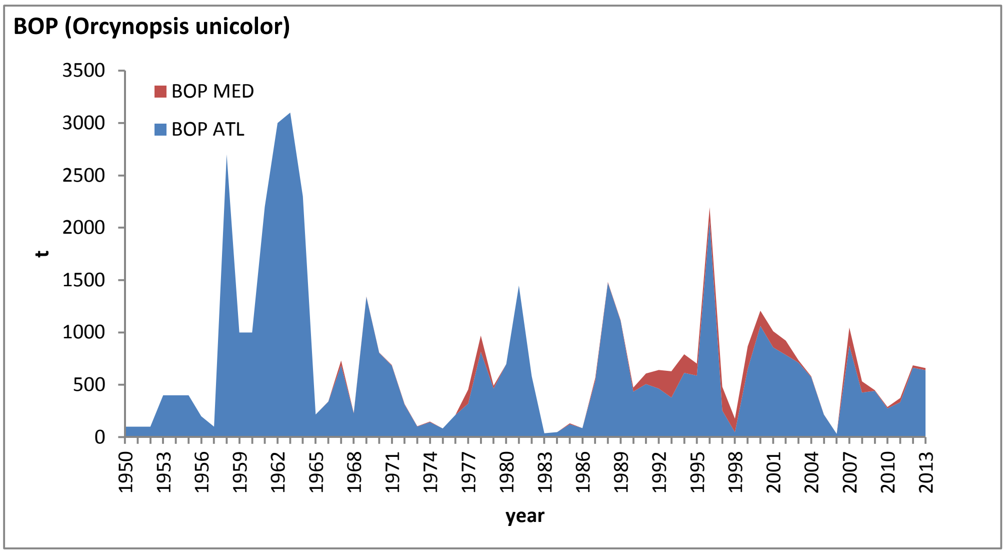
g)



h)

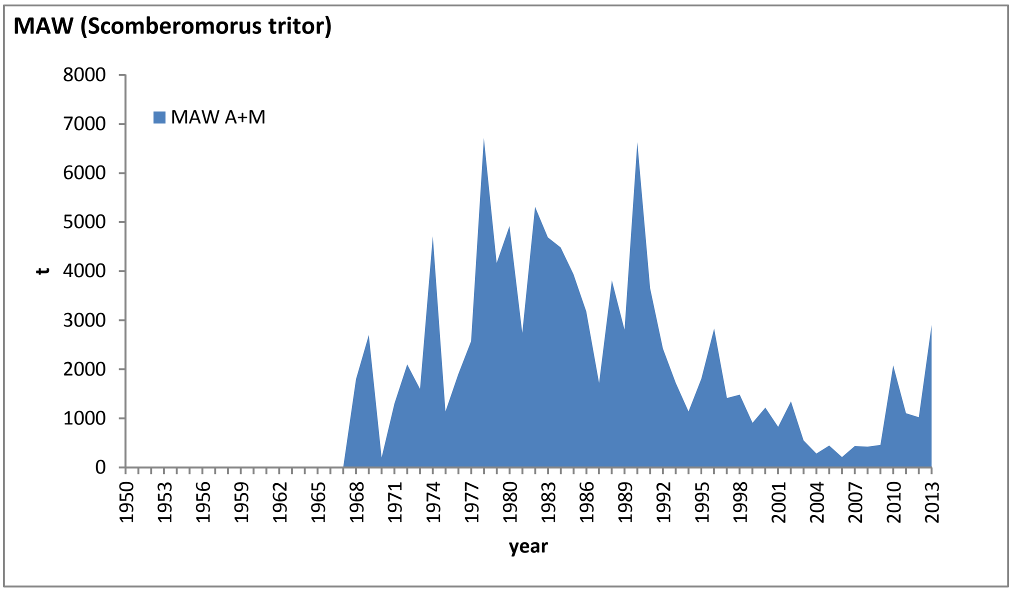


i)

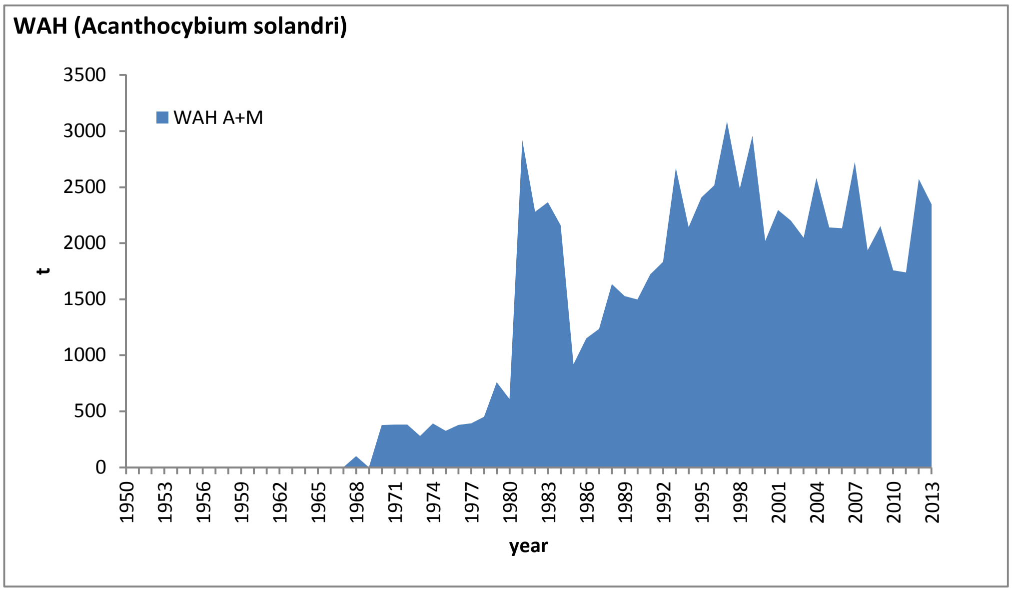


SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2013. The data for the last years are incomplete.

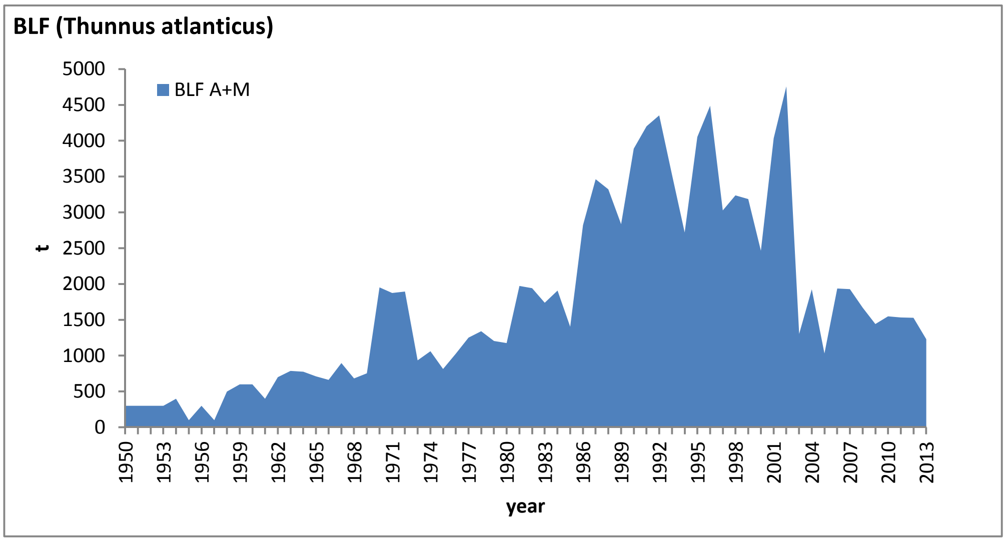
j)



k)

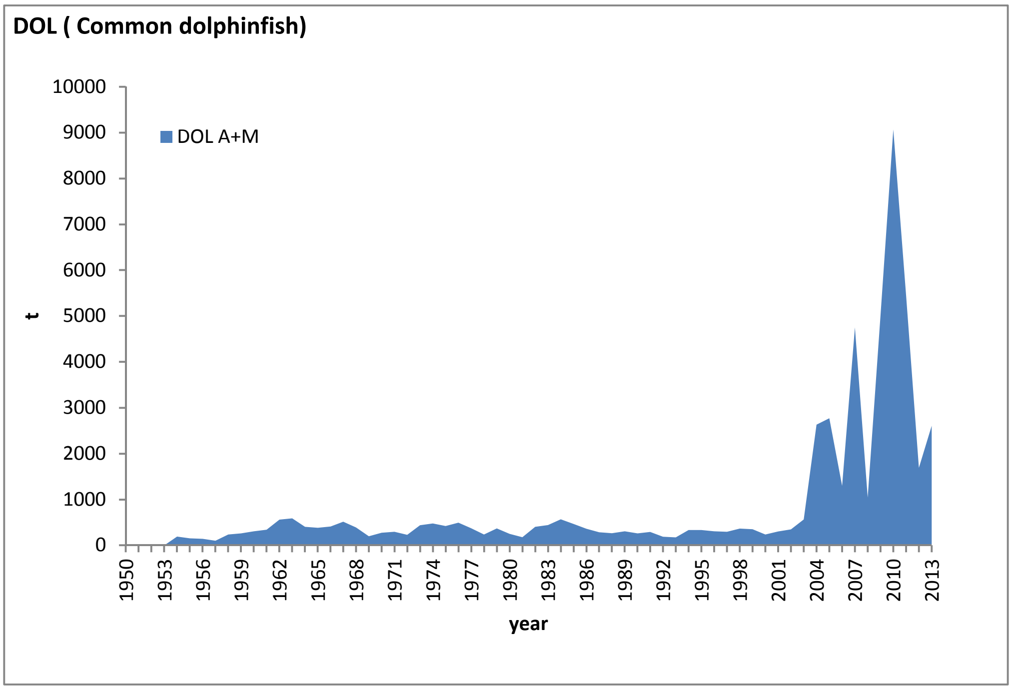


l)



SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2013. The data for the last years are incomplete.

m)



SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2013. The data for the last years are incomplete.

8.13 SHK - SHARKS

Following the development of the Shark Research and Data Collection Programme in 2013, an intersessional meeting was held in Piriapolis, Uruguay, in 2014 to collate available fishery and biological information and explore the feasibility of conducting stock assessments in the future for sharks other than the three main species (BSH, SMA, and POR). Information about the status of the shortfin mako (*Isurus oxyrinchus*) is available in the 2012 report of the assessment (Anon. 2013c), while information about the status of the blue shark (*Prionace glauca*) and porbeagle (*Lamna nasus*) stocks is available in the SCRS 2008 and 2009 reports of the assessments of those species (Anon. 2009c). An Ecological Risk Assessment was also conducted for 16 shark species (20 stocks), which is detailed in the 2012 report of the Sharks Working Group.

SHK-1. Biology

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

Blue shark, shortfin mako and porbeagle are large pelagic sharks that show a wide geographic distribution; the first two from tropical to temperate waters worldwide, while the porbeagle has a distribution associated with cold-temperate waters. Shortfin mako and porbeagle have an aplacental viviparity with an oophagy reproductive system, which decreases their fecundity but increases the probability of survival of their young. The blue shark is placental viviparous and have an average litter size of 35 individuals, while the shortfin mako has an average litter size of around 12 and the porbeagle a litter size of usually just four individuals. Although high uncertainty regarding their biology remains, available life history traits (slow growth, late maturity and small litter size) indicate that they are vulnerable to overfishing. A behavioral characteristic of these species is their tendency to segregate temporally and spatially by size-sex, during feeding, mating-reproduction, gestation and birth processes. Tagging studies have suggested that they exhibit large-scale migratory behaviour and periodic vertical movement, but the lack of information on some components of the populations precludes a complete understanding of their distribution/migration pattern by ontogenetic stages and in some cases identifying their pupping/mating grounds. Numerous aspects of the biology of these species are still poorly understood or completely unknown, particularly for some regions, which contributes to increased uncertainty in quantitative and qualitative assessments.

SHK-2. Fishery indicators

Earlier reviews of the shark database resulted in recommendations to improve data reporting on shark catches. Though global statistics on shark catches included in the database have improved, they are still insufficient to permit the Committee to provide quantitative advice on stock status with sufficient precision to guide fishery management toward optimal harvest levels. Reported and estimated catches for blue shark, shortfin mako and porbeagle are provided in **SHK-Table 1** and **SHK-Figures 1** to **2**.

A number of standardized CPUE data series for blue shark were presented in 2008. The Committee placed emphasis on using the series that pertained to fisheries that operate in oceanic waters over wide areas. **SHK-Figure 3** presents the central tendency of the available series for the two stocks of this species. During the 2012 shortfin mako stock assessment, different standardized CPUE series were presented, both for the South and North stocks. For both stocks, the series were conflicting and did not coincide with the catch tendencies (**SHK-Figures 4-5**). The Committee noted that the increase in the CPUE series could be due to an increase in abundance, an increase in catchability, in the fishing strategy or in data reporting for this species. In 2014, Chinese Taipei and Japan provided updated CPUE series for blue shark caught by pelagic longlines.

During the porbeagle assessment in 2009 (Anon. 2010b), standardized CPUE data were presented for three of the four stocks (NE, NW and SW) (**SHK-Figure 6**). These series when referring to fisheries targeting porbeagle may not reflect the global abundance of the stock and where they refer to sharks caught as by-catch they could be highly variable. In 2010, only new information from the Japanese longline fleet on the CPUE of shortfin mako and porbeagle was presented.

With regard to the 16 species (20 stocks) included in the 2012 ERA, the Committee believes that, in spite of existing uncertainties, results are more robust than those obtained in the 2008 ERA. With this information the Committee considers it easier to identify those species that are most vulnerable to prioritize research and management measures (**SHK-Table 2**). These ERAs are conditional on the biological parameters used to estimate productivity as well as the susceptibility values for the different fleets. The committee highlights the higher participation of scientists from diverse CPCs, who provided valuable data for this ERA.

SHK-3. State of the stocks

The results of the stock assessments and the 2012 ERA carried out for elasmobranchs within the ICCAT Convention area are summarised below. To date, these assessments have focused only on Atlantic stocks, and not on shark stocks in the Mediterranean Sea. Nevertheless, it should be noted that two Mediterranean-specific measures relevant to shark species of interest were adopted during 2012. First, 10 elasmobranch species were strictly protected under Annex II of the Barcelona Convention (under the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean). These species include shortfin mako (*Isurus oxyrinchus*), porbeagle (*Lamna nasus*), smooth hammerhead (*Sphyrna zygaena*), scalloped hammerhead (*Sphyrna lewini*), great hammerhead (*Sphyrna mokarran*), and tope (*Galeorhinus galeus*). Under Annex II protection, these shark species can no longer be captured or sold, and plans for their recovery should be developed. Second, the General Fisheries Commission for the Mediterranean (GFCM) adopted Recommendation GFCM/36/2012/3, under which shark species listed under Annex II of the Barcelona Convention cannot be retained on board, transhipped, landed, transferred, stored, sold, displayed, or offered for sale. Additionally, in 2014, porbeagle was added to appendix II of CITES, which regulates global trade.

The ERA conducted by the Committee was a quantitative assessment consisting of a risk analysis to evaluate the biological productivity of these stocks and a susceptibility analysis to assess their propensity to capture and mortality in pelagic longline fisheries. Three metrics were used to calculate vulnerability (Euclidean distance, a multiplicative index, and the arithmetic mean of the productivity and susceptibility ranks). The five stocks with the lowest productivity were the bigeye thresher (*Alopias superciliosus*), sandbar (*Carcharhinus plumbeus*), longfin mako (*Isurus paucus*), night (*Carcharhinus signatus*), and South Atlantic silky shark (*Carcharhinus falciformis*). The highest susceptibility values corresponded to shortfin mako (*Isurus oxyrinchus*), North and South Atlantic blue sharks (*Prionace glauca*), porbeagle (*Lamna nasus*), and bigeye thresher. Based on the results, the bigeye thresher, longfin and shortfin makos, porbeagle, and night sharks were the most vulnerable stocks. In contrast, North and South Atlantic scalloped hammerheads (*Sphyrna lewini*), smooth hammerhead (*Sphyrna zygaena*), and North and South Atlantic pelagic stingray (*Pteroplatytrygon violacea*) had the lowest vulnerabilities. The Committee observed that the data regarding night shark distribution was considered to be incomplete and therefore the results with regard to this species should be considered preliminary and requiring revision before publication.

SHK-3.1 Blue shark

For both North and South Atlantic blue shark stocks, although the results are highly uncertain, biomass was believed to be above the biomass that would support MSY and harvest levels at that time below F_{MSY}. Results from all models used in the 2008 assessment (Anon. 2009c) were conditional on the assumptions made (*e.g.*, estimates of historical catches and effort, the relationship between catch rates and abundance, the initial state of the stock in the 1950s, and various life-history parameters), and a full evaluation of the sensitivity of results to these assumptions was not possible during the assessment. Nonetheless, as for the 2004 stock assessment (Anon. 2005), the weight of available evidence does not support hypotheses that fishing has yet resulted in depletion to levels below the Convention objective (**SHK-Figure 7**).

SHK-3.2 Shortfin mako shark

The 2012 assessment of the status of North and South Atlantic stocks of shortfin mako shark was conducted with updated time series of relative abundance indices and annual catches. Coverage of Task I catch data and number of CPUE series increased since the last stock assessment conducted in 2008, with Task I data now being available for most major longline fleets. The available CPUE series showed increasing or flat trends for the finals years of each series (since the 2008 stock assessment) for both North and South stocks, hence the indications of potential overfishing shown in the previous stock assessment have diminished and the level of catches at that time may be considered sustainable.

For the North Atlantic stock, results of the two stock assessment model runs used indicated almost unanimously that stock abundance in 2011 was above B_{MSY} and F was below F_{MSY} (**SHK-Figure 8**). For the South Atlantic stock, all model runs indicated that the stock was not overfished and overfishing was not occurring (**SHK-Figure 9**). Thus, these results indicated that both the North and South Atlantic stocks are healthy and the probability of overfishing is low. However, they also showed inconsistencies between estimated biomass trajectories and input CPUE trends, which resulted in wide confidence intervals in the estimated biomass and fishing mortality trajectories and other parameters. Particularly in the South Atlantic an increasing trend in the abundance indices since the 1970s was not consistent with the increasing catches. The high uncertainty in past catch estimates and deficiency of some important biological parameters, particularly for the Southern stock, are still obstacles for obtaining reliable estimates of current status of the stocks.

SHK-3.3 Porbeagle shark

In 2009, the Committee attempted an assessment of the four porbeagle stocks in the Atlantic Ocean: Northwest, Northeast, Southwest and Southeast (Anon. 2010b). In general, data for Southern hemisphere porbeagle are too limited to provide a robust indication on the status of the stocks. For the Southwest, limited data indicate a decline in CPUE in the Uruguayan fleet, with models suggesting a potential decline in porbeagle abundance to levels below MSY and fishing mortality rates above those producing MSY (**SHK-Figure 10**). But catch and other data are generally too limited to allow definition of sustainable harvest levels. Catch reconstruction indicates that reported landings grossly underestimate actual landings. In 2013 Uruguay prohibited retention of porbeagle sharks. For the Southeast, information and data are too limited to assess their status. Available catch rate patterns suggest stability since the early 1990s, but this trend cannot be viewed in a longer term context and thus are not informative on current levels relative to B_{MSY}.

The Northeast Atlantic stock has the longest history of commercial exploitation. A lack of CPUE data for the peak of the fishery adds considerable uncertainty in identifying the status relative to virgin biomass. Exploratory assessments indicate that biomass is below B_{MSY} and that recent fishing mortality is near or above F_{MSY} (**SHK-Figure 11**). Recovery of this stock to B_{MSY} under no fishing mortality is estimated to take ca. 15-34 years. The 2009 EU TAC of 436 t in effect for the Northeast Atlantic may have allowed the stock to remain stable, at its depleted biomass level, under most credible model scenarios. Since 2010 the EU TAC has been set at zero.

The Canadian assessment of the Northwest Atlantic porbeagle stock indicated that biomass is depleted to well below B_{MSY}, but recent fishing mortality is below F_{MSY} and recent biomass appears to be increasing. Additional modelling using a surplus production approach indicated a similar view of stock status, i.e. depletion to levels below B_{MSY} and fishing mortality rates also below F_{MSY} (**SHK-Figure 12**). The Canadian assessment projected that with no fishing mortality, the stock could rebuild to B_{MSY} level in approximately 20-60 years, whereas surplus-production based projections indicated 20 years would suffice. Under the Canadian strategy of a 4% exploitation rate, the stock was expected to recover in 30 to 100+ years according to the Canadian projections. Canadian directed fisheries for porbeagle have been closed since 2013.

SHK-4. Management recommendations

Precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible.

Considering the need to improve stock assessments of pelagic shark species impacted by ICCAT fisheries and bearing in mind Rec. 12-05 adopted in 2012 as well as the various previous recommendations which made the submission of shark data mandatory, the Committee strongly urges the CPCs to provide the corresponding statistics of all ICCAT fisheries, including recreational and artisanal fisheries, and to the extent possible non-ICCAT fisheries capturing these species. The Committee considers that a basic premise for correctly evaluating the status of any stock is to have a solid basis to estimate total removals.

During the 2009 porbeagle assessment, both porbeagle stocks in the Northwest and Northeast Atlantic were estimated to be overfished, with the Northeastern stock being more highly depleted. In addition, porbeagle received a high vulnerability ranking in the 2008 and 2012 ERAs. The main source of fishing mortality on these stocks was from directed porbeagle fisheries which are not under the Commission's direct mandate. The main porbeagle directed fisheries have subsequently ceased operations (EU and Canada).

The Committee recommends that the Commission work with countries catching porbeagle and relevant RFMOs to ensure recovery of North Atlantic porbeagle stocks (e.g. NAFO) and prevent overexploitation of South Atlantic stocks (e.g. CCSBT). In particular, porbeagle fishing mortality should be kept to levels in line with scientific advice and with catches not exceeding the current level. New targeted porbeagle fisheries should be prevented, porbeagles retrieved alive should be released alive, and all catches should be reported. Management measures and data collection should be harmonized as much as possible among all relevant RFMOs dealing with these stocks, ICCAT should facilitate appropriate communication.

The Committee recommends that joint work with the ICES Working Group on Elasmobranch Fishes should be continued. Species occurring in the Mediterranean Sea should also be discussed. Collaboration with the GFCM regarding these species should be explored.

The Committee welcomed the management measures (Rec 13-10) adopted by the Commission recently regarding scientific observer collection of biological samples from currently prohibited species that are dead at haulback, provided that the samples are part of the research project approved by the SCRS.

The Committee reiterates that the CPCs explore methods to estimate catches of sharks in purse seine and artisanal fisheries. Management measures should be applied to these sectors where catches of shark species are determined to be significant. Methods for mitigating shark by-catch by these fisheries also need to be investigated and applied.

Taking into consideration the continued high vulnerability ranking in the ERA, results from the modelling approaches used in the assessment, the associated uncertainty, and the relatively low productivity of shortfin mako sharks, the Committee recommends, as a precautionary approach, that catches of shortfin mako sharks should not be increased with respect to current levels until more reliable stock assessment results are available for both the Northern and Southern stocks.

NORTH ATLANTIC BLUE SHARK SUMMARY

Provisional Yield (2013)		37,137 t[2]
2007 Yield		61,845 t[1]
Relative Biomass	B_{2007}/B_{MSY}	1.87-2.74[3]
	B_{2007}/B_0	0.67-0.93[4]
Relative Fishing Mortality	F_{MSY}	0.15[5]
	F_{2007}/F_{MSY}	0.13-0.17[6]
Overfished 2007 (Y/N)		No
Overfishing 2007 (Y/N)		No

[1] Estimated catch used in the 2008 assessments (Anon. 2009c).
[2] Task I catch.
[3] Range obtained from the Bayesian Surplus Production (BSP) (low) and the Catch-Free Age Structured Production (CFASP) (high) models. Value from CFASP is SSB/SSB_{MSY}.
[4] Range obtained from BSP (high), CFASP and Age-Structured Production Model (ASPM) (low) models.
[5] From BSP and CFASP models (same value). CV is from CFASP model.
[6] Range obtained from BSP (high) and CFASP (low) models.

SOUTH ATLANTIC BLUE SHARK SUMMARY

Provisional Yield (2013)		19,314 t[2]
2007 Yield		37,075 t[1]
Relative Biomass	B_{2007}/B_{MSY}	1.95-2.80[3]
	B_{2007}/B_0	0.86-0.98[4]
Relative Fishing Mortality	F_{MSY}	0.15-0.20[5]
	F_{2007}/F_{MSY}	0.04-0.09[5]
Overfished 2007 (Y/N)		No
Overfishing 2007 (Y/N)		No

[1] Estimated catch used in the 2008 assessments (Anon. 2009c).
[2] Task I catch.
[3] Range obtained from BSP (low) and CFASP (high) models. Value from CFASP is $SSB/SSB_{MSY.}$
[4] Range obtained from BSP (high) and CFASP (low) models. Value from CFASP is SSB/SS_{B0}.
[5] Range obtained from BSP (low) and CFASP (high) models.

NORTH ATLANTIC SHORTFIN MAKO SUMMARY

Provisional Yield (2013)		3,635 t[1]
Relative Biomass	B_{2010}/B_{MSY}	1,15-2,04[2]
	B_{2010}/B_0	0,55-1,63[2]
Relative Fishing Mortality	F_{MSY}	0,029-0,104[2]
	F_{2010}/F_{MSY}	0,16-0,92[2]
Overfished 2010 (Y/N)		No[3]
Overfishing 2010 (Y/N)		No[3]
Management Measures in Effect		[Rec. 04-10], [Rec. 07-06], [Rec. 10-06]

[1] Task I catch.
[2] Range obtained from BSP.
[3] The Committee considers that the results present a high level of uncertainty.

SOUTH ATLANTIC SHORTFIN MAKO SUMMARY

Provisional Yield (2013)		1,907 t[1]
Relative Biomass	B_{2010}/B_{MSY}	1,36-2,16[2]
	B_{2010}/B_0	0,72-3,16[2]
Relative Fishing Mortality	F_{MSY}	0,029-0,041[2]
	F_{2010}/F_{MSY}	0,07-0,40[2]
Overfished 2010 (Y/N)		No[3]
Overfishing 2010 (Y/N)		No[3]
Management Measures in Effect		[Rec. 04-10], [Rec. 07-06], [Rec. 10-06]

[1] Task I catch.
[2] Range obtained from BSP.
[3] The Committee considers that the results present a high level of uncertainty.

NORTHWEST ATLANTIC PORBEAGLE SUMMARY

Current Yield (2008)		144.3 t[1]
Relative Biomass	B_{2008}/B_{MSY}	0.43-0.65[2]
Relative Fishing Mortality	F_{MSY}	0.025-0.075[3]
	F_{2008}/F_{MSY}	0.03-0.36[4]
Domestic Management Measures in Effect		TACs of 185 t and 11.3 t[5]
Overfished (Y/N)		Yes
Overfishing (Y/N)		No

[1] Estimated catch allocated to the Northwest stock area. Not updated as area boundaries have not been formally defined.
[2] Range obtained from age-structured model (Canadian assessment; low) and BSP model (high). Value from Canadian assessment is in numbers; value from BSP in biomass. All values in parentheses are CVs.
[3] Range obtained from BSP model (low) and age-structured model (high).
[4] Range obtained from BSP model (low) and age-structured model (high).
[5] The TAC for the Canadian EEZ was 185 t (in 2008) (MSY catch is 250 t); the TAC for the USA is 11.3 t (dressed weight).

SOUTHWEST ATLANTIC PORBEAGLE SUMMARY

Current Yield (2008)		164.6 t[1]
Relative Biomass	B_{2008}/B_{MSY}	0.36-0.78[2]
Relative Fishing Mortality	F_{MSY}	0.025-0.033[3]
	F_{2008}/F_{MSY}	0.31-10.78[4]
Overfished (Y/N)		Yes
Overfishing (Y/N)		No
Domestic Management Measures in Effect:		TAC of 0 t[5]

[1] Estimated catch allocated to the Southwest stock area. Not updated as area boundaries have not been formally defined.
[2] Range obtained from BSP (low and high) and CFASP models. Value from CFASP model (SSB/SSB_{MSY}) was 0.48 (0.20).
[3] Range obtained from BSP (low) and CFASP (high) models.
[4] Range obtained from BSP (low and high) and CFASP models. Value from CFASP model was 1.72 (0.51).
[5] Retention of porbeagle sharks has been prohibited in Uruguay since 2013.

NORTHEAST ATLANTIC PORBEAGLE SUMMARY

Current Yield (2008)		287 t[1]
Relative Biomass	B_{2008}/B_{MSY}	0.09-1.93[2]
Relative Fishing Mortality	F_{MSY}	0.02-0.03[3]
	F_{2008}/F_{MSY}	0.04-3.45[4]
Overfished (Y/N)		Yes
Overfishing (Y/N)		No
Domestic Management Measures in Effect		TAC of 0 t[5] Maximum landing length of 210 cm FL[5]

[1] Estimated catch allocated to the Northeast stock area. Not updated as area boundaries have not been formally defined.
[2] Range obtained from BSP (high) and ASPM (low) models. Value from ASPM model is SSB/SSB_{MSY}. The value of 1.93 from the BSP corresponds to a biologically unrealistic scenario; all results from the other BSP scenarios ranged from 0.29 to 1.05.
[3] Range obtained from the BSP and ASPM models (low and high for both models).
[4] Range obtained from BSP (low) and ASPM (high) models. The value of 0.04 from the BSP corresponds to a biologically unrealistic scenario; all results from the BSP scenarios ranged from 0.70 to 1.26.
[5] In the European Union the TAC has been set at zero t since 2010.

BSH-Table 1. Estimated catches (t) of blue shark (*Prionace glauca*) by area, gear and flag.

			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL			1812	3030	4310	3644	9577	9562	9634	9561	37611	33811	35095	39102	34447	32736	35572	36303	43070	40351	47043	53900	58840	65192	73049	62909	56552
	ATN		1810	3028	4299	3536	9566	8084	8285	7258	29053	26510	25741	27965	21022	20037	22911	21740	22357	23215	26925	30722	35196	37177	38083	36722	37137
	ATS		0	0	8	107	10	1472	1341	2301	8409	7238	9332	11091	13378	12682	12650	14438	20642	16957	20068	23097	23459	27799	34926	26145	19314
	MED		2	1	3	1	0	6	8	2	150	63	22	45	47	17	11	125	72	178	50	81	185	216	40	42	101
Landings	ATN	Longline	0	1387	2257	1583	5734	5880	5871	5467	27618	25288	24405	26473	20013	18426	21936	20304	21033	22090	25966	30443	34429	36283	37284	36506	36824
		Other surf.	1330	900	1270	1768	2696	1632	1793	1086	1255	1030	1228	1355	904	1543	975	1372	1258	1080	905	150	664	727	593	109	81
	ATS	Longline	0	0	8	107	10	1472	1341	2294	8398	7231	9305	11091	13376	12678	12645	14339	20638	16898	19998	22708	23453	27785	34531	25877	19314
		Other surf.	0	0	0	0	0	0	0	0	6	4	27	0	1	4	6	99	3	59	10	375	6	14	391	264	0
	MED	Longline	0	0	0	0	0	5	7	1	147	61	20	44	47	17	10	43	71	83	48	81	18	50	40	41	69
		Other surf.	2	1	3	1	0	1	1	1	2	2	2	1	1	1	0	81	0	95	2	1	167	165	0	0	32
Discards	ATN	Longline	480	741	772	184	1136	572	621	602	180	170	104	137	105	68	0	63	66	45	53	129	102	167	205	106	232
		Other surf.	0	0	0	0	0	0	0	103	0	22	4	0	0	0	0	1	0	0	0	1	1	1	2	1	
	ATS	Longline	0	0	0	0	0	0	0	7	5	4	1	0	0	0	0	0	0	0	60	14	0	0	4	4	0
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	ATN	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	461	1039	903	1216
		Brazil	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	978	680	774	1277	1702	1260	1494	528	831	612	547	624	581	836	346	965	1134	977	843	0	0	0	0	1	0
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China PR	0	0	0	0	0	0	0	0	0	0	0	0	185	104	148	0	0	0	367	109	88	53	109	98	327
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	206	240	588	292	110	73	99	148	94	133
		EU.Denmark	2	2	1	1	0	1	2	3	1	1	0	2	1	13	5	1	0	0	0	0	0	0	0	0	
		EU.España	0	0	0	0	0	0	0	0	24497	22504	21811	24112	17362	15666	15975	17314	15006	15464	17038	20788	24465	26094	27988	28666	28562
		EU.France	79	130	187	276	322	350	266	278	213	163	399	395	207	221	57	106	120	99	167	119	84	122	115	31	
		EU.Ireland	0	0	0	0	0	0	0	0	0	0	66	31	66	11	2	0	0	0	0	0	0	0	1	3	2
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		EU.Portugal	0	1387	2257	1583	5726	4669	4722	4843	2630	2440	2227	2081	2110	2265	5643	2025	4027	4338	5283	6167	6252	8261	6509	3725	3463
		EU.United Kingdom	0	1	0	0	0	0	12	0	0	1	0	12	9	6	4	6	5	3	6	6	96	8	10	8	10
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		Japan	0	0	0	0	0	1203	1145	618	489	340	357	273	350	386	558	1035	1729	1434	1921	2531	2007	1763	1227	2437	2210
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	537	299	327
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
		Panama	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	254	892	613	1575	0	0	0	271
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	456	0	0	0	0	43	134	255	56	0	5	12
		Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	281
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	2	1	1	0	2	8	9	11	11	8
		U.S.A.	271	87	308	215	680	29	23	283	211	255	217	291	39	0	0	7	2	2	1	8	4	9	65	56	32
		UK.Bermuda	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	26	10	18	7	71	74	117	98	52
	ATS	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	259	0	236	109	0	273	243	483	234
		Benin	0	0	0	0	0	0	0	0	6	4	27	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brazil	0	0	0	0	0	0	0	743	1103	0	179	1683	2173	1971	2166	1667	2523	2591	2258	1986	1274	1500	1980	1607	1008
		China PR	0	0	0	0	0	0	0	0	0	0	0	0	565	316	452	0	0	0	585	40	109	41	131	84	64
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	521	800	866	1805	2177	1843	1356	1625	2138	1941	2105
		EU.España	0	0	0	0	0	0	0	0	5272	5574	7173	6951	7743	5368	6626	7366	6410	8724	8942	9615	13099	13953	16978	14348	10408
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
		EU.Portugal	0	0	0	0	0	0	847	867	1336	876	1110	2134	2562	2324	1841	1863	3184	2751	4493	4866	5358	6338	7642	2424	1646
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	239	0	0	14	0	0	0	
		Japan	0	0	0	0	0	1388	437	425	506	510	536	221	182	343	331	209	236	525	896	1789	981	1161	1483	3060	2271
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222	125	112	61
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	2213	0	1906	6616	0	0	1829	207	2352	2957	1439	1147
		Panama	0	0	0	0	0	0	0	0	0	0	168	22	0	0	0	0	0	0	0	521	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	203	51	60
		South Africa	0	0	0	0	0	0	0	0	0	23	21	0	83	63	232	128	154	90	82	126	119	125	318	158	179
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	
		Uruguay	0	0	8	107	10	84	57	259	180	248	118	81	66	85	480	462	376	232	337	359	942	208	725	433	130
	MED	EU.Cyprus	0	0	0	0	0	0	0	0	0	0	0	9	0	0	3	6	5	0	0	0	0	0	0	0	
		EU.España	0	0	0	0	0	0	0	0	146	59	20	31	6	3	3	4	8	61	3	2	7	48	38	39	40
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
		EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	113	1	95	46	75	175	165	0	0	57
		EU.Malta	2	1	3	1	0	1	1	1	2	2	2	1	1	1	0	0	0	0	1	1	2	1	1	2	2
		EU.Portugal	0	0	0	0	0	0	0	0	0	2	0	5	41	14	3	0	56	22	0	0	0	2	0	0	
		Japan	0	0	0	0	0	5	7	1	1	0	0	0	0	0	1	1	2	0	0	2	0	0	0	0	
Discards	ATN	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		U.S.A.	480	741	772	184	1136	572	618	704	180	192	100	137	106	68	0	65	66	45	54	130	103	167	206	106	231
		UK.Bermuda	0	0	0	0	0	0	3	1	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATS	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	14	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0
		U.S.A.	0	0	0	0	0	0	0	7	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included on the table.

SMA-Table 1. Estimated catches (t) of Shortfin mako (Isurus oxyrinchus) by area, gear and flag.

			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL			1648	1349	1326	1446	2966	2972	4870	2778	5570	5477	4097	4994	4654	5361	7324	7598	6618	6330	6911	5440	6143	6661	7024	7351	5543
	ATN		1011	785	797	953	2193	1526	3109	2019	3545	3816	2738	2568	2651	3395	3895	5174	3472	3370	4075	3559	4109	4183	3771	4477	3635
	ATS		637	564	529	493	773	1446	1761	759	2019	1652	1355	2422	1996	1964	3426	2423	3130	2951	2834	1880	2034	2477	3251	2872	1907
	MED		0	0	0	0	0	0	0	0	6	8	5	4	7	2	2	2	17	10	2	1	1	2	2	2	0
Landings	ATN	Longline	321	497	573	660	1499	1173	1633	1770	3369	3648	2645	2254	2424	3129	3792	4755	3172	3105	3901	3367	3551	3554	3197	4145	3292
		Other surf.	681	278	213	254	670	331	1447	248	177	168	91	313	227	266	104	418	300	264	168	183	538	627	565	314	328
	ATS	Longline	637	564	519	480	763	1426	1748	744	1997	1642	1345	2413	1979	1949	3395	2347	3116	2907	2792	1798	2027	2476	3189	2817	1873
		Other surf.	0	0	9	13	10	20	13	15	23	10	10	9	18	15	31	76	14	43	30	82	7	1	62	55	34
	MED	Longline	0	0	0	0	0	0	0	0	6	8	5	4	7	2	2	2	17	10	2	1	1	2	2	2	0
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	ATN	Longline	9	10	11	38	24	21	29	1	0	0	0	0	0	0	0	0	0	0	7	9	20	2	9	18	15
		Other surf.	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	
	ATS	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	
Landings	ATN	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	28	69	114	99
		Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Canada	0	0	0	0	0	0	111	67	110	69	70	78	69	78	73	80	91	71	72	43	53	41	37	29	35
		China PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	16	19	29	18	24	11
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	57	19	30	25	23	11	14	13	14	9
		EU.España	0	0	0	0	0	0	0	0	2416	2199	2051	1566	1684	2047	2068	3404	1751	1918	1816	1895	2216	2091	1667	2308	1509
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	2	0	0	
		EU.Portugal	0	193	314	220	796	649	657	691	354	307	327	318	378	415	1249	473	1109	951	1540	1033	1169	1432	1045	1023	801
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	2	3	2	1	1	1	0	0	0	1	15	0	0	0	
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	4	0	0	4
		Japan	207	221	157	318	425	214	592	790	258	892	120	138	105	438	267	572	0	0	82	131	98	116	53	56	35
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	27	15
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	420	406	667
		Mexico	0	0	0	0	0	0	10	0	0	0	0	10	16	0	10	6	9	5	8	6	7	8	8	8	4
		Panama	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	49	33	39	0	0	0	18
		Philippines	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	17	21	0	0	2	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	1	0	1	2	3	1	2	1	1	1	1	1	0	2	1
		U.S.A.	795	360	315	376	948	642	1710	469	407	347	159	454	395	415	142	521	469	386	375	344	365	392	383	412	402
		UK.Bermuda	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	20	6	11	2	35	22	20	33	9
	ATS	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	17	2	0	32	59	78	88
		Brazil	0	0	0	0	0	0	0	83	190	0	27	219	409	226	283	238	426	210	145	203	99	128	192	196	80
		China PR	0	0	0	0	34	45	23	27	19	74	126	305	22	208	260	0	0	0	77	6	24	32	29	8	9
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	626	121	128	138	211	124	117	144	203	150	156
		Côte D'Ivoire	0	0	9	13	10	20	13	15	23	10	10	9	15	15	30	15	14	16	25	0	5	7	0	20	34
		EU.España	0	0	0	0	0	0	0	0	1356	1141	861	1200	1235	811	1158	703	584	664	654	628	939	1192	1535	1197	1080
		EU.Portugal	0	0	0	0	0	0	92	94	165	116	119	388	140	56	625	13	242	493	375	321	502	336	409	176	132
		EU.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	11	0	0	0	
		Japan	618	538	506	460	701	1369	1617	514	244	267	151	264	56	133	118	398	0	0	72	115	108	103	132	291	111
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	13	7	7
		Namibia	0	0	0	0	0	0	0	0	0	0	1	0	0	459	0	509	1415	1243	1002	295	23	307	377	586	9
		Panama	0	0	0	0	0	0	0	0	0	0	24	1	0	0	0	0	0	0	0	10	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	34	23
		South Africa	0	0	0	0	0	0	0	0	0	19	13	0	79	19	138	126	125	99	208	136	100	144	211	92	177
		U.S.A.	0	0	0	0	0	0	0	0	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Uruguay	19	26	13	20	28	12	17	26	20	23	21	35	40	38	188	249	146	68	36	41	106	23	76	36	1
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	12	13	1	0	0	0	0	0	
	MED	EU.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	
		EU.España	0	0	0	0	0	0	0	0	6	7	5	3	2	2	2	2	2	4	1	0	0	1	2	2	0
		EU.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	0	0	0	0	0	0	0	0	0	1	0	1	5	0	0	0	15	5	0	0	0	0	0	0	
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	ATN	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		Mexico	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		U.S.A.	9	10	11	38	24	21	28	1	0	0	0	0	0	0	0	0	0	0	7	10	20	2	9	18	15
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATS	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included on the table.

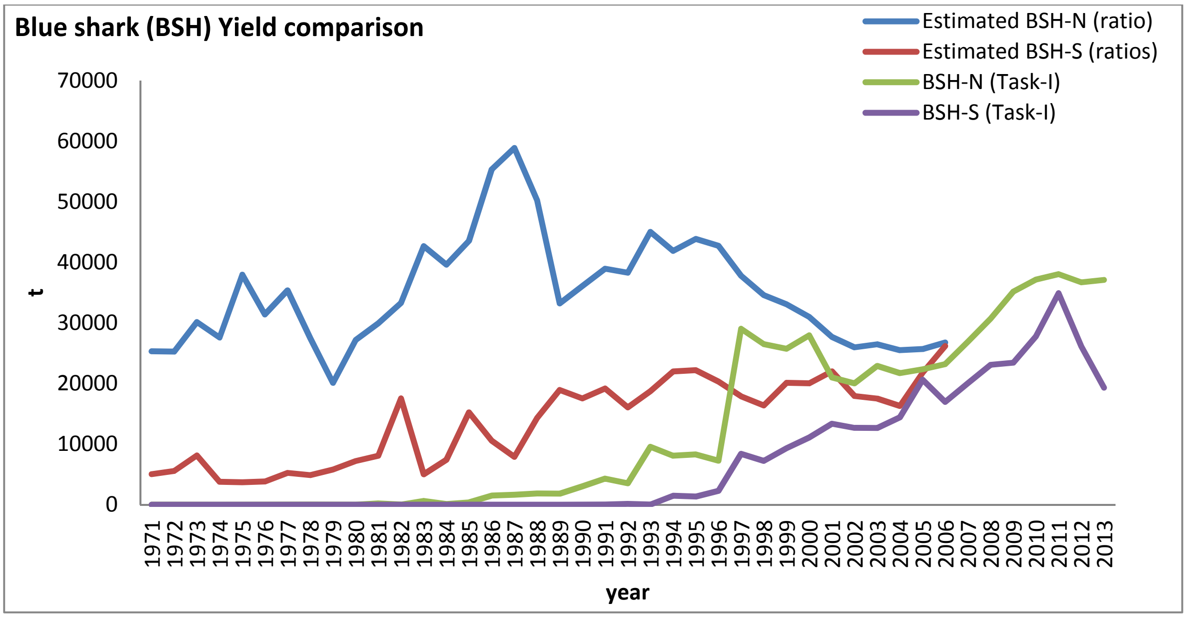
POR-Table 1. Estimated catches (t) of porbeagle (Lamna nasus) by area, gear and flag.

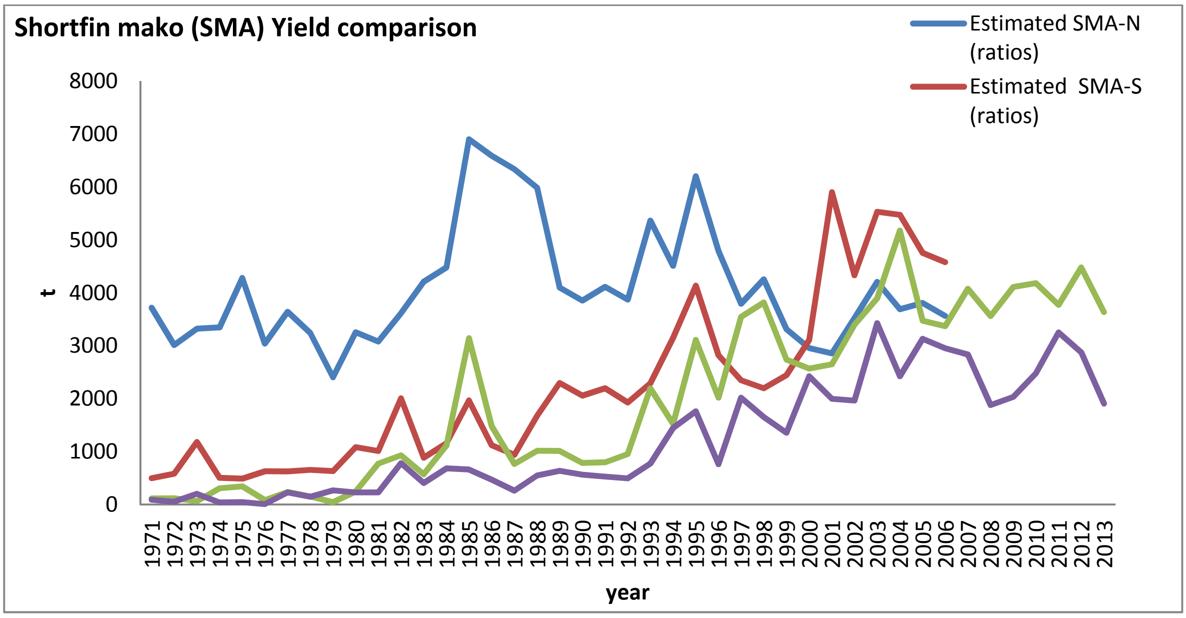
			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL			1013	1309	1991	2603	1910	2729	2140	1560	1859	1469	1403	1469	999	848	648	745	571	507	525	611	484	136	90	149	188
	ATN		1013	1309	1990	2603	1909	2726	2136	1556	1833	1451	1393	1457	998	838	604	725	539	470	512	524	421	119	68	111	158
	ATS		0	0	0	0	1	2	3	3	26	17	10	11	1	11	43	17	31	37	13	85	62	16	21	37	30
	MED		1	0	1	0	0	0	0	1	0	1	0	1	1	0	0	3	2	1	0	2	1	1	0	1	0
Landings	ATN	All gears	1013	1309	1990	2601	1909	2725	2136	1556	1833	1451	1393	1457	998	838	604	725	539	470	512	524	421	117	67	111	154
	ATS		0	0	0	0	1	2	3	3	26	16	9	11	1	11	43	17	31	37	13	85	62	16	21	37	30
	MED		1	0	1	0	0	0	0	1	0	1	0	1	1	0	0	3	2	1	0	2	1	1	0	1	0
Discards	ATN		0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4
	ATS		0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	ATN	Canada	73	78	329	813	919	1575	1353	1051	1334	1070	965	902	499	237	142	232	202	192	93	124	62	83	30	33	19
		EU.Denmark	33	46	85	80	91	93	86	72	69	85	107	73	76	42	0	0	0	0	0	0	0	0	0	2	
		EU.España	42	26	47	15	21	52	19	41	25	25	18	13	24	54	27	11	14	34	8	41	77	0	0	0	
		EU.France	341	551	300	496	633	820	565	267	315	219	240	410	361	461	303	413	276	194	354	311	228	0	2	4	
		EU.Germany	0	0	0	0	0	0	0	0	0	0	0	17	1	3	0	0	0	0	0	0	0	0	0	0	
		EU.Ireland	0	0	0	0	0	0	0	0	0	0	8	2	6	3	11	18	0	4	8	7	3	0	0	0	
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	2	2	1	0	0	0	0	0	0	0	0	7	4	10	101	50	14	6	0	3	17	7	0	0	**0**
		EU.Sweden	3	2	2	4	3	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
		EU.United Kingdom	15	9	0	0	0	0	0	0	0	1	6	8	12	10	0	0	24	11	26	15	11	0	0	0	
		Faroe Islands	477	550	1189	1149	165	48	44	8	9	7	10	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Iceland	0	0	0	1	3	4	6	5	3	4	2	2	3	2	1	1	0	1	0	1	0	1	0	0	
		Japan	0	0	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	0	12	10	13	13	14	49	98
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		Norway	25	43	32	41	24	24	26	28	17	27	32	22	11	14	19	0	8	27	10	12	10	12	11	17	9
		U.S.A.	2	2	5	1	50	106	35	78	56	13	3	1	1	1	0	1	0	0	0	1	1	1	11	4	27
	ATS	Benin	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
		Chile	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	**0**
		EU.Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.España	0	0	0	0	0	0	0	0	2	2	2	7	1	2	9	4	0	3	5	4	13	0	0	0	**0**
		EU.Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Poland	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EU.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	
		Falklands	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	0	0	0	0	1	0	0	3	14	0	1	0	0	0	0	0	0	0	5	41	34	8	7	25	16
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	0	0	0	0	0	0	3	0	5	13	2	4	0	8	34	8	28	34	3	40	14	6	12	12	
	MED	EU.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	2	0	0	0	0	
		EU.Malta	1	0	1	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	1	0
Discards	ATN	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.A.	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4
	ATS	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		Uruguay	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	

Updates/corrections to Task 1 (2013 only) provided after 2014-09-29 (Ghana, China PR and EU-France) were not included on the table.

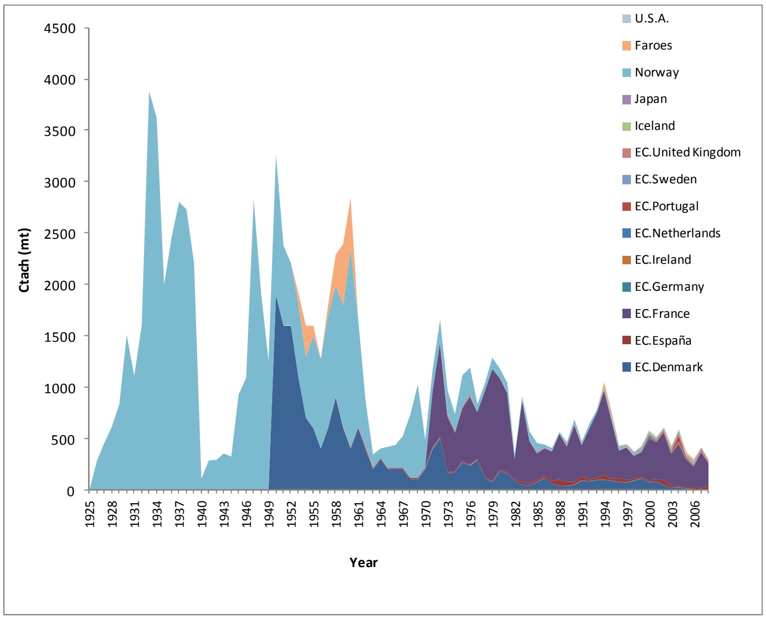
SHK-Table 2. Vulnerability ranks for 20 stocks of pelagic sharks calculated with three methods: Euclidean distance (v1), multiplicative (v2), and arithmetic mean (v3). A lower rank indicates higher risk. Stocks listed in decreasing risk order according to the sum of the three indices. Red highlight indicates risks scores 1-5; yellow, 6-10; blue, 11-15; and green, 16-20. Productivity values ranked from lowest to highest.

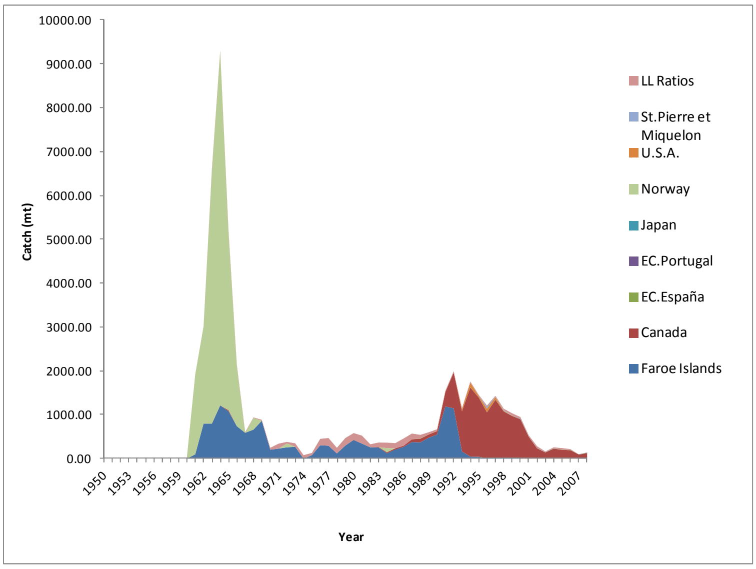
Stock	v_1	v_2	v_3
BTH	3	1	1
LMA	5	3	2
SMA	1	8	2
POR	2	7	4
CCS	11	4	5
FAL SA	12	5	6
CCP	15	2	6
OCS	4	13	8
FAL NA	8	11	8
ALV	9	14	11
BSH NA	6	19	10
DUS	17	6	12
SPK	14	10	13
BSH SA	7	20	14
TIG	10	16	15
PLS SA	18	9	16
SPL NA	16	12	16
SPZ	13	17	18
SPL SA	19	15	19
PLS NA	20	18	20

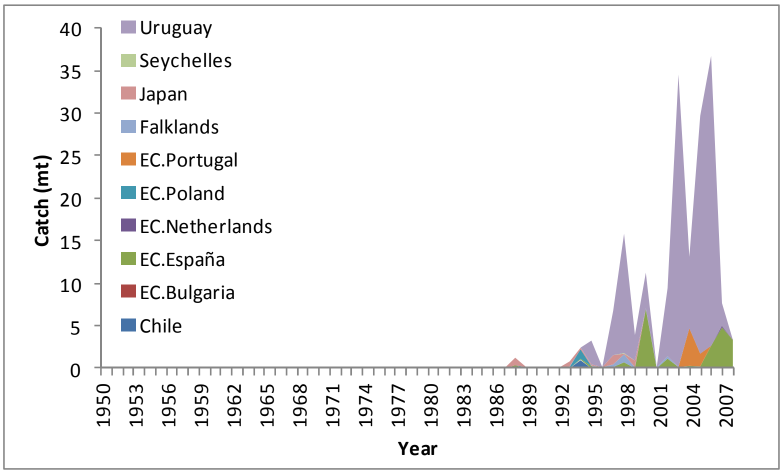




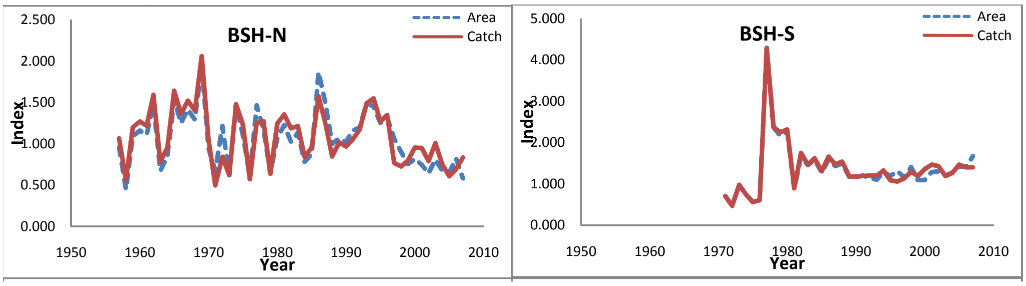
SHK-Figure 1. Blue shark (BSH) and shortfin mako (SMA) catches reported to ICCAT (Task I) and estimated by the Committee (2013 landings are considered provisional).



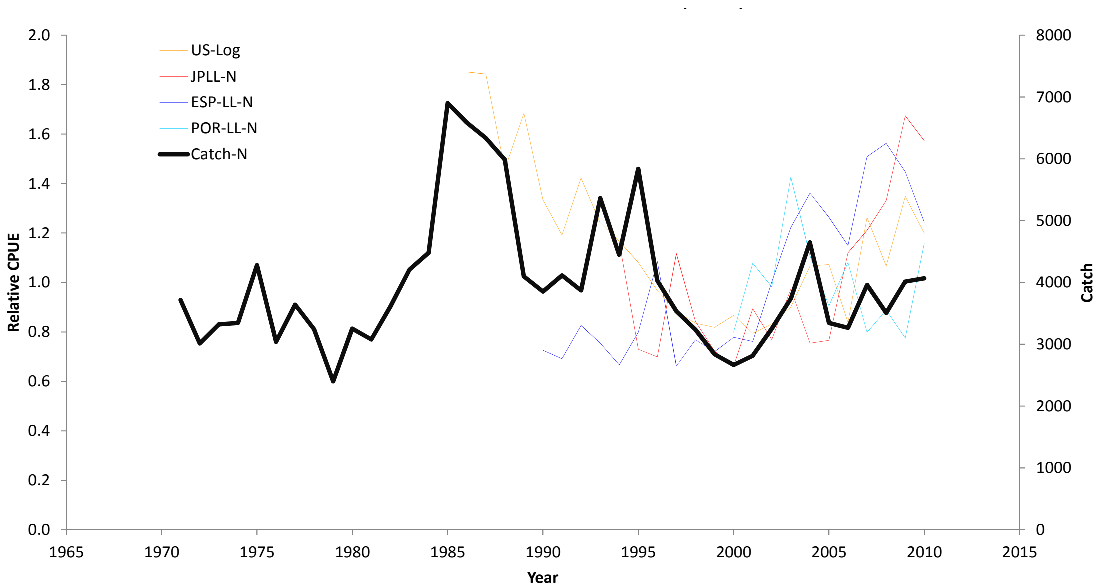




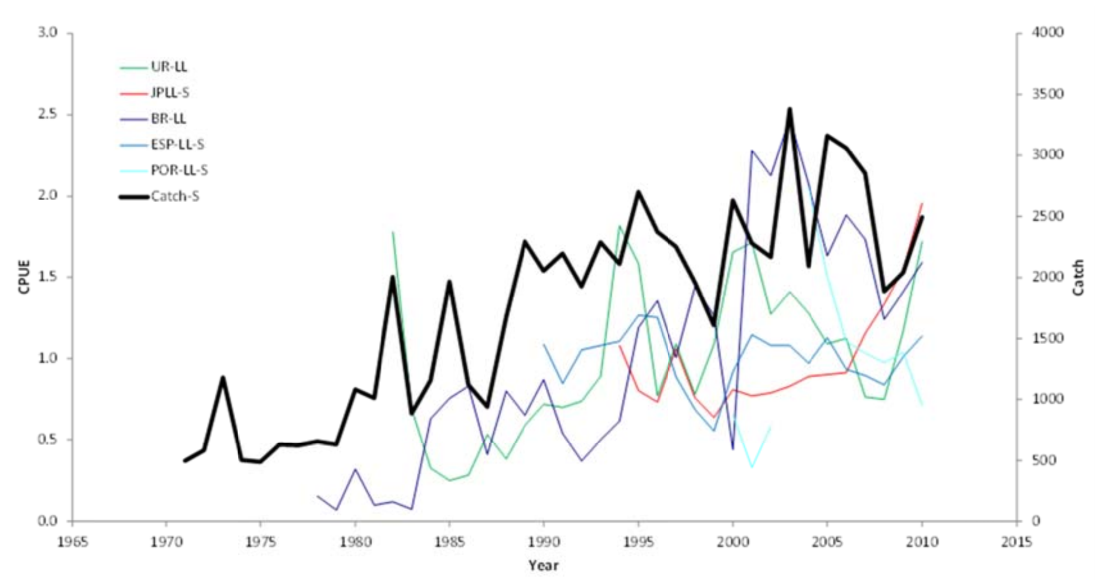
SHK Figure 2. Catch by flag of porbeagle sharks from the northeast Atlantic (top), northwest Atlantic (middle), and southwest Atlantic (bottom) used in the assessment. While these catches are considered the best available, NE catches are believed to underestimate the pelagic longline catches for this species, those from the NW include non-reporting fleets, which in this case represent a small proportion of the total, and those from the SW are Task I data also believed to significantly underestimate actual catches by all fleets.



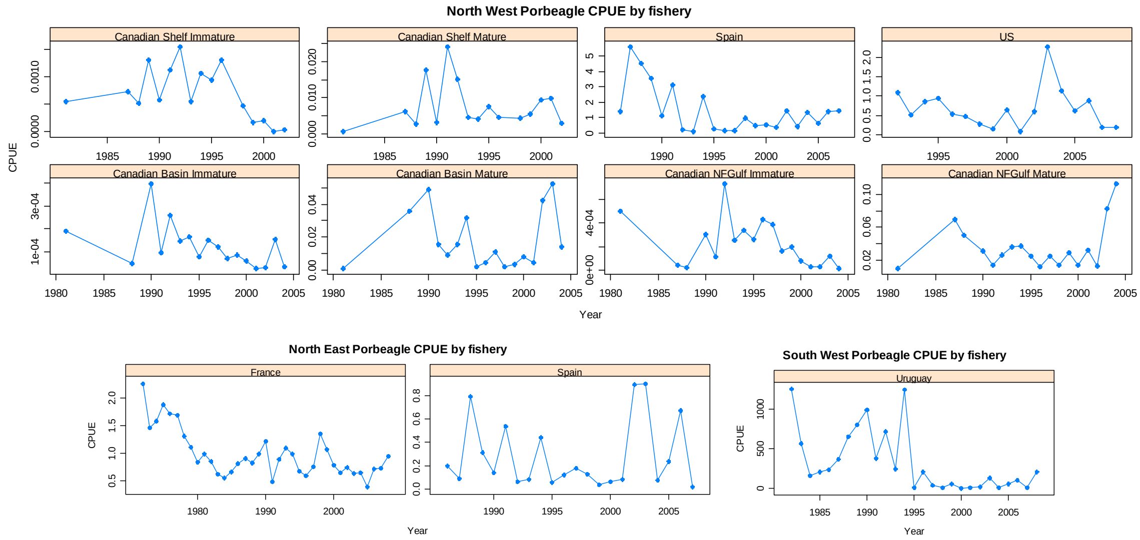
SHK-Figure 3. Average trends in the CPUE series used in the assessments of blue shark (BSH). The averages were calculated by weighting the available series either by their relative catch or by the relative spatial coverage of the respective fisheries.



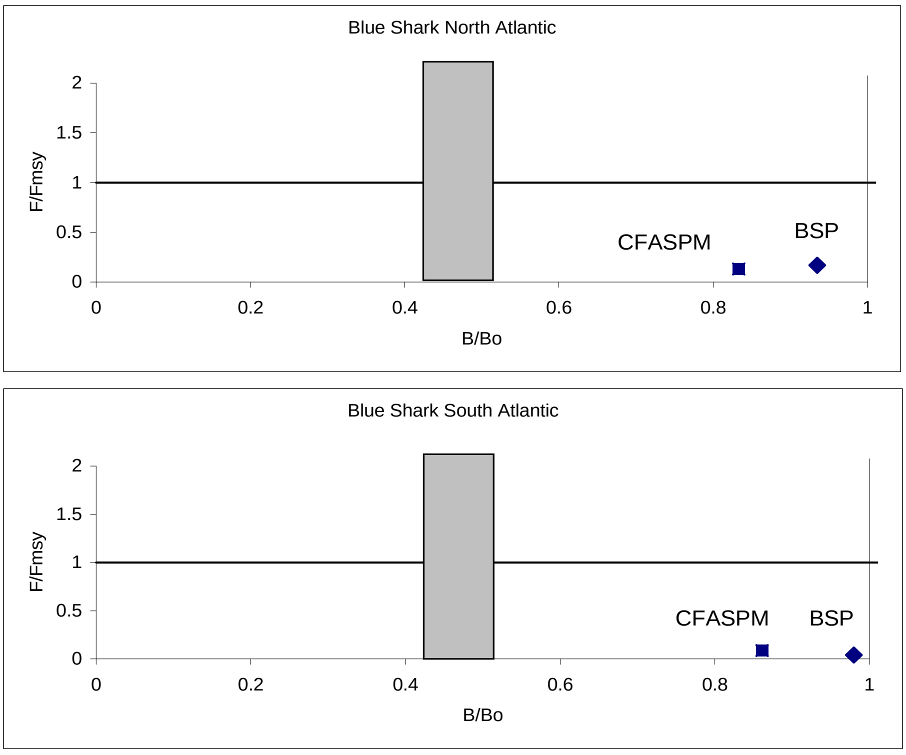
SHK-Figure 4. Indices of abundance for North Atlantic shortfin mako shark, along with total catches input into the BSP model.



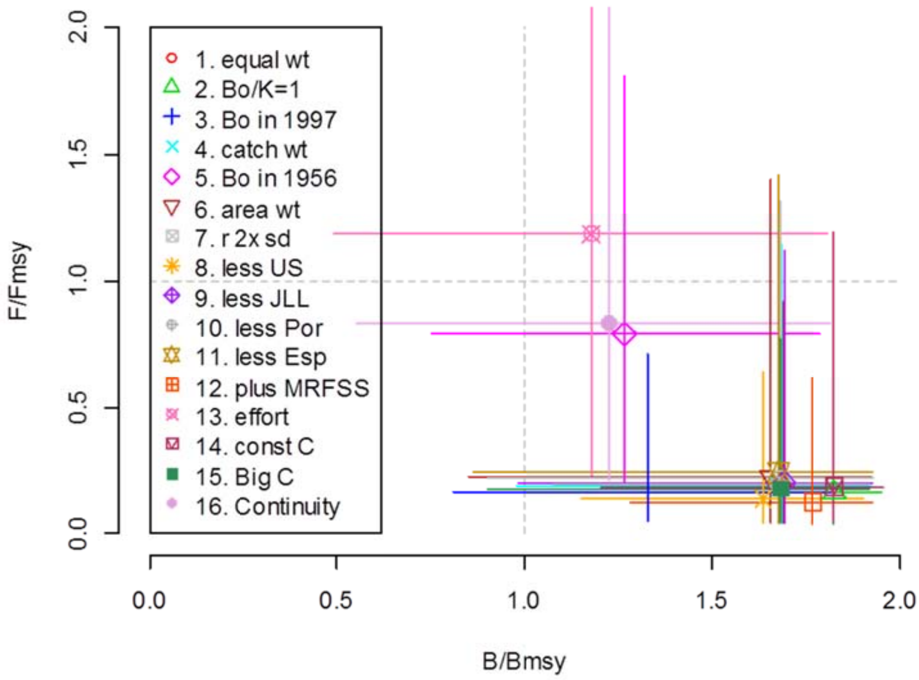
SHK-Figure 5. South Atlantic catches and indices of abundance input to the BSP model.



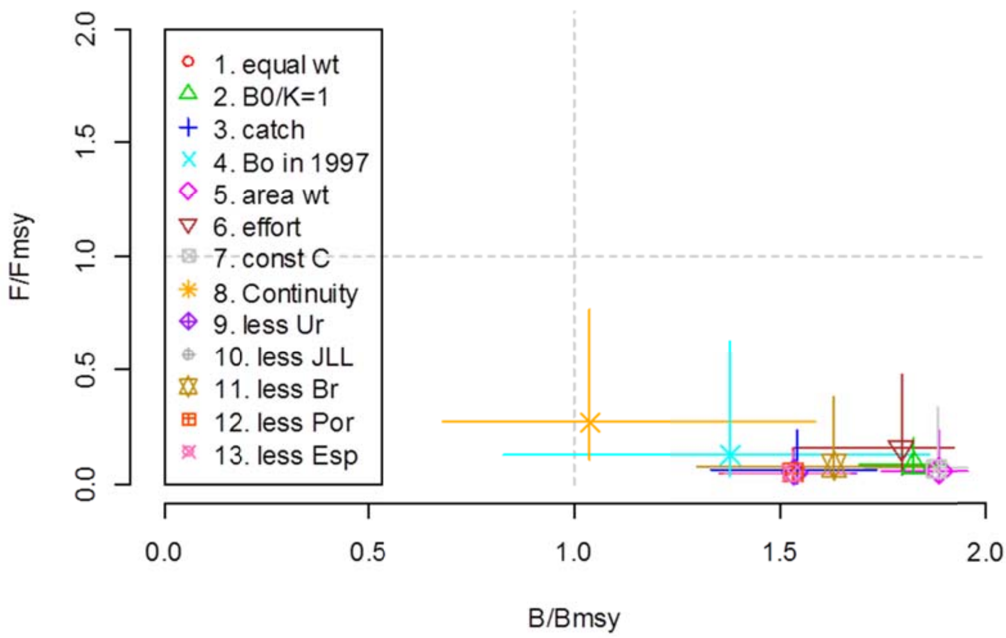
SHK-Figure 6. CPUE series for the porbeagle used in the last assessment NW stock (upper figures), NE stock (lower left figures) and SW stock (lower right figure).



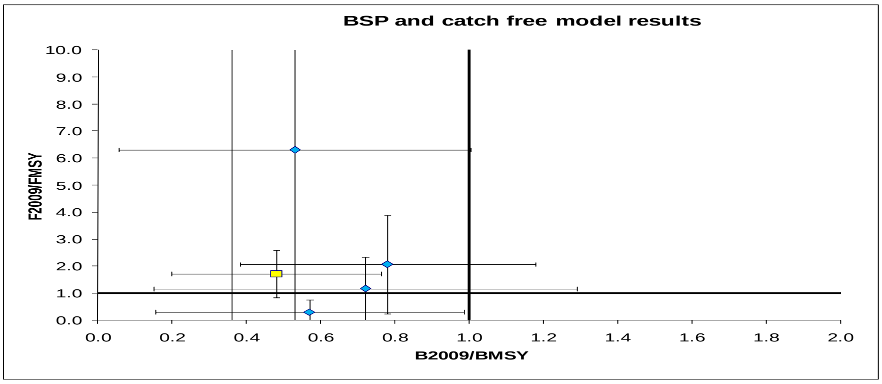
SHK-Figure 7. Phase plots summarizing base scenario outputs for the current stock status of blue shark (BSH). BSP=Bayesian surplus production model; CFASPM=catch-free, age-structured production model. The shaded box represents the area at which the biomass at MSY is estimated to be reached. Any points inside or to the left of the box indicate the stock is overfished (with respect to biomass). Any points above the horizontal line indicate overfishing (with respect to F) is occurring.



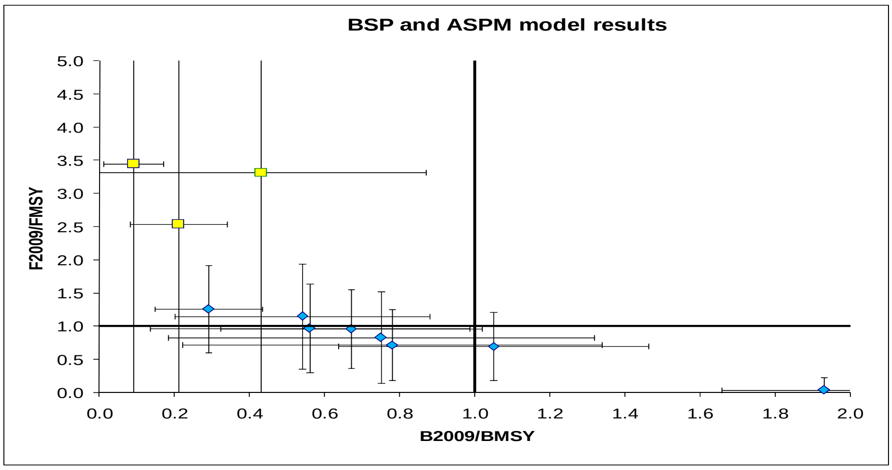
SHK-Figure 8. For North Atlantic shortfin mako sharks, median biomass relative to B_{MSY} and median fishing mortality rate relative to F_{MSY}, with 80% credibility intervals, from BSP model.



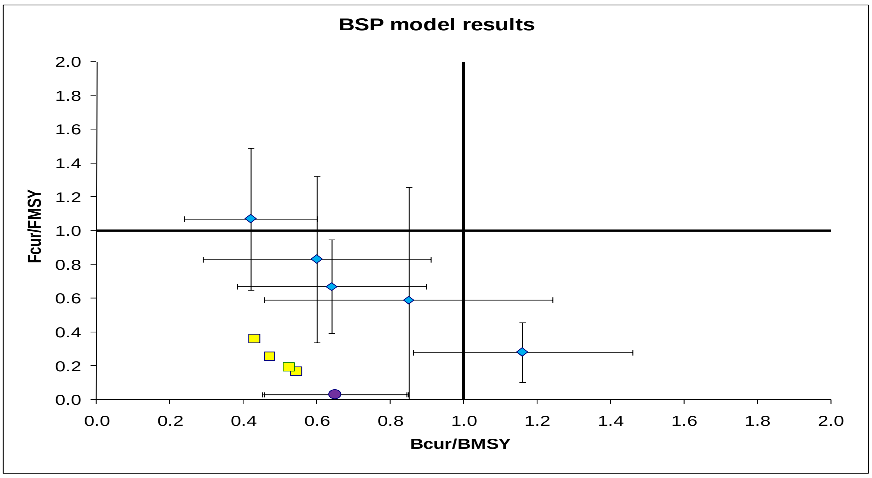
SHK-Figure 9. For South Atlantic shortfin mako sharks, median biomass relative to B_{MSY} and fishing mortality rate relative to F_{MSY}, with 80% credibility intervals.



SHK-Figure 10. Phase plot for the southwest Atlantic porbeagle, showing status in 2009 from both the BSP model runs (diamonds) and the catch free age structured production model (square) results. Error bars are plus and minus one standard deviation.



SHK-Figure 11. Phase plot showing current status of northeast Atlantic porbeagle for the BSP model (diamonds) and the ASPM model (squares). Error bars are plus and minus one standard deviation.



SHK-Figure 12. Phase plot showing the northwest Atlantic porbeagle expected value of B/B_{MSY} and F/F_{MSY} in the current year, which is either 2005 (diamonds) or 2009 (circle), as well as approximate values from Campana *et al.* (2010) (squares). B/B_{MSY} was approximated from Campana *et al.* (2010) as N2009/N1961 times 2. Error bars are plus and minus one standard deviation.

9. Report of inter-sessional SCRS meetings

The reports of the inter-sessional meetings held in 2014 were presented.

9.1 Sharks species group inter-sessional meeting

The meeting was held in Piriápolis, Uruguay, 10-14 March 2014. The objective of the meeting was to collect and analyze available information on shark biology and fisheries under the ICCAT mandate, in order to assess the feasibility of carrying out stock assessments in the future. Particular attention was given to the blue shark (*Prionace glauca*), scheduled to be assessed in 2015. The Group also identified the main sources of data uncertainties aimed at completing the proposed shark research programme, in particular with regard to financial requirements and research priorities.

The Detailed Report of the meeting is presented as document SCRS/2014/012.

Discussion

It was emphasized that Task I and II data are poor for species other than the three main ones (i.e. BSH, SMA, POR) limiting the ability to conduct detailed stock assessments. Collaborative working within the Group has been very successful, resulting in a number of studies including the 2008 and 2012 Ecological Risk Assessments and there are several ongoing projects on distribution and life history of pelagic sharks. A formal proposal for a 2-year implementation of the Shark Research and Data Collection Program focusing on stock ID and life history of SMA was presented to continue such activities (**Appendix 4**, Addendum to Sharks Work Plan).

9.2 Meeting of the ICCAT Working Group on stock assessment methods

The meeting was held in Dublin, Ireland, 7-11 April 2014. The objective of the meeting was, among others, to provide guidance on the evolution and possibility of harmonizing methods to apply for uncertainty characterization across species groups in order to provide risk-based advice to the Commission, to continue the evaluation of advice using Management Strategy Evaluation (MSE) and to establish guidance on best practices to reconcile or combine assessment results when multiple modelling methods to estimate the status of the stock relative to ICCAT conservation benchmarks are used.

The Detailed Report of the meeting is presented as document SCRS/2014/010.

Discussion

The importance of the EFFDis database for work on by-catch species was emphasized. The Executive Secretary explained that a contract for an outside expert could be prepared and issued as soon as possible once clear terms of reference were prepared. This should be done preferably in 2014.

The proposal on standardization of CPUE using data sets across different fleets in particular was thought to be a valuable exercise and potentially important for stock assessments. However, since different fleets are subject to different domestic management regulations and may target different stocks and age classes the results may not be very clear. An alternative is to use integrated assessment models which allow weighting of fleet in a statistical manner. The WGSAM will ensure that these concerns are addressed by making clear when combining CPUE's is appropriate.

HCRs were recognized as being important. However if the Commission asks the SCRS to develop HCRs the uncertainty should be quantified and reduced as much as possible. For example if the stock assessment changes between WG sessions then there will be a big problem on how to proceed. The benefits of risk analysis to evaluate the impact of uncertainty were discussed.

As were the benefits of collaboration with other tRFMOs. The Coordinator of the FAO-GEF ABNJ Tuna Project indicated that the project considers the adoption of harvest control rules and reference points, via a management strategy evaluation, as one of the key outcomes to support sustainable fisheries. Therefore, it supports the MSE process through two activities: capacity building for officials from CPCs to familiarize them with the concepts of an MSE process, and facilitation of the science-management dialogues amongst members as part of the MSE process.

9.3 Bluefin data preparatory meeting

The meeting was held in Madrid, Spain, 5-10 May 2014. The meeting had a double objective, to carry out the data preparatory work and to elaborate a work plan to update the 2014 stock assessment as well as to integrate new Task II information in the ICCAT databases and continue working on new modeling platforms and inputs in a view to minimize uncertainties in the 2015 and ongoing assessments.

The Detailed Report is presented as document SCRS/2014/014.

Discussion

See item 9.7.

9.4 Billfish species group inter-sessional meeting

The meeting was held in Veracruz, Mexico, 2-6 June 2014. This Group analyzed existing billfish fishery statistics; tagging data and other information on biology and other aspects of billfish life-history, with the objective of identifying gaps and uncertainties in the data and develop a work plan to obtain the information required in future assessments.

The Detailed Report is presented as document SCRS/2014/015.

Discussion

The discussion focused on the effect of the Oxygen Minimum Zone (OMZ) and the impacts on billfish distribution that should be taken into account in stock assessment. It was observed that samples are being collected for sailfish which should provide guidance on the stock structure of the species, assisting future assessments.

9.5 Skipjack stock assessment meeting

The meeting was held in Dakar, Senegal, 23 June to 1 July 2014. The objective of this meeting was to evaluate the eastern Atlantic and western Atlantic skipjack stocks. The Group also revised the Feasibility Study for the Atlantic Ocean Tropical Tuna Tagging Program (AOTTP) carried out under a short term ICCAT contract cofunded by the European Union and USA.

The Detailed Report of the meeting is presented as document SCRS/2014/011.

Discussion

A contract was awarded by the European Union for an external expert to assist in the work of the Group and his involvement greatly assisted the assessment this year. The proposed tagging programme was discussed and it was agreed that it will greatly help in resolving uncertainty about the stock dynamics of tropical species and provide important inputs into stock assessment that are currently lacking.

9.6 Mediterranean swordfish stock assessment meeting

The meeting was held in Heraklion, Greece, 21-25 July 2014. The objective of this meeting was to update the results of previous Mediterranean swordfish stock assessments, as well as to develop and to apply alternative stock assessment approaches. The Group also evaluated the effects of the management framework and provided advice on possible amendments of the various measures with a view to recover or to maintain the stock within safe biological limits while delivering economically viable fishing activity.

The Detailed Report of the meeting is presented as document SCRS/2014/019.

Discussion

It was noted that both biomass and age based assessment methods were used in the assessment. In the case of the former the work of the Group was greatly assisted by an external expert who had given a course in the previous week on Bayesian surplus production methods. It was explained that advice was based on an aged based assessment, Extended Survivors Analysis (XSA) due to the lack of contrast in the CPUE indices that were used as proxies for stock trends.

9.7 Bluefin stock assessment meeting

The meeting was held in Madrid, Spain, 22-28 September 2014 during the species group meeting. Update assessments were conducted for both stocks. Various sensitivity tests had also been conducted to investigate the impact of uncertainty on stock assessment results. Ongoing research activities and initiatives to improve knowledge were also reported on.

The Detailed Report of the meeting is presented as document SCRS/2014/018.

Discussion

The Chair noted that the Group had performed its duties in a way that differed from the normal mode, with work on the assessment being mainly performed intersessionally, assisted by a variety of web based tools (see section 6 Secretariat Report for details). The Committee recognized the hard work of the Group and in particular that of the rapporteurs.

The sacrifices that fishers had made during the rebuilding plan were also recognized. While the SCRS tries to provide the best advice the tools at its disposal are limited and the need to perform the update also meant that many important tasks were delayed.

10. Report of Special Research Programs

10.1 Atlantic-wide Research Program for Bluefin Tuna (GBYP)

Dr Antonio Di Natale, Program Coordinator, presented the report on the Atlantic-wide Bluefin Tuna Research Programme (GBYP) activities carried out in 2014. The SCRS Chairman recognized the good work conducted by the GBYP team and the ICCAT Secretariat as well as the coordinated work of the CPC research institutions and scientists.

The Program Coordinator reiterated that the role of the program is to provide the requested data and studies requested by the Commission and by the SCRS in the best format and of the best quality possible. It is then the responsibility of the Species Group to use the data. The data which were recovered in the first phases of the GBYP have finally been incorporated in the ICCAT bluefin tuna database, after the validation of the ICCAT Secretariat, as well as the revision made by the SCRS BFT Species Group and the Sub-Committee on Statistics, and the further checks made by some national scientists for some specific data sets. These data were used by the SCRS bluefin tuna Species Group during the 2014 bluefin tuna assessment, for a sensitivity run only, due to the lack of time for carrying out a dedicated assessment including all new data.

The programme was able to provide several new data on some important biological aspects of bluefin tuna, including new genetic and micro-chemical details, which can help in better identifying the population structure. Initial tagging results are also providing many new data, even if the tag recovery rate is still low as releases were primarily of juvenile fish.

The future modeling activities have explicitly been planned to utilize the new GBYP information. It was also noted that the comprehensive modeling work plan was endorsed by the SCRS in 2013 and the GBYP is currently enforcing the work plan and some key external experts have been contracted, including a modeling coordinator, while a GBYP Core Modelling Steering Group has been put in place. The need to resume the necessary staff level and to have stable funding to fulfill the specific tasks required to provide better scientific advice for management and to continue the research activities within the necessary time frame for providing reliable data were also reported.

The ongoing issue of annual contributions was briefly discussed and it was again stressed that the current system is showing many limits and causing some practical problems. The need to have a stable funding system was stressed again. It was requested to quantify the value and benefits of the data collected so far, for showing how the investment was productive, due to the high importance of the preliminary results even with the reduced budget available.

The Committee noted the importance of the continuity of the bluefin research. It was proposed to search for procedures to ensure stable funding for the current GBYP, recommending that this issue be further discussed by the Commission.

Dr Josu Santiago, on behalf of the GBYP Steering Committee and SCRS Chair, presented the document Time to Plan for the Future of GBYP (SCI-082) (**Addendum 1 to Appendix 5**), concerning the future plan for the GBYP, taking into account the complexity of bluefin tuna assessment and management and the need for a large scale, long term, international and coordinated research program. The Steering Committee noted that substantial improvements occurred under GBYP but still a large amount of work is required to achieve its primary objectives as identified by the Commission, the SCRS and the Mid-Term Review.

The Steering Committee planned in detail all different activities, which now include programme coordination, biological studies, fishery independent indices, modelling approaches and an ABFT GBYP Conference. For the coordination, the Steering Committee proposed to resume the previous staff level and to improve the number of external members of the Committee, including an additional member. Further developing the biological studies (genetic, micro-chemical, ageing, etc.) for better defining the population structure, the fish origin and the age composition is another important task for the GBYP. Due to the very serious problems recently noticed regarding the reliability of recent fishery dependent-data, the need to obtain fishery-independent data from aerial surveys, tagging and other advanced techniques was also stressed. The modelling approaches will require the necessary time as identified by the SCRS, with the objective to have an OM and develop an MSE approach.

The updated GBYP plan now includes activities up to 2021 and a detailed planning was recommended by the Steering Committee, stressing the need to have a stable funding system and the Steering Committee recommended again proposing the adoption of a scientific quota to the Commission. The Committee also noted the importance of the continuity of the bluefin research, and again called for procedures to ensure stable funding for the GBYP, recommending that this issue be further discussed by the Commission so as to find an urgent solution.

The report was adopted and is attached as **Appendix 5**.

10.2 Enhanced Research Program for Billfish

The ICCAT Enhanced Research Program for Billfish continues to achieve its objectives of supporting the work of the SCRS in providing scientific advice about the status and outlook of Atlantic billfish stocks. During 2014 this program supported the collection of biological data and fishery statistics in selected fleets. During 2015 the program will continue the collection and processing of genetic samples that aim to define the extent of misidentification of white marlin and spearfish species. It will also support the collection of data on artisanal and longline fisheries and collect information to prepare the SCRS for the stock assessment of sailfish in 2016. The program depends for its functioning on the provision of Commission funds and the generous monetary and non-monetary contributions of others that have contributed to its success.

It was noted that the objective of the genetic sampling for billfish is for confirmation of species identification by genetic analysis, and contrasting with onsite species identification in particular between white marlin and round-scale spearfish. It was indicated that this research can be expanded by including electronic tagging with these species. The Rapporteur expressed the interest of the genetic sampling being extended specially to high seas longline fleets in the central Atlantic Ocean.

The report was adopted and is attached as **Appendix 6**.

10.3 Small Tunas Research Program

In 2014, a Call for tenders for establishing an inventory of the bibliographic and the biological data on small tunas was launched by the Secretariat (ICCAT Circular # 00988/2014**)**. Côte d'Ivoire was awarded to conduct this work.

The study conducted concluded that in total, 40 bibliographic references related to the biology of small tunas were available, of which 30 (75%) were available. This information is related to the little tuna (36%), the frigate tuna (24%), the Atlantic bonito (21%), *scomberomorus* sp (16%), which includes the Atlantic Spanish mackerel (*Scomberomorus macculatus),* and the West African Spanish mackerel (*Scomberomorus tritor)* and the Wahoo *(*2%*)*. The first three of these species are very important for ICCAT in terms of catches.

Most of the documents cover the eastern Atlantic (45%), the Mediterranean Sea (38%) and the Gulf of Guinea (16%). Thirty seven percent (37%) of these documents date back to 1985.

SCRS/2014/144 also highlighted the difficulties that the study has faced in collecting the documents containing the biological information on SM.

Based on this study, the Group identified the priorities that should be taken into account both in terms of the species to be sampled and the biological data to be collected under the SMTYP. These priorities are presented in the Small Tunas Work Plan for 2015 (**Appendix 4**).

The report was adopted and is attached as **Appendix 7**.

11. Report of the Sub-Committee on Statistics

Dr Gerald Scott, Convener of the Sub-Committee on Statistics, presented the Sub-Committee's Report (**Appendix 8**), which held its session in Madrid, 22 and 23 September 2014. The Sub-Committee noted that the Commission aspires to be a science-based fishery management body and thus relies on the SCRS to advise on developing and recommending policies and procedures in the collection, compilation, analysis and dissemination of fishery statistics as may be necessary to ensure that the Commission has available at all times complete, current and equivalent statistics on fishery activities in the Convention area. It was recommended that, inasmuch as possible, the SCRS provide scientific advice to the Commission's bodies which deal with fishery monitoring and statistics, including comments on the meeting's agenda, and requesting feedback from the Commission on the usefulness of such advice. Continued management-science dialogue is needed to assure that this support function is fulfilled.

Despite the good participation of scientists, Dr Scott highlighted the importance that the CPCs' Statistical Correspondents are fully versed and equipped to meet data reporting obligations and that they be present at this meeting where important issues regarding official data submission are discussed.

Following the issues raised in the Secretariat Report on Statistics and Research (SCI-008), the Sub-Committee discussed the application of prior methodology (filters) for characterizing Task I and Task II data reporting. Although reporting seemed improved during the past few years, after initial application of the previously agreed filters, the data reported remains far from ideal. The Sub-Committee informed on the continuing improvement in data submission from the CPCs, although noting the increased workload for the Secretariat statistics staff due to revisions of data previously submitted, to allow the data to pass through the agreed filters and thus reflect a more representative view of the real fishery performance. This practice increases the burden on the current staff at the Secretariat and undermines support for the SCRS. Full application of quality assurance "Filters" is expected to improve the situation. Also regional training and web-based reference materials are necessary components of this evolution.

The Sub-Committee noted that there exist several vessel lists as a result of diverse recommendations of the Commission. A comparison of these lists with the Task I Fleet Characteristic annual report revealed inconsistencies which need further investigation. Furthermore, CPCs are currently required to report fleet data under different formats and forms for different purposes. The Secretariat recommended modifying the e-Forms for Vessels related data to streamline and avoid redundancy, facilitating the CPCs vessel registration and reporting requirements. The Sub-Committee endorsed this proposal.

The Sub-Committee continues to recommend an increase equivalent to 1 additional person-year to support the increasing demands placed on the SCRS to meet the needs of the Commission. In spite of prior recommendations to better coordinate the Budget Request to address SCRS support needs, no action has apparently been taken to improve this coordination.

In support of advising the Commission on data deficiencies, it is useful to identify where there are gaps in the current information. The Sub-Committee considered and endorsed the recommendations regarding statistical deficiencies identified by species groups and in inter-sessional meetings, in view of the operative concepts the SCRS has used to respond to [Rec. 05-09]. Species groups assessed have drafted advice to the Commission considering the impact of these deficiencies on recent assessments.

The Sub-Committee reported on the tagging activities reported in 2014. It was noted that most releases of conventional tags occurred under the GBYP. For electronic tagging, most reports reflect archival tags with bluefin the dominant species although there are a range of species reported by a wide range of investigators. CPCs tend not to use the e-Form for Electronic Tagging (TG03-EleTReRc.xlsx) for transmitting these data. The Sub-Committee did not discuss the East bluefin tuna VMS data, but it was noted that the information through 2014 was available for consideration by the Bluefin Tuna Species Group (see SCI-008).

The Sub-Committee noted the support provided through the Data Funds applications and recommended continued use and refreshing of these funds by the CPCs, since they have become a vital portion of supporting the work of the SCRS. In the recent past, ICCAT has made strategic investments using a diversity of funds from various CPCs (JDMIP, Data Funds, Capacity Building, etc.) in order to enhance data collection for a number of artisanal fisheries. In view of the desire to continue such strategic investments and to avoid duplication of efforts thus improving the efficacy of the use of these funds, a comprehensive inventory of strategic investment in the artisanal fishery data collection system in West Africa was provided in the document on the Artisanal Fishery Strategic Investment Inventory (SCI-072).

The Sub-Committee welcomed reports on progress made in applying electronic monitoring systems on board tropical tuna purse seiners. The Sub-Committee noted that the SCRS should develop minimum standards for Electronic Monitoring Systems using the ISSF guidelines (technical report 2014-08 "Updated guidance on Electronic Monitoring Systems for tropical tuna purse seine fisheries").

The Sub-Committee thanked the Secretariat for their excellent work during the year and acknowledged that high quality work was again achieved in spite of the increasing burden of even greater workloads on staff. However, it was noted that a number of priority items previously identified in need of completion were postponed due to the increasing workload and this was viewed as a lowering of support for the SCRS.

Discussion

The Committee acknowledged and congratulated the Secretariat for the large amount of work carried out by them in 2014. As in previous years, the need to increase capacity at the Secretariat was discussed. The Executive Secretary clarified that if additional permanent capacity is required at the Secretariat, this needs to be reflected in the Secretariat budget. The usual practice has been for short term contracts to be awarded using funds that were not included in the annual budget to conduct work required from year to year. This is a complex issue and is not easily resolved, but the Secretariat is working to ensure capacity is sufficient to achieve the tasks required to support the SCRS.

Support was expressed for the application of filters to data submitted by CPCs and it was requested that the report cards for each CPC be made available so that they can review their submissions.

12. Report of the Sub-Committee on Ecosystems

The meeting was held in *Olhão*, Portugal, 1-5 September 2014. This meeting had different objectives pertaining to by-catch or to ecosystems. On by-catch, the meeting was focused on revising and updating the ecological risk assessment of the impact of ICCAT fisheries on sea turtles and to provide advice based on its results, as well as to review seabird by-catch mitigation measures. Regarding ecosystems, the primary objectives were to identify where the EBFM can be implemented by ICCAT, as well as develop and refine a potential framework for its application.

The Detailed Report of the meeting of the Sub-Committee on Ecosystems is presented as document SCRS/2014/017.

A summary of the inter-sessional meeting is attached as **Appendix 9**.

Discussion

The Global Coordinator of the FAO-GEF ABNJ Tuna Project emphasized the opportunities provided by this global initiative to advance areas of interest of the SCRS, as well as to collaborate on technical matters with other tRFMOs. The ABNJ Tuna Project includes the five tRFMOs as executing partners.

On by-catch related issues, there are a number of activities planned that are relevant to the work of the SCRS, such as the establishment of a global By-catch Mitigation Information System and development of best practices to mitigate incidental mortality of non-target species. The ABNJ Project also welcomes any proposal for new activities emanating from the SCRS on this subject.

Both the SCRS Chair and the ICCAT Executive Secretary acknowledged the role that this project could play in the work of ICCAT and thanked the Coordinator for his attendance of the SCRS and the information he provided. The Secretariat confirmed that it is working with the coordination of the ABNJ Tuna Project to obtain support not only for the eBCD, but to ensure that ICCAT take full advantage of other activities such as workshops, capacity building, support to management strategy evaluation and science-management dialogues, that are provided by the Project. The Executive Secretary also confirmed that the Secretariat will endeavour to inform CPCs of any developments and opportunities under this project as well as opportunities for participation in this project.

Regarding the by-catch component, the Committee noted the ambitious work plan proposed by the Sub-Committee and highlighted the importance of CPCs submitting the required data to be able to conduct these studies. It was also noted that the observer data collection forms still require modification (such as pull down menus for data entry) to facilitate the ease of submission for observer data.

Regarding the ecosystems component, clarification was requested regarding the work plan for assessing the Sargasso Sea. It was noted that the components of this assessment are included in the general work plan, but additional factors will need to be considered and discussed. The ABNJ Tuna Project Coordinator noted that the Project counts as one of its primary objectives, the development of RFMO-based plans for the implementation of an EBFM. Therefore, the Project will be supportive of any activities not only leading to further development of this process, but also, noting the advanced state of the ICCAT work, to share this experience with other tRFMOs in a global forum. It was proposed that this should be discussed at the Commission so that advancement can be made on this important issue.

13. Report of the Second Meeting of the Working Group of Fisheries Managers and Scientists in Support of the W-BFT Stock Assessment

The meeting was held in Prince Edward Island, Canada, 10-12 July 2014. The objective of this second meeting was to review the results of the previous meeting of the Group and review the research plans, presented by CPCs, aimed at obtaining reliable stock abundance indices.

The report of the Second Meeting of the Working Group of Fisheries Managers and Scientists in Support of the West Bluefin Tuna Stock Assessment was presented (SCI-037); the substantive issues were discussed under the GBYP and in the bluefin tuna Species Group.

Discussion

The Committee noted the usefulness of the meeting and welcomed the more informal dialogue between the scientists and the managers that occurred.

14. Report of the First Meeting of the Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers (SWGSM)

The meeting was held in Barcelona, Spain, 26-28 May 2014 (SCI-036). This Standing Working Group, established to foster dialogue between fisheries managers and scientists, at its first meeting, focused its discussions on the use of B_{MSY} and F_{MSY} and other approximations as limit and/or target reference points in a precautionary management environment and on potential improvement regarding the ICCAT management and science processes, taking into account the development of the Strategic Plan by the SCRS.

Discussion

The Committee welcomed this important first step to facilitate communication between scientists and managers and strongly supported the continuation of this initiative. It was noted the SCRS must continue to work to demonstrate the utility of the MSE and HCR approach. It was also suggested that these meetings would provide a good platform for presenting important SCRS research programmes (such as tagging initiatives) in order to communicate their importance to managers. The Committee emphasized the need to ensure a more balanced presence and active participation of scientists and managers in future meetings.

15. Presentation of the Science Strategic Plan for 2015-2020, including estimated budget

The SCRS Chair presented the 2015-2020 SCRS Science Strategic Plan (**Appendix 10**) for the functioning and orientation of the SCRS, including its estimated budget. The components of the plan included a Mission, a Vision, a SWOT (strengths, weaknesses, opportunities, threats) analysis and the values or guiding principles of the plan. The plan also comprised Goals, Objectives, the Strategies to achieve each goal as well as Measurable targets. A tentative work plan for the time period (scheduling of SCRS meetings) was also provided. The proposed budget was presented in the context of the envisioned needs and proposed work of the SCRS for the five year period.

The need for this plan and the importance of communication between the SCRS and the Commission was mentioned. The range of the plan is extensive and ambitious but this is viewed as important due to the changing demands on the SCRS and increased amount of work required. The plan was elaborated at the Meeting of the Working Group for the Development of the SCRS Science Strategic Plan in April 2014 and then presented to the First Meeting of the Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers (SWGSM) in 2014 in order to obtain feedback for improvement.

The Strategic Plan adopted by the Committee with its proposed budget is included in **Appendix 10**.

Discussion

The Committee noted the important, extensive and collaborative work conducted in order to develop the plan. Its necessity for organizing the work of the SCRS was stressed. It was acknowledged that the work plan is flexible and is open to revision according to requests by the Commission. The incorporation of socio-economic aspects into the plan was also noted. The GEF funded ABNJ Tuna Project was also viewed as an important opportunity to realize work planned under the SCRS Strategic Plan. The project offers opportunities for collaboration as well as a source of potential funding for work of importance to the SCRS. The Coordinator of the FAO-GEF ABNJ Tuna Project agreed that there are activities proposed in the Plan that are aligned with the objectives of the Project. The Committee agreed the coordination of the Project work in collaboration with the Secretariat, the Chair elect and the outgoing Chair in formulating a plan of activities to be conducted with support from the Project. Such a plan will be presented at the coming annual meeting.

In concluding, the Committee strongly supported the adoption of the plan as an important step in SCRS work and its presentation to the Commission.

16. Consideration of plans for future activities

16.1 Annual Work Plans

The Rapporteurs summarized the Work Plans for 2015 for the various Species Groups, the Working Group on Stock Assessment Methods, the Sub-Committee on Statistics and the Sub-Committee on Ecosystems. These Plans were adopted and are attached as **Appendix 4**.

16.2 Inter-sessional meetings proposed for 2015

Taking into account the assessments mandated by the Commission and the Committee's recommendations for research coordination, the proposed inter-sessional meetings for 2015 are shown in **Table 16.2.1**. The Committee noted that the schedule needs to maintain some flexibility in order to account for any changes that may result from the deliberations held by the Commission in November 2014 and the meetings scheduled by other RFMOs.

The European Union put forward an invitation to host two shark meetings (data preparatory and assessment meetings) and one bigeye stock assessment meeting.

16.3 Date and place of the next meeting of the SCRS

The next meeting of the Standing Committee on Research and Statistics (SCRS) will be held in Madrid, Spain, 28 September to 2 October 2015; the Species Groups will meet from 21-25 September 2015 at the ICCAT Secretariat.

Table 16.2.1 Proposed calendar of ICCAT scientific meetings in 2015.

	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sat	Mon	Tue
Jan						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
Feb									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
Mar									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
										BFT DATA PREP.																					BSH DATA PREP.								
Apr					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
																								WGSAM															
May							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
										BET DATA PREP.							FADs																						
Jun										1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	
										SC-ECOSYSTEMS																					BSH ASSESSMENT								
												SMT DATA REVISION																											
Jul					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
																	BET ASSESSMENT																						
Aug								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
Sep				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30						
																								SPECIES GROUPS							SCRS								
Oct						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
Nov									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	30			
Dec				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					

SCRS meetings

17. General Recommendations to the Commission

17.1 General recommendations to the Commission that have financial implications

Eastern and western Atlantic bluefin tuna

- The Commission should consider revising and extending the current plan for the GBYP, according to the recommendations of the GBYP Steering Committee, allowing the programme to have enough time to establish fishery independent indices (including expanding support for the western Atlantic), clarifying population structure and other biological aspects of bluefin tuna, and for fulfilling the mandate for developing new modeling approaches.

- The Commission should reconsider the merits of a research TAC set aside to fund the GBYP. A research allocation of 300 t would fully support the current GBYP research enterprise and secure the future of long term research activities such as aerial surveys and scientific tagging programs (which is not the case under the current funding mechanism).

- The next full assessment for bluefin tuna, which will employ new methods and new information, was previously scheduled for 2015. However, because the Commission insisted on a bluefin stock assessment in 2014 and as a consequence the 2015 assessment will have to be postponed to 2016 in order to take full advantage of the available data. The Committee recommends an inter-sessional meeting in early 2015 to update the catch-at-size statistics with new information from farms and other sources, review tagging data, and incorporate the new information into appropriate stock assessment models. The Committee recommends that CPCs make the necessary arrangements to ensure the presence of their national scientists at both meetings. There will also be a need for several external experts to assist with the interpretation of those data, particularly the principal investigators of several key studies.

Tropicals

- The Tropical Tunas Working Group reiterates the importance of the implementation of a large-scale tagging program for tropical tuna species (AOTTP). The implementation of AOTTP financial contributions, are necessary from ICCAT CPCs and others. The EU has expressed interest in funding 80% of the budget if others co-fund the remaining 20% and with the condition that no more than half of the co-funding is "in-kind". The estimated amount of the 10% "in cash" is 1,687,559.20 Euros. A summary of the budget for the AOTTP including the annual level of co-financing required to match the proposed funding offered by the EU is presented in the table below:

Year	**1**	**2**	**3**	**4**	**5**	**Total**
Total (Thousands of Euros)	€ 6,401	€ 5,425	€ 2,983	€ 895	€ 1,171	€ 16,876
EU Funding	€ 5,121	€ 4,340	€ 2,386	€ 716	€ 937	€ 13,500
Co-Funding total	€ 1,280	€ 1,085	€ 597	€ 179	€ 234	€ 3,375
Cash	€ 640	€ 543	€ 298	€ 90	€ 117	€ 1,688
In kind	€ 640	€ 543	€ 298	€ 90	€ 117	€ 1,688

- The tropical Working Group encourages the continuation of the cooperation between Ghanaian and IRD scientists in order to complete de development of the T3+ software necessary for the treatment of Ghanaian statistics and to support the budget proposal in SCRS/2014/192.

- Peer review of the bigeye stock assessment.

Billfishes

- In the recent blue marlin and white marlin stock assessments, it was indicated that one of the major uncertainties was in the reported catch estimates to ICCAT. It is possible that a portion of the unreported catches of these species may be in the data from some artisanal fisheries across the region, like the one presented in SCRS/2014/043. The Group recommends that the Enhanced Program for Billfish Research continues and increases its support to enhance species-specific data collection and reconstruction from all artisanal fisheries in the area of the Convention.

- Assistance for developing standardized CPUEs for the artisanal fleets (Senegal, Ghana, Côte d'Ivoire) needs to be determined early in 2015. Assign groups to review data and do analyses. A support workshop will be organized and funded from ICCAT funds.

Sharks

- Shark Research and Data Collection Program (SRDCP). Two year project with an overall budget of 200,000 Euros [135K year 1 + 65K year 2].

- Invite an external expert to provide support for implementation of SS3 in the stock assessment of Atlantic BSH planned for 2015.

Small tunas

- Continue the ICCAT annual SMTYP research program for 2015 to further improve statistical and biological data related to the main species identified by the Group (the details of this program are attached as **Appendix 4**, Addendum to the Small Tunas Work Plan);

- The Group recommends that an inter-sessional meeting on small tunas be held in 2015 and the CPCs should make the necessary arrangement to ensure a large participation of their national scientists in this meeting (the details of this meeting are attached as **Appendix 4**, Addendum to the Small Tunas Work Plan).

Working Group on Stock Assessment Methods (WGSAM)

- To expedite the completion of the EFFDis estimations, the WGSAM recommends that a technical expert be hired to assist the Secretariat on a short term basis as soon as possible. The expert would, under the direction of the Secretariat, develop a database of historic and current fishing effort distribution that meets the stated needs of the various Sub-Committees and Species Groups. The Group expects that this task could be completed within a 12-month time frame, and should begin no later than spring 2015. This update of the EFFDis dataset is critical, especially with regard to by-catch evaluations.

Sub-Committee on Statistics

- The Sub-Committee notes that a proposal by the Secretariat to develop web-based training videos was discussed and recommended. It was also noted that in addition to the three official languages, translation into other languages (e.g. Arabic, or others) could facilitate data reporting. The Sub-Committee recommended that in addition to web-based training videos, a series of regional workshops be implemented starting in early 2015 to assure that adequate training in the currently adopted reporting obligations and proper utilization of electronic reporting forms be undertaken. Conducting such workshops would require financial support for trainers and material preparations as well as support for attendees requiring travel assistance.

- In light of the limited man power and time required for completion of the Work Plan identified in document SCI-054, choices will obviously have to be made with regard to how to prioritize the activities. The current rate of tasks is unsustainable and the Sub-Committee reiterates prior recommendations to increase staff to conduct this work so as not to further reduce the required support of the SCRS. It is unfortunate that this recommendation has been largely ignored over the past five or so years and is taken as a sign of a continuing decline in support for the work of the SCRS.

- In view of the necessity for code migration (due to the lack of backward compatibility in the most recent version of Microsoft Office) for the numerous applications that interact with various databases of the ICCAT-DB system, the Secretariat has started the process in 2014. This work must be outsourced since staff are already severely overburdened and must be continued next year until the complete migration of all applications necessary for the numerous database summaries and analyses undertaken by the Secretariat has been achieved. The Sub-Committee agreed the need of doing this migration and strongly recommended to finalize this task as soon as possible in order to ensure the full operation of the ICCAT-DB system. This will require financial support of around 150,000 Euros to be completed.

- The Sub-Committee favorably reviewed the report on investigation into current and recent investments by various groups aimed toward improvement of information from artisanal fisheries of West Africa which exploit tuna and tuna-like species. It is obvious from the work described in SCI-072 that multiple and large investments have and are being made, which seem not well coordinated. The Sub-Committee recommends that broader oversight of these programs by groups such as the FAO and/or the ATLAFCO to improve their efficiency and efficacy. The Sub-Committee noted that similar inventories for other regions in the ICCAT Convention area are lacking and reiterated its prior recommendation to develop such inventories for other regions (e.g. Central and South America, the Caribbean, north African Mediterranean coast). The Sub-Committee noted that the inventory reported upon in SCI-072 was achieved at a cost of about 20,000 Euros. It is expected that inventories for other regions could require about the same financial commitment.

Sub-Committee on Ecosystems

- The Sub-Committee on Ecosystems will develop a work plan for a potential workshop on by-catch species to be submitted to the ABNJ Tuna Project as a candidate proposal for a funded workshop.

- In accordance with the provisions of the proposed 2015-2020 SCRS Strategic Plan the Sub-Committee on Ecosystems recommends to enhance the Ecosystem Approach to Fisheries Management (EAFM) advice using the opportunity provided by the ABNJ Tuna Project.

The estimated cost to implement the recommendations above is detailed in the table below.

	Objective	Budget required (€)
SCSTAT	Four regional workshops, starting in early 2015 to assure that adequate training in the currently adopted reporting obligations and proper utilization of electronic reporting forms be undertaken.	**60,000.00** ***(15,000.00 by workshop)***
	Increase staff to complete the Work Plan identified in document SCI-054 so as not to further reduce the required support of the SCRS.	**75,000.00**
	Complete the code migration (due to the lack of backward compatibility in the most recent version of Microsoft Office), started in 2014 with the DB of vessels, for the numerous applications that interact with various databases of the ICCAT-DB system.	**150,000.00**
	To extend the inventory on current and recent investments by various groups aimed toward improvement of information from artisanal fisheries of West Africa, conducted in 2014, to other regions in the ICCAT Convention area (e.g. Central and South America, the Caribbean, north African Mediterranean coast).	**60,000.00** ***(20,000.00 by area)***
TROP	Peer reviewer.	**12,000.00**
	Continue the cooperation between Ghanaian and IRD scientists in order to complete development of the T3+ software necessary for the treatment of Ghanaian statistics.	**38,500.00**
SMT	SMTYP: Recovery Task I and Task II data and to support biological sampling in the Atlantic: size and biological data.	**105,000.00**
SHARKS	Shark Research and Data Collection Program (SRDCP).	**135,000.00**
	Invite an external expert to provide support for implementation of SS3 in the stock assessment of Atlantic BSH planned for 2015.	**10,000.00**
WGSAM	Call for Tenders to expedite the completion of the EFFDis revision database.	**50,000.00**
TOTAL		**695,500.00**

17.2 Other recommendations

Albacore

- The Albacore Species Group recommends that further elaboration of the MSE framework be developed for albacore. Among other things, work should be promoted towards including a more complete range of uncertainties, including observation, process, model, and implementation errors. This would permit better characterization of uncertainty in current and future stock condition. Moreover, such a framework would help establish priorities between the main components of the Albacore Research Program (biological parameters, fishery data, and models). The MSE framework would also help the Albacore Species Group simplify the process of updating management advice (e.g. through the use of simpler models).

- Several research lines should be pursued. First, the biological parameters used in the assessment should be reviewed. Accurate biological parameters are very important for stock assessment purposes and for the process of estimating limit reference points for albacore stocks. Albacore biological parameters are in many cases based on old studies and it is important to assess whether these parameters have changed over time or if current observations are consistent with estimates from old studies. Second, the Group recommended further studies on the effect of environmental variables on CPUE trends of surface and other fisheries. Finally, the Species Group also recommends further research to better characterize the nature and, if possible, quantify potential mixing rates between the Atlantic and the Indian Oceans.

Eastern and western Atlantic bluefin tuna

- Reliable evaluation of Atlantic bluefin tuna stock status is hindered by the lack (or low quality) of catch, catch effort and size statistics over time for some of the major fleets. Effort to improve the temporal and spatial coverage for detailed size and catch-effort statistics of the main fisheries, especially in the Mediterranean, should be continued and even increased, using new technologies (e.g. stereoscopic camera for size data and VMS data for effort).

- The sampling effort for biological tissues (otolith, muscle, spine, etc.) carried out through the GPYP or other national programs should also be continued and increased in some fisheries to improve ageing and stock mixing rates (see SCRS/2013/011). Effort in 2015 should focus on the analysis of the data that have been collected to update size and age conversion relationships and to give most probable hypotheses regarding population structure prior to the 2016 stock assessment. Attention must also be given to the creation of a centralized database containing the reference images, direct ages, otolith microchemistry and associated metadata to facilitate future analyses and safeguard current and future data.

- A complete revision of Task I (aggregated catch, by gear/fleet) and Task II (catch-effort, size) data has to be done for bluefin tuna by including new sources of information (BCDs, trade statistics, etc.), following the outputs from experts contracted by the GBYP.

North and South Atlantic swordfish

- Model Validation. The Group recommended that methods be developed to evaluate indices of stock abundance based on fisheries dependent data, e.g. by using simulation and cross validation based on detailed data such as logbooks and sales records.

- Impact of management on CPUE series. As fishery-dependent time series of CPUE are absolutely critical to all ICCAT assessments. It is essential to maintain their continuity and ensure they properly capture distribution changes of swordfish stocks. To this end, and to the extent possible, any management action that may affect catchability should either: a) be phased in over a series of years so that there is overlap, allowing the effect of the action to be estimated; or b) have the effect of the action assessed experimentally, e.g. experiments testing the effects of a new hook type. This will achieve two valuable purposes: a) maintaining the integrity of CPUE time series; and b) allow for the direct estimation of the efficacy of the management action.

Mediterranean swordfish

- Stock mixing and management boundaries. The Group noted the need to intensify collaborative and multi-disciplinary research taking into account fine-scale (e.g. 1º squares) and quarterly sampling strata, aiming at improving the current knowledge about stock boundaries between the Mediterranean and North Atlantic swordfish stocks.

- Gear selectivity. Further research on gear design and use is encouraged in order to minimize catch of age-0 swordfish and increase yield and spawning biomass per recruit from this fishery. The Group recommended further studies to be conducted on the recently developed mesopelagic longlines fisheries, due to the impact these new fisheries may have in terms of catch composition, CPUE series, size distribution of the catches and consequently on the assessment of the stock status and provision of management advice.

Tropicals

- The SCRS should recommend creating a temporary working group on FADs. The Working Group would need to have members that are scientists, fishery managers, fishing industry administrators and fishermen. The objectives of this Working Group would be to:

  a) initiate an active exchange of views concerning FAD management options;
  b) better estimate the past and present numbers of buoys, FADs and changes in FAD-related technology;
  c) evaluate ways to improve the use of information related to FADs in the process of stock assessment, evaluate the consequences of future FAD-related management options on ICCAT-managed species and on the pelagic ecosystems.

- The Committee reiterates the need to obtain economic data on the commercial category landing values of the various species managed by ICCAT. The Committee therefore recommends that ICCAT collates this information and creates a database of historic tuna prices for species harvested in the ICCAT Convention area.

Billfishes

- Marlins and sailfish have been assessed to be overfished and possibly to continue to suffer overfishing. Unfortunately these assessments have substantial uncertainty that can only be reduced if scientists from all countries that have a stake in these stocks contribute to the research and assessment process. Of the CPCs that capture billfishes in the Atlantic, relatively few sent participants to the billfish scientific meetings. As a consequence, the billfish Working Group did not have the full advantage of the experience and insight of the experts that could have attended. The Commission needs to reaffirm its obligation and commitment (*Resolution by ICCAT on Best Available Science* [Res. 11-17]) to support the SCRS in this regard, to ensure the best possible scientific products.

- Although it is preferable to have scientists present at the billfish Working Group meeting contributions can be made in the form of SCRS documents that other members of the Group can present at the meeting. Such papers are often critical to the productivity of the Group during the meeting. Therefore, the billfish Working Group again stresses the need that scientists prepare SCRS documents for the meeting.

Sharks

- Invite ICES WGEF (Working Group on Elasmobranch Fishes), GFCM (General Fisheries Commission of the Mediterranean), the West African SRFC (Sub-Regional Fisheries Commission), and the SEAFO (Southeast Atlantic Fisheries Organisation) to provide data and participate in the 2015 Blue Shark Stock Assessment.

Working Group on Stock Assessment Methods (WGSAM)

- The Group again encourages CPCs to provide access to CPUE set-by-set data according to the needs and priorities identified by the different species groups and the sub-committees in accordance with the ICCAT confidentiality protocols. Clear procedures will be elaborated advising how to provide this data. This would enable the SCRS to produce a wide variety of indices on a more informative spatial scale. Initially information on a single species and/or by specific fleet could be used to illustrate the benefits. Use of the existing "cloud" opportunities maintained by the Secretariat for storage and access was suggested for ease of multi-lateral collaborations. This exchange could be made under the ICCAT Confidentiality Agreement already in place.

- The Group also agreed that the implementation of the management strategy evaluation approach (MSE) and promotion of the dialogue between scientists and fisheries managers on the Harvest Control Rules and MSE should be encouraged to improve the scientific advice given to the Commission. These efforts should include a review of MSE efforts so far in light of successes, lack of successes and the resources limiting future MSE progress.

Sub-Committee on Ecosystems

- Develop a strategic research plan for the Sub-Committee on Ecosystems in accordance with the SCRS strategic plan.

- The conceptual management objectives on the EBFM developed by the Sub-Committee should be presented to the 2015 meeting of the Standing Working Group to Enhance the Dialogue between Science and Fisheries Managers (SWGSM) in order to explain the importance of these considerations and to receive input from the Commission.

Sub-Committee on Statistics

- In view of the recent advancements on the use of electronic monitoring systems for at-sea data collections, the Sub-Committee agreed that the SCRS should adopt minimum standards for Electronic Monitoring Systems given that, according to recent analyses conducted, they can provide very useful information on fishing trips and be a complement to port sampling and human observer programs for tropical tuna purse seine fisheries. Since there are several vendors and multiple possible system configurations, these standards would aim to standardize the implementation of electronic monitoring systems and to ensure that the systems can result in collecting useful information for fisheries monitoring. The ISSF's technical report 2014-08 "Updated guidance on Electronic Monitoring Systems for tropical tuna purse seine fisheries" could be used as a starting point for this objective. The Sub-Committee also noted the need to determine best practices for the integration of information from electronic monitoring systems, human observer, and port sampling programs. A task group should provide additional advice on this topic in 2015.

18. Responses to Commission's requests

18.1 Evaluate the efficacy of the area/time closure referred to in paragraph 20 for the reduction of catches of juvenile BET and YFT Rec. [11-01] paragraph 22

The 2-month area/time closure for FAD fishing called for in Rec. 11-01 and designed by the Commission went into force at the beginning of 2013 (herein called "the closure", **Figure 18.1.1**). Considering that data is only available for one year with this closure, the Committee is limited in the extent to which it can evaluate the effectiveness of this measure. The Committee did conduct some analyses with the data available so far:

- Historically, less than 10% of the annual FAD associated catches of yellowfin and bigeye are caught within the area/time closure. The Committee suggests this 10% should be considered as a maximum potential reduction that may be expected from such closure. In general, however, these catches are predominantly of small fish, which are the ones to be protected by the measure.

- Examination of the available catch, size and effort data for 2013, in comparison with prior years, does indicate that there were substantial changes in the tropical tuna catch concurrent with the closure:

  - FAD catches by the EU and associated fleets in the moratorium area immediately after the closure (March) were high, but at the same high level observer in the historic time series.

  - There were few reported free school catches by EU and associated vessels within the closure area, despite that being permitted by Rec. 11-01 (**Figure 18.1.2**).

  - The EU PS fleet more or less maintained its catches during the closure by fishing outside the closure area on FAD and free schools.

  - FAD catches from the Ghanaian fleet during the closure season were much lower than in previous years.

In the future, accumulation of additional years of data from VMS, logbooks and on-board observers combined with the expected availability of detailed data on FAD deployments, should enable a more thorough evaluation of the effectiveness of this area/time closure.

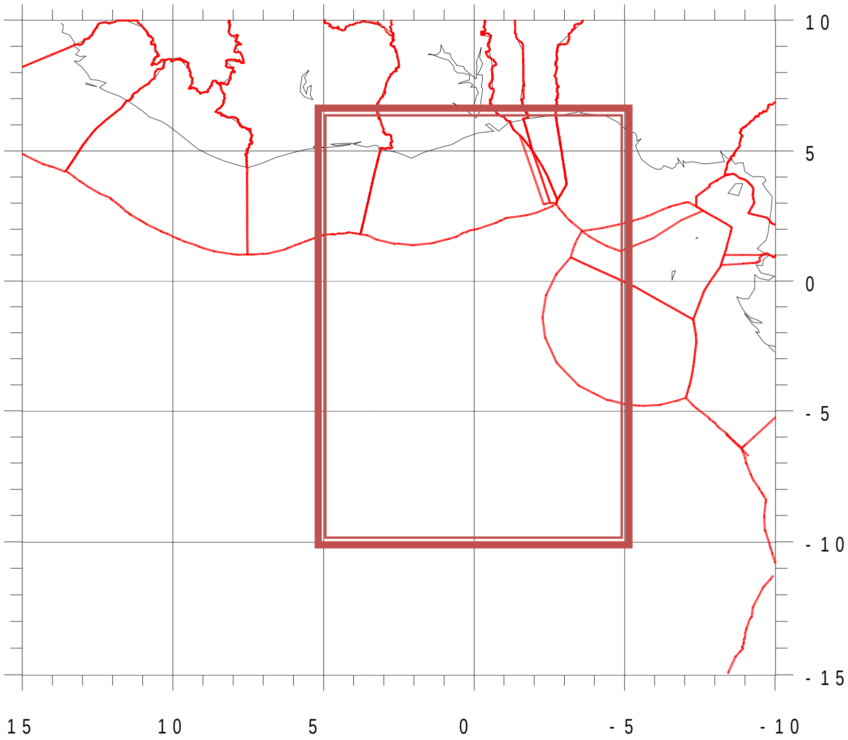


Figure 18.1.1 Area of the 2 month closure of FAD fishing (January and February) beginning in 2013, targeting the reduction of small YFT and BET (Rec. 11-01).

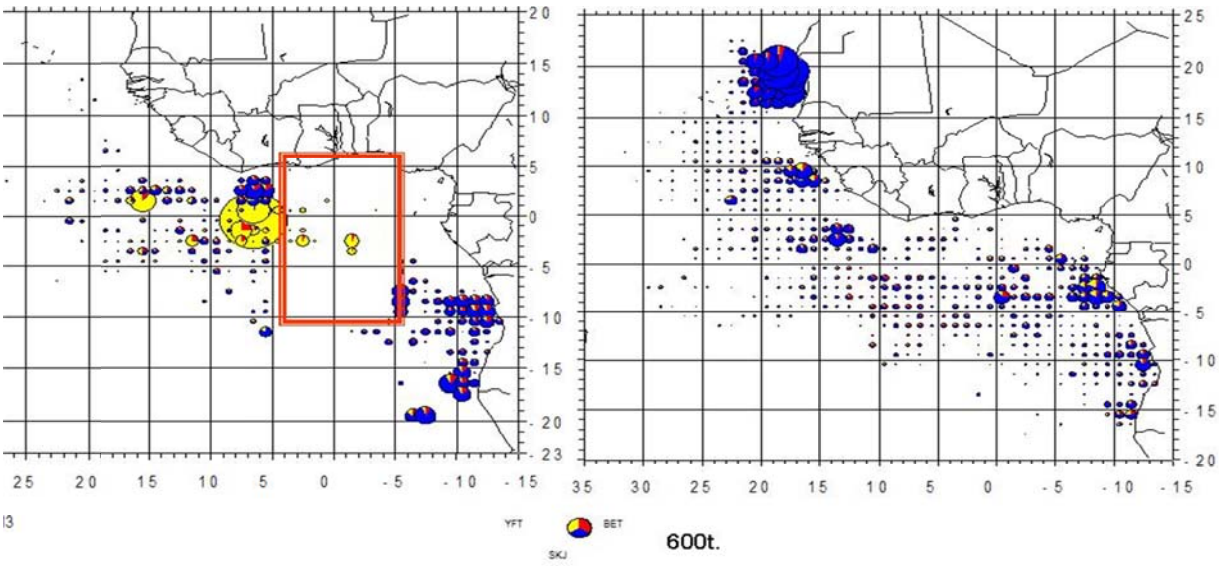


Figure 18.1.2 Catches of tropical tunas by EU purse seiners in 2013, during January and February in free school and FAD sets (left panel) and March to December only on FAD sets (right panel). Catches inside the closure area in the left panel correspond to free school sets. Colors represent species composition and bubble size the amount of catch.

18.2 Review the technical specifications of the use of stereoscopic cameras systems as defined in Rec. [13-08]

Background: *[Rec. 13-08] paragraph 6 requests the SCRS to review the technical specifications of the use of stereoscopic cameras systems as defined in paragraphs 1 to 5 of this recommendation. The SCRS shall also provide any recommendations to improve the system.*

Six CPCs submitted in 2014 size and weight data from measures at caging operations using stereoscopic cameras systems. However information on the specific details of the technical specifications of the stereoscopic cameras systems used was not provided. Therefore, the Committee was not able to review or compare the specification provided in Rec. [13-08]. The Committee recommends that CPCs using stereoscopic cameras systems do provide to the Secretariat the specification of their applications including:

- Logistic settings of the cameras between the holding cage and transferring nets.
- Specifics of the cameras, distance, video recording specification, count and size determinations specifics.
- Software and settings for converting digital images and measures to actual size equivalent measure, as well as conversion factors for weight.

These specifications should be provided in conjunction with the size and weight data submitted. A preliminary review of the stereoscopic camera data collected and submitted is provided in SCRS/2014/141.

18.3 Continue to explore operationally viable technologies and methodologies for determining the size and biomass at the points of capture and caging and evaluate the BFT pilot studies to estimate both the number and weight of bluefin tuna at the point of capture and caging using stereoscopical systems, Rec. [13-07] paragraph 88

Background: *[Rec. 13-07] paragraph 88 requests CPCs to provide to the SCRS data and information collected under pilot studies implemented to better estimate both the number and weight of bluefin tuna at the point of capture and caging including through the use of stereoscopical cameras systems or alternative techniques that provide the equivalent precision and shall cover 100% of all cagings in order to refine the number and weight of the fish in each caging operation. The SCRS shall continue to explore operationally viable technologies and methodologies for determining the size and biomass at the points of capture and caging and report to the Commission at the 2014 annual meeting.*

In 2014 six flags started submitting size and weight measures of bluefin tuna at caging operation using stereo camera video systems. However the data submitted did not include technical specifications on the operation and software used. Document SCRS/2014/141 summarized size distribution of the data provided and compared the modal distributions to back-calculated harvest size data from previous years (2010-2013). Differences were found between the density and size frequency distributions by flag and it was not possible to determine if these differences reflect differences in the catches of different years or in the methodologies related to back-calculating catch at size from harvest data.

The Group recommended that procedures for the use of the stereo camera, calibration and estimation of size from video recording be standardised and made available to the SCRS. It was also requested that the Secretariat provide a standard electronic format for data submission to the CPCs.

The Group also recommends reviewing and providing appropriate conversion factors to estimate weight based on the size measures. Finally the Group recommend use of the stereo camera measurements to validate methods that use size and weight at harvest data for estimation of size frequency of bluefin catch destined to farms. New results including area/time specific relationships will be presented during the next data preparatory group.

18.4 Evaluate the BFT national observer programmes conducted by CPCs to report to the Commission and to provide advice on future improvements, Rec. [13-07] paragraph 90

Background: *[Rec. 13-07] paragraph 90 requests CPCs to provide to the SCRS data and information collected under each CPC's observer programme in accordance with requirements and procedures to be developed by the Commission by 2009 taking into account CPC confidentiality requirements.*

The Commission calls the SCRS to report on the scientific aspects of the programme. The report shall include:

- *The coverage level achieved by each CPC.*
- *A summary of the data collected and any relevant findings associated with those data.*
- *Recommendations to improve the effectiveness of CPC observer programmes.*

In accordance with Recs. 12-03 and 13-07, data collected under the national bluefin tuna observer programmes has been submitted to the Secretariat. No format has been developed for this data submission as of yet, although potentially the general observer data collection forms developed and presented to the Sub-Committee on Ecosystems in 2014 could be used. As such several CPCs have submitted data describing their observer programmes (using statistical from CP45), but not the actual data collected by them. Should the newly developed observer forms be adopted for bluefin tuna observer programmes as well, this problem may be resolved and the Committee will be able to provide a more detailed response to the Commission.

18.5 Provide updated BFT growth rates tables based on the information from BCDs and other submitted data, Rec. [13-07], paragraph 98

Background: *[Rec. 13-07] paragraph 98 requests the SCRS to review information from BCDs and other submitted data and further study growth rates so as to provide updated growth tables to the Commission by the 2014 annual meeting.*

Harvest data from over 130,000 caged bluefin were analysed in document SCRS/2014/162 to estimate maximum potential growth factors in farms (not any specific farm). The document presents possible proxies of “maximum” growth, based on the probability distribution of variance of weight at size, from 3 alternative statistical models, using the 75% percentile of the cumulative density functions. These estimated proxies were compared to the current maximum growth table adopted by the SCRS in 2010. Two of the estimated proxies were found to be lower. This analysis confirmed that farming increases the weight compared to similar sized wild fish and indicated that there were seasonal effects on growth. However, it was concluded that the differences between the growth proxies and the current growth table should be further reviewed and evaluated before an updated growth table can be submitted to the Commission.

18.6 Provide answer to the requests from the 2nd WG WBFT Fisheries Managers and Scientists

One of the objectives of the Science and Manager meeting in Prince Edward Island, Canada, was to explore options/proposals for the development of new fishery independent indices of abundance and the improvement of existing bluefin tuna indices. In this context Japan proposed a longline CPUE survey in the intermediate area of three nations’ fishing grounds. To complement this enhanced survey, the SCRS discussed the potential for a new index comprised of combined existing CPUE data from the Japanese, Canadian, and U.S. fleets operating in the northwest Atlantic. The combined index would require access to set-by-set data from the respective CPC. There was general consensus that such a CPUE index could make a significant contribution to the future WBFT stock assessment. The SCRS recognized the potential obstacles that might arise due to the data confidentiality rules of the different CPCs. However, the SCRS also agreed that possible venues to estimate the combined CPUE using set-by-set data should be explored (recognizing the confidentiality requirements of each CPC), and it strongly encouraged Japan, Canada, and U.S. scientists to collaborate in the development of a new index. It was suggested to start the collaborative work using the existing aggregated data which has no confidentiality constraints while pursuing options for bringing together higher resolution data. To achieve this objective it was recommended that a small working group with 1-2 scientific representatives from Canada, Japan, Mexico and the USA be established (in 2015) to investigate approaches for combining raw catch/effort data for CPUE from each country into a new index (or indices) of abundance for western Atlantic BFT.

A number of proposals were presented on the development of new fishery (dependent and independent) indices of abundance and the improvement of existing indices for bluefin tuna at the meeting of the Working Group of Fisheries Managers and Scientists, Charlottetown, PEI. It was recommended that the results of this work and that the novel proposals be presented to the SCRS in September 2014 for review and evaluation. Unfortunately, given the time commitment required for an update assessment of both the eastern and western stocks, insufficient time was available to review the specific details of each proposal. A general evaluation matrix was developed (**Tables 18.6.1** and **18.6.2**) and the criteria for each proposal formulated by the proponent CPC. It should be noted that each of the proposals were vetted through their national scientists and the Science/Managers workshop, as such each has scientific merit to address a variety of issues and would make a valuable contribution to the western BFT stock assessment. The SCRS generally agreed that these projects could contribute to the development of new indices and improvements to the old, and supports the further development of formal proposals by the CPCs for the proposals which require scientific quota or funding from the Commission. However, the projects were not rated for priority or benefit.

The 2nd Meeting of the WG WBFT Fisheries Managers and Scientists also made the following requests:

Provided that it does not interfere with the current work program of the SCRS deriving from previous decisions of the SCRS and the Commission, the WG requests the SCRS to:

1) Consider the proposal from Canada to employ the surplus production model in association with the update of stock assessment in 2014.

2) As part of the 2014 update assessment of western Atlantic bluefin tuna, provide guidance on a range of fish size management measures for western Atlantic bluefin tuna and their impact on yield per recruit and spawner per recruit considerations. The SCRS should also comment on the effect of fish size management measures on their ability to monitor stock status.

3) Provide to the 2014 Commission meeting for its consideration: A range of potential interim target reference points based on levels expressed in the percentage of currently estimated spawning stock biomass taking into account relevant factors including, but not limited to, the estimated speed of increase of the spawning stock biomass, levels of recent recruitment, and the level corresponding to a biomass enabling the SCRS to determine if there is an applicable recruitment scenario for the western Atlantic bluefin tuna stock. A Strategy Matrix to achieve these interim target reference points; a limit reference point, taking into account the historically lowest level of spawning stock biomass; a Strategy Matrix to avoid dropping below the interim limit reference point.

The Committee did not have sufficient time to fully address all of these requests, but offers the following responses until the matters can be considered more adequately.

1) The second meeting of the Working Group of Fisheries Managers and Scientists in Support of the WBFT Stock Assessment requested that the Working Group on bluefin tuna consider a proposal from Canada to employ a surplus production model in association with the update stock assessment in 2014, provided it did not interfere with the current work plan. The SCRS agrees that it is useful to evaluate all methods appropriate for the available data and life history of the species in question, which in some cases may include production models. However, the SCRS expressed concern that the Commission was prescribing which methods the SCRS should employ. Nevertheless, in support of the Commission's request, the Group reviewed document SCRS\2014\183. The Group did not reach a consensus on the merits of using production models of the kind discussed in SCRS/2014/183 to provide scientific advice on the status of Atlantic bluefin tuna. It was pointed out that such production models ignore information on the size or age structure of the catch and assume that all age classes are equally vulnerable to the fishery (which is clearly not the case for Atlantic Bluefin tuna). However, it was also noted that past working Groups have explored the use of age-structured production models and that it might be worth exploring those approaches again. The Group agreed that the surplus production model might be useful as a possible management procedure tested in a management strategy framework.

2) The Committee was unable to conduct any new bluefin tuna yield per recruit analysis to address this particular question during the 2014 stock assessment meeting due to time constraints and, therefore, it reiterates the response provided to the Commission in 2012 (paragraph below). The Committee indicated that, if time permits, it will evaluate the impact of adopting alternative larger size limits that take into consideration the age of maturity of western bluefin tuna, on the yield per recruit and spawner per recruit during 2015.

   The Committee recalls that in 2012 it reviewed yield-per-recruit calculations using various selectivity patterns by gear based on the 2010 assessment results and for decreased selectivity pattern by up to 40% for ages 1 to 6 for the whole fishery based on the 2012 assessment results. The Committee recognized that Y/R and SSB/R could be improved by changing the selectivity pattern (decreasing the selectivity of ages 1-6 by 40% resulted in only modest improvements), but this would imply allocation changes with implications beyond strict Y/R and SSB/R considerations. In addition, the Committee was concerned that such changes in selectivity would affect the availability and utility of indices of stock sizes currently used in the assessment. Furthermore, regulations to decrease the catches of ages 1 to 6 bluefin tuna may have unintended negative consequences such as increased discard mortality, which may be difficult to monitor, and changes due to reallocation of effort which may be difficult to predict.

3) The target spawning stock biomass for western Atlantic bluefin tuna is currently based on the level that would support MSY (SSB_{MSY}), with the goal of attaining this target by 2019 (Rec. 98-07). The calculation of MSY and SSB_{MSY} is dependent upon assumptions about the underlying stock-recruitment relationship; the SCRS currently provides management advice assuming two alternative stock recruitment scenarios which are broadly divergent in their estimates of SSB_{MSY} for Atlantic bluefin tuna. Therefore it is difficult to implement Harvest Control Rules using MSY based reference points. There are several potential candidates for an interim target reference point that can serve as a proxy for MSY-based targets, but do not require any assumptions about the stock-recruitment relationship. One that has been suggested for bluefin tuna in the past is $F_{0.1}$ (a fishing mortality rate based on yield per recruit considerations) and the associated biomass target $SSB_{F0.1}$. In some cases $SSB_{F0.1}$ has been derived using an assumed stock-recruitment relationship, however one could also simply assume that future levels of recruitment in the near-term are likely to be similar to estimates of recruitment from the recent past and treat the resulting calculation of $SSB_{F0.1}$ as an interim (short term) target that would be updated with each assessment. Other proxies such as spawning potential ratio (SPR) have been used for other fisheries, although determination of which level of SPR that is appropriate requires some additional work.

   ICCAT has no official definition of a limit reference point. As part of Harvest Control Rules, a limit reference point (LRP) is intended to restrict harvesting so as to avoid highly undesirable states of the stock, such as recruitment overfishing, from which recovery could be irreversible or slowly reversible. LRPs can be set based on fishing mortality rates or related to biomass levels; in this case, it is interpreted that the Commission is referring to biomass related LRP. In the context of recent discussions of harvest controls within the SCRS, and for this response, a biomass related LRP is defined as a boundary (e.g. in terms of absolute or relative biomass levels, spawning potential ratios (SPR), etc.) which, if crossed, would require the cessation of harvesting until the stock has recovered to a level above the LRP. Additional Harvest Control Rules can be put in place to work in conjunction with the LRP to avoid falling below the LRP with high probability. Note that LRPs need to be considered in conjunction with related management measures as some of the possible LRPs referred to here are used in other RFMOs, but not necessarily as a point where the cessation of harvesting is required. It was also pointed out that the LRP paradigm effectively assumes that stock status is known exactly, whereas in reality this is subject to uncertainty, which leads to problems in making recommendations on this basis; a primary purpose of MSE approaches is to avoid these problems.

For the western bluefin tuna stocks, it is preferable to base the LRP on parameters which are not dependent upon a particular stock recruitment scenario. Options for limit reference points include:

- Biomass levels considered necessary to avoid recruitment overfishing, to preserve genetic diversity, ensure spawning success and/or maintain robustness to changes in environmental conditions, etc. These can be absolute or relative.
- SSB levels based on historical estimates.
- SPR (spawning potential ratios).
- Values of directly "observable" quantities such as (preferably fishery-independent) abundance indices which are independent of the assumptions associated with assessments.

As an example, an interim limit reference point of SPR (e.g. 20%, 30%, 40%) could be used for the western bluefin tuna stock. In such a case, were the Commission to adopt a set of Harvest Control Rules that incorporated this LRP, if the SPR (calculated, for example, from the ratio of the fished spawning stock biomass per recruit [SSBR] to the unfished SSBR) should fall below the prescribed level, fishing on the stock should cease until the SPR is once again greater than that level. A measure like $F_{0.1}$ could also be considered as a fishing mortality limit reference point, with a target reference point set as some fixed percentage of $F_{0.1}$.

The Committee reviewed results based on simulation modeling (SCRS/2014/145) which indicate that setting adequate target F levels with a Harvest Control Rule for eastern BFT could increase long-term harvest, permit greater stability in annual TACs, and maintain low probabilities of recruitment overfishing. However, the Committee previously identified some limitations in this approach and recommended further analyses. Management strategy evaluations (MSE) can help characterize the relative performance of specific reference points in regards to achieving management objectives and the risk of stock levels falling below defined reference points (limits and thresholds) for a series of target reference points under specific Harvest Control Rules (HCR), similar to those conducted for the eastern BFT may help to characterize the relative performance of specific target reference points. The Committee noted the GBYP program is well-along in developing a framework for conducting MSEs for Atlantic bluefin tuna. Further guidance from the Commission is required in order to define these target reference points, as they may be dependent on such criteria as the desired probability for maintaining stocks in a not-overfished, non-overfishing status (e.g. an appropriate percentage of F_{MSY}), or for avoiding stock collapse. In general, it must be remembered that MSE effectively integrates over the range of alternative plausible assessments and does not relate straightforwardly to reference points as defined in the "best assessment" paradigm; instead MSE focuses on trade-offs between attainment of often conflicting objectives, as expressed in terms of performance statistics.

Due to time constraints, the SCRS could not prepare Strategy Matrixes for each example of the reference points.

Table 18.6.1 General evaluation matrix for each proposal formulated by the proponent CPC.

	Proposal	CPC	Type of index	Source of data New or old?	Timeframe Solution	Feasibility/ Scientific Merit	Contribute to Biology/Ecology	Limitations/ Uncertainties	Method track Record	Time Commitment	Spatial Coverage	Collaboration/ Technology Transfer	Incidental Mortalities	Budget Available	Funding Identified
1	Acoustic-trolling BFT survey for the development of a new fishery independent index of abundance	Canada	Fishery Independent Index	New	Long-Term	Yes	Yes	Yes	New	Ongoing/continuing	Expandable	Yes	Yes	Yes	No
2	A Mark and Recapture Experiment to Determine the Abundance of Atlantic Bluefin Tuna in the Gulf of St. Lawrence, Canada	Canada	Intermediate	New	Short-Term	To be determined	Yes	Yes	Proven	Multi-year	In some cases	Yes	Yes	Yes	No
3	Longline CPUE survey in the intermediate area of three nations' fishing grounds	Japan	Fishery Dependent Index	New and old	Long-Term	Yes	Yes	Yes	Proven	Multi-year	Expandable	Yes	Yes	No	No
4	Improvements to the Current Larval Index - expand existing sampling on annual surveys	USA	Fishery Independent Index	New and old	Long-Term	Yes	Yes	Yes	Proven	Ongoing/continuing	Restricted	Yes	No	Yes	No
5	Improvements to the Current Larval Index - dynamic age/growth mode and predictive recruitment model	USA	Fishery Independent Index	New and old	Long-Term	Yes	Yes	Yes	New	Ongoing/continuing	Restricted	Yes	No	Yes	No
6	Larval prey, feeding success and growth index	USA	Fishery Dependent Index	New	Long-Term	Yes	Yes	Yes	New	Ongoing/continuing	Restricted	Yes	No	Yes	No
7	Develop and index of daily egg production with continuous eggs sampling and genetic analysis of eggs	USA	Fishery Independent Index	New	Long-Term	To be determined	Yes	Yes	New	Ongoing/continuing	Restricted	Yes	No	No	No
8	Extension of sampling efforts in the Caribbean and western North Atlantic	USA	Fishery Independent Index	New	Short-Term	Yes	Yes	Yes	Proven	Ongoing/continuing	Restricted	Yes	No	Yes	No

9	Improve existing and/or develop new indices for stock assessments	USA	Fishery Dependent Index	New and old	Short-Term	Yes	Yes	Yes		Ongoing/continuing	Restricted	Yes	No	No	No
10	Improve the collection and processing of biological material (otoliths, spines, tissue samples) from the fishery	USA	Fishery Dependent Index	New and old	Short-Term	Yes	Yes	Yes	Proven	Ongoing/continuing	Restricted	Yes	No	No	No
11	Develop a genomic-based approach to assessment of BFT similar to the close-kin estimates of spawning biomass of southern bluefin tuna	USA	Intermediate	New	Long-Term	To be determined	Yes	Yes	New	Ongoing/continuing	Expandable	Yes	No	No	No
12	Young-of-the-year index	USA	Fishery Independent Index	New	Long-Term	To be determined	Yes	Yes	New	Ongoing/continuing	Restricted	No	Yes	No	No

Table 18.6.2 Suggestions for Proposal Evaluation Criteria.

1. Type of index of abundance:
   a. Fishery Independent Index of abundance
   b. Fishery Dependent Index of abundance
   c. Intermediate – relies to some extent on the fishery
2. Source of data: (Is this a new index of abundance?)
   a. Yes
   b. No – improvements to existing index
3. Timeframe for solution: (Does the proposal address a long or short term solution?)
   a. Short-term
   b. Long-term
4. Feasibility: (Is the proposal/method feasible and have scientific merit?)
   a. Yes
   b. No
   c. To be determined
5. Biology/ecology: (Will the proposal contribute to our understanding of the biology/ecology of BFT
   a. Yes
   b. No
6. Limitations: (Are there assumptions/uncertainties that could seriously impact the index?)
   a. Yes
   b. No
   c. Potentially
7. Track record: (Does the methodology/technology have a proven track record?)
   a. Yes
   b. No
8. Time commitment
   a. Ongoing/continuing
   b. One year
   c. Multi-year
9. Coverage: (Can the proposal be expanded to other areas – increased coverage?)
   a. Yes
   b. No
   c. In some cases
10. Collaboration: (Is there potential for collaboration/technology transfer?)
    a. Yes
    b. No
11. Incidental mortalities: (Will there be a requirement for incidental mortalities?)
    a. Yes
    b. No
12. Budget: (Has a budget been provided with the proposal?)
    a. Yes
    b. No
13. Funding: (Has a source of funding been identified?)
    a. Yes
    b. No

18.7 Evaluation of data deficiencies pursuant to [Rec. 05-09]

Deficiencies were discussed by each species group, particularly by those that conducted an assessment this year (skipjack, bluefin (East and West), and the Sub-Committee on Ecosystems).

18.7.1 Current data catalogues of major species by stock

The Secretariat presented the Task I & II catalogues for all main species as approved last year (Appendix 1 to SCI-008) to the Sub-Committee. The Sub-Committee noted that the method applied provided a better view of data gaps that should be addressed by CPCs.

18.7.2 Implications of identified deficiencies in future stock assessments

The Committee agreed that implications of data deficiencies for future stock assessments should be discussed by each species group, particularly by those that conducted an assessment this year (skipjack, bluefin (East and West), and Sub-Committee on Ecosystems. In order to facilitate the discussions, the Secretariat circulated the Questionnaire on data deficiencies, impacts, solutions and priorities for stock assessment of ICCAT species. The information provided by the species groups to the Committee is included in document SCRS/2014/199.

18.7.3 Proposals for data recovery plans and improvements on data collections systems

None were noted.

18.8 Response to Resolution 12-12 regarding the ecological importance of the Sargasso Sea to tuna and tuna-like species and ecologically associated species

The Group was requested by the Commission [Res. 12-12] to examine the available data and information concerning the Sargasso Sea and its ecological importance to tuna and tuna-like species and ecologically associated species. Working paper SCRS/2013/132 provided an inventory and ecology of 16 fish species of interest to ICCAT in the Sargasso Sea. This work has been summarized as a table that relates important life history parameters of ICCAT species to their dependence on the Sargasso Sea ecosystem. Working paper SCRS/2014/120 provided a preliminary pelagic food web for the Sargasso Sea ecosystem that illustrated the dependencies of the ICCAT species on common prey species like squid, and also flying fishes, which use Sargassum as a reproductive habitat. Finally, SCRS/2014/119 summarized the annual removals by species from the Sargasso Sea relative to total removals from the relevant stock of each species. Based on these contributions, the Group prepared a work plan to continue assessing the importance of the Sargasso Sea in response to Resolution 12-12.

18.9 Definition of the SCRS plan for future sea turtle impact analyses Rec. [13-11] paragraph 4

The Sub-Committee on Ecosystems agreed on a plan to continue to assess the impact of ICCAT fisheries on sea turtles pursuant to Rec. [13-11] paragraph 4.

Specifically, the Sub-Committee proposes to:

1. Complete draft by-catch data collection forms and support their adoption.
2. Update EFFDis for longline gear, and facilitate the development of similar products for the other major gear types.
3. Compare by-catch rates of ICCAT fisheries to the spatial distribution of effort by major gear types.
4. Develop “best practice” guidance for the extrapolation of total by-catch.
5. Continue to evaluate approaches used to conduct impact assessments for by-catch species.
6. Continue to evaluate by-catch mitigation techniques and safe release practices, and recommend revisions to management regulations if warranted.
7. Collect and review data for future impact assessments. Specifically on:

    a. By-catch rates
    b. Total extrapolated by-catch
    c. Post-release mortality and methods of estimation
    d. Size composition

The Sub-Committee will continue to advise the Commission when new information becomes available with regard to the impact of ICCAT fisheries on sea turtles.

18.10 Provide answer to the requests from the Second Meeting of the Working Group on Convention Amendment

18.10.1 Proposal for updating the definition of tuna and tuna-like species under the ICCAT Convention as defined when the Convention was adopted in 1969

The Commission has asked "What constituted tuna and tuna-like species when the Convention was adopted in 1969 and how is this list of species best characterized today, given that taxonomic categories and names can change from time to time and the Convention cannot be modified frequently?"

In 1969, the species that would have been described as "tuna and tuna-like fishes (the Scombriformes with the exception of the families Trichiuridae and Gempylidae and the genus Scomber)" are included in the following list, using current taxonomic nomenclature:

Table 18.10.1.1

Scombridae

Acanthocybium solandri (Cuvier 1832) – Wahoo

*Auxis rochei rochei (*Risso 1810) – Bullet Tuna

Auxis thazard thazard (Lacepède 1800) – Frigate Tuna

Euthynnus alletteratus (Rafinesque 1810) – Little Tunny

Katsuwonus pelamis (Linnaeus 1858) – Skipjack Tuna

Orcynopsis unicolor (Geoffrey St. Hilaire 1817) – Plain Bonito

Sarda sarda (Bloch 1793) – Atlantic Bonito

Scomberomorus maculatus (Mitchill 1815) – Spanish Mackerel

Scomberomorus regalis (Bloch 1793) – Cero

Scomberomorus tritor (Cuvier in Cuvier & Valenciennes 1832) – West African Spanish Mackerel

Gasterochisma melampus Richardson 1845 – Butterfly Kingfish

Allothunnus fallai Serventy 1948 – Slender Tuna

Thunnus alalunga (Bonnaterre 1788) – Albacore

Thunnus albacares (Bonnaterre 1788) – Yellowfin Tuna

Thunnus atlanticus (Lesson 1831) – Blackfin Tuna

Thunnus obesus (Lowe 1839) – Bigeye Tuna

Thunnus thynnus (Linnaeus 1758) – Atlantic Bluefin Tuna

Thunnus maccoyii (Castelnau 1872) – Southern Bluefin Tuna

Istiophoridae

Istiompax indica (Cuvier 1832) – Black Marlin

Istiophorus platypterus (Shaw 1792) - Sailfish

Kajikia albida (Poey 1860) – White Marlin (currently known as *Tetrapturus albidus* in FAO and other CPCs species list that use FAO species names as reference, but can change in the future)

Makaira nigricans Lacepède 1802 – Blue Marlin

Tetrapturus belone Rafinesque 1810 – Mediterranean Spearfish

Tetrapturus georgii Lowe 1841- Roundscale Spearfish

Tetrapturus pfluegeri Robins & de Sylva 1963 – Longbill Spearfish

Xiphiidae

Xiphias gladius Linnaeus 1758 – Swordfish

These species are classified as Scombroidei and Xiphioidei. As an example, if the Commission wishes to update the text found in the first sentence of paragraph 1, Article IV of the ICCAT Convention to reflect current nomenclature and research responsibilities of the SCRS, the text could read:

In order to carry out the objectives of this Convention the Commission shall be responsible for the study of the populations of tuna and tuna-like fishes (the Scombroidei and Xiphioidei) and such other species of fishes exploited in tuna fishing in the Convention area and are not under investigation by another international fishery organization.

Alternatively, the species could be defined explicitly by adopting a list of covered species. **Table 18.10.1.1** can serve as the list of tuna and tuna-like species, and the other species known to be impacted during fishing for tuna and tuna-like species are included in the updated ICCAT list (http://www.iccat.int/en/Stat_Codes.htm).

18.10.2 Response to Commission on "species covered by the term oceanic, pelagic, and highly migratory elasmobranchs"

The shark species Group agreed on the following definitions of the terms "oceanic", "pelagic", and "highly migratory" elasmobranchs. "Oceanic species" are defined as those usually occurring in the open ocean, beyond the continental shelf (in contrast to the neritic zone); "pelagic species" are defined as those not generally associated with the bottom (in contrast to demersal); and "highly migratory species" are defined as those that in the course of their life cycle migrate over great distances of the ocean. A table containing a preliminary list of species believed to meet these three criteria (i.e. species that are oceanic *and* pelagic *and* highly migratory) is attached below. This table is based on knowledge on taxonomy and the list of species in the ICCAT database that were available to the Group during the 2014 intersessional meeting held in Piriápolis, Uruguay.

List of elasmobranch species* considered to be Oceanic, Pelagic and Highly Migratory.

Order	*Family*	*Genus*	*Species*	*Species authorship*
Orectolobiformes	Rhincodontidae			
Orectolobiformes	Rhincodontidae	*Rhincodon*	*typus*	Smith 1828
Lamniformes	Pseudocarchariidae			
Lamniformes	Pseudocarchariidae	*Pseudocarcharias*	*kamoharai*	(Matsubara 1936)
Lamniformes	Lamnidae			
Lamniformes	Lamnidae	*Carcharodon*	*carcharias*	(Linnaeus 1758)
Lamniformes	Lamnidae	*Isurus*	spp.	
Lamniformes	Lamnidae	*Isurus*	*oxyrinchus*	Rafinesque 1810
Lamniformes	Lamnidae	*Isurus*	*paucus*	Guitart Manday 1966
Lamniformes	Lamnidae	*Lamna*	*nasus*	(Bonnaterre 1788)
Lamniformes	Cetorhinidae			
Lamniformes	Cetorhinidae	*Cetorhinus*	*maximus*	(Gunnerus 1765)
Lamniformes	Alopiidae			
Lamniformes	Alopiidae	*Alopias*	spp.	
Lamniformes	Alopiidae	*Alopias*	*superciliosus*	Lowe 1841
Lamniformes	Alopiidae	*Alopias*	*vulpinus*	(Bonnaterre 1788)
Carcharhiniformes	Carcharhinidae			
Carcharhiniformes	Carcharhinidae	*Carcharhinus*	spp.	
Carcharhiniformes	Carcharhinidae	*Carcharhinus*	*falciformis*	(Müller & Henle 1839)
Carcharhiniformes	Carcharhinidae	*Carcharhinus*	*galapagensis*	(Snodgrass & Heller 1905)
Carcharhiniformes	Carcharhinidae	*Carcharhinus*	*longimanus*	(Poey 1861)
Carcharhiniformes	Carcharhinidae	*Prionace*	*glauca*	(Linnaeus 1758)
Carcharhiniformes	Sphyrnidae			
Carcharhiniformes	Sphyrnidae	*Sphyrna*	spp.	
Carcharhiniformes	Sphyrnidae	*Sphyrna*	*lewini*	(Griffith & Smith 1834)
Carcharhiniformes	Sphyrnidae	*Sphyrna*	*mokarran*	(Rüppell 1837)
Carcharhiniformes	Sphyrnidae	*Sphyrna*	*zygaena*	(Linnaeus 1758)
Myliobatiformes	Dasyatidae			
Myliobatiformes	Dasyatidae	*Pteroplatytrygon*	*violacea*	(Bonaparte 1832)
Myliobatiformes	Mobulidae			
Myliobatiformes	Mobulidae	*Manta*	spp.	

Myliobatiformes	Mobulidae	*Manta*	*alfredi*	(Krefft 1868)
Myliobatiformes	Mobulidae	*Manta*	*birostris*	(Walbaum 1792)
Myliobatiformes	Mobulidae	*Mobula*	spp.	
Myliobatiformes	Mobulidae	*Mobula*	*hypostoma*	(Bancroft 1831)
Myliobatiformes	Mobulidae	*Mobula*	*japanica*	(Müller & Henle 1841)
Myliobatiformes	Mobulidae	*Mobula*	*mobular*	(Bonnaterre 1788)
Myliobatiformes	Mobulidae	*Mobula*	*rochebrunei*	(Vaillant 1879)
Myliobatiformes	Mobulidae	*Mobula*	*tarapacana*	(Philippi 1892)
Myliobatiformes	Mobulidae	*Mobula*	*thurstoni*	(Lloyd 1908)

List of elasmobranch species* considered to potentially be oceanic, pelagic and highly migratory, but require further evaluation.

Order	*Family*	*Genus*	*Species*	*Species authorship*
Squaliformes	Dalatiidae			
Squaliformes	Dalatiidae	*Euprotomicrus*	*bispinatus*	(Quoy & Gaimard 1824)
Squaliformes	Dalatiidae	*Isistius*	spp.	
Squaliformes	Dalatiidae	*Isistius*	*brasiliensis*	(Quoy & Gaimard 1824)
Squaliformes	Dalatiidae	*Isistius*	*plutodus*	Garrick & Springer 1964
Squaliformes	Dalatiidae	*Squaliolus*	*laticaudus*	Smith & Radcliffe 1912
Lamniformes	Megachasmidae			
Lamniformes	Megachasmidae	*Megachasma*	*pelagios*	Taylor, Compagno & Struhsaker 1983

*Note: Where only the order, family or genus is listed, this is to facilitate submissions of information which lack species specific identification. This does not imply that all species of the order, family or genus are considered to be oceanic, pelagic and highly migratory.

19. Other matters

19.1 Issues related directly and indirectly to the Code of Conduct for SCRS participants

The SCRS Chair informed the plenary that preliminary results and documents have been circulated outside of the meeting to third parties prior to the completion of the work and adoption by the Committee. This has created a difficult situation(s) for some of the CPC authorities that have received inquiries about these preliminary findings. The Committee noted that these actions undermine the work and integrity of the Scientific Meeting and recall on the Commission request to have a Code of Conduct for participants of ICCAT Scientific meetings including scientist and observers.

The Japanese delegation informed the Committee that immediately prior to the bluefin tuna stock assessment an external non-governmental institution circulated and distributed a peer review scientific paper via email to Commissioners and Scientists, highlighting and making their own conclusions based on their interpretation of the document. It was further noted that the authors of the scientific document included SCRS scientists and Secretariat staff fully involved in the bluefin species Working Group and that the scientific document referred to results from the 2012 bluefin stock assessment exclusively.

The Committee agreed on the importance of the need for scientists to publish their research and noted that peer-review scientific publication is essential and fundamental for the advancement and transparency of the science process.

19.2 Collaboration with other international organizations

The Executive Secretary reported on the collaboration and meeting participation of ICCAT with other international organizations during 2014. In February the Executive Secretary and the SCRS Chair attended the OSPAR working group on biodiversity at The Hague at which they stated their concern about the fact that the document lists the eastern bluefin tuna as an endangered species.

The Secretariat also attended the OSPAR Commission meeting in Cascais, Portugal in June 2014.

The Secretariat did also meet with the Director of ICES to establish a closer collaboration between ICCAT and ICES. Dr. Kell from the ICCAT Secretariat will be participating in the ICES Methods Working Group meeting in 2015 in Copenhagen.

The Executive Secretary informed of the guidelines established between ICCAT and CITES in 2011. He informed the Committee of the entry into force of the adopted CITES resolutions in 2013 regarding sharks. The Secretariat will circulate this information in the upcoming commission meeting.

The Secretariat also informed on the participation of SCRS scientist during the WECAFC meeting. Dr. Louanna Martin attended this meeting in behalf of ICCAT.

19.3Consideration of implications of the 9th Meeting of the Working Group on Integrated Monitoring Measures and the Second Meeting of the Working Group on Convention Amendment for the work of the Committee

The SCRS Chair presented summaries of the 9th meeting of the Working Group on Integrated Monitoring Measures and the 2nd meeting of the Working Group on Convention Amendment that took place in May in Barcelona, Spain on those issues related to the Committee. Several items were discussed including discussions on the precautionary approach and ecosystem considerations, scope of the ICCAT species defined in the Convention, regional observer programs for tropical fisheries, and VMS data requirements. The SCRS Chair commented that several of these items are included in the SCRS Strategic Plan and others questions from this meeting are addressed in the responses to the Commission (see item 18).

The SCRS Chair reported on the conclusions of the IMM Working Group meeting which would be forwarded to the Commission for consideration, including a proposal to reduce required reporting of VMS pooling time data from six to four hours. Finally the Executive Secretary informed that during this meeting and the IMM meeting discussions took place in reference to the Regional Observer Program for Tropical fisheries adopted by the Commission in 2013, indicating the EU and Ghana had requested to postpone the implementation of this program for one more year, to be started in 2015. However, it was noted that these groups do not have decision ruling capacity, and that from the Secretariat point of view Rec. 11-01 is still in place, however as there are no funds, this Regional Observer Program cannot be currently implemented. This issue will be decided in the upcoming Commission meeting in Italy.

20. Election of SCRS Chair

The outgoing SCRS Chair (Dr Josu Santiago) opened the proceedings for the election of the new SCRS Chair. He reiterated the responsibility of the position especially with regard to the implementation of the new Science Strategic Plan of the SCRS. He noted the SCRS commitment to scientific transparency and dialogue which are among the main values to take into account when considering the position.

Two candidates were nominated to fill the position, namely Dr David Die (USA) and Dr Kotaro Yokawa (Japan). Clarification of the procedures for the election of the SCRS Chair was requested at which stage it was decided that a secret ballot would be held amongst all attending CPCs. In total, 25 CPCs were in attendance at the SCRS, however, 23 were present for the election. Dr David Die was voted the new Chair of the SCRS by majority.

The outgoing Chair congratulated both candidates and the newly elected Chair expressed his gratitude for the support of the CPCs and the responsibility entrusted to him. The ICCAT Executive Secretary expressed his congratulations to both candidates for their willingness to stand for this difficult position and ensured the commitment of the Secretariat to fully collaborate and support Dr Die in his new position. The Executive Secretary then thanked Dr Santiago for his work, and presented a token of appreciation on behalf of the Secretariat and the SCRS.

The Executive Secretary’s congratulations to Dr Santiago were reiterated by the Committee who also welcomed the new Chair and expressed their gratitude to Dr Yokawa for his participation in this important SCRS process. Dr. Yokawa thanked the SCRS for its support and wished Dr Die the best as well as his continued support. Lastly, Dr Santiago expressed his gratitude for the privilege of representing the SCRS.

21. Adoption of Report and closure

The Chair thanked the SCRS for its hard work this year and expressed its concern that the discussions conducted by the Committee during the week were, in some cases, beyond scientific approaches. Dr Santiago reminded the Committee of the importance for the SCRS to maintain its independence and to base its advice on scientific arguments only.

Dr Santiago thanked the Secretariat staff for all their excellent work and appreciated its professional attitude. Dr Santiago then expressed his appreciation towards the interpreters.

The Executive Secretary closed the meeting showing his appreciation to Dr Santiago for the work done during his mandate and welcoming the elected SCRS Chair, Dr David Die. Mr. Meski also thanked Dr Santiago for the trust he placed in the Secretariat and thanked the Secretariat staff for their efforts in supporting the SCRS work before and during the meeting. Mr. Meski thanked the interpreters for their hard work this week and wished everyone a safe journey home.

The Report of the 2014 SCRS meeting was adopted and the 2014 Meeting of the SCRS was adjourned.

Appendix 1

AGENDA

1. Opening of the meeting
2. Adoption of Agenda and arrangements for the meeting
3. Introduction of Contracting Party delegations*
4. Introduction and admission of observers*
5. Admission of scientific documents
6. Report of Secretariat activities in research and statistics
7. Review of national fisheries and research programs**
8. Executive Summaries on species:

   YFT-Yellowfin, BET-Bigeye, SKJ-Skipjack, ALB-Albacore, BFT-Bluefin, BUM-Blue marlin, WHM-White marlin, SAI-Sailfish, SWO-Atl. Swordfish, SWO-Med. Swordfish, SMT-Small Tunas, SHK-Sharks
9. Report of inter-sessional SCRS meetings

   9.1 Sharks species group intersessional meeting

   9.2 Meeting of the ICCAT Working Group on Stock Assessment Methods

   9.3 Bluefin Data preparatory Meeting

   9.4 Billfishes species group intersessional meeting

   9.5 Skipjack stock assessment meeting

   9.6 Mediterranean swordfish stock assessment meeting

   9.7 Bluefin stock assessment meeting
10. Report of Special Research Programs

    10.1 Atlantic Wide Research Programme for Bluefin tuna (GBYP)

    10.2 Enhanced Research Program for Billfish

    10.3 Small Tunas Research Program
11. Report of the Sub-Committee on Statistics
12. Report of the Sub-Committee on Ecosystems
13. Report of the Working Group of Fisheries Managers and Scientists in support of the W-BFT stock assessment
14. Report of the Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers
15. Presentation of the Science Strategic Plan for 2015-2020, including estimated budget
16. Consideration of plans for future activities

    16.1 Annual Work Plans

    16.2 Inter-sessional meetings proposed for 2015

    16.3 Date and place of the next meeting of the SCRS
17. General recommendations to the Commission

    17.1 General recommendations to the Commission that have financial implications

    17.2 Other recommendations

18. Responses to Commission's requests***

 18.1 Evaluate the efficacy of the area/time closure referred to in paragraph 20 for the reduction of catches of juvenile bigeye and yellowfin Rec. [11-01] paragraph 22.

 18.2 Review the technical specifications of the use of stereoscopic cameras systems as defined in Rec. [13-08]

 18.3 Continue to explore operationally viable technologies and methodologies for determining the size and biomass at the points of capture and caging and evaluate the BFT pilot studies to estimate both the number and weight of bluefin tuna at the point of capture and caging using stereoscopical systems, Rec.[13-07] paragraph 88.

 18.4 Evaluate the BFT national observer programmes conducted by CPCs to report the Commission and to provide advice on future improvements, Rec.[13-07] paragraph 90.

 18.5 Provide updated BFT growth rates tables based in the information from BCDs and other submitted data, Rec.[13-07], paragraph. 98.

 18.6 Provide answer to the requests from the 2nd WG WBFT Fisheries Managers and Scientists.

 18.7 Evaluation of data deficiencies pursuant to [Rec. 05-09].

 18.8 Response to Resolution 12-12 regarding the ecological importance of the Sargasso Sea to tuna and tuna-like species and ecologically associated species

 18.9 Definition of the SCRS plan for future sea turtle impact analyses Rec. [13-11] paragraph 4.

 18.10 Provide answer to the requests from the First Meeting of the Working Group on Convention Amendment

  18.10.1 Proposal for updating the definition of tuna and tuna-like species under the ICCAT Convention as defined when the Convention was adopted in 1969
  18.10.2 Response to the Commission on "Species covered by the term oceanic, pelagic, and highly migratory elasmobranchs".

19. Other matters

 19.1 Issues related to the Code of Conduct for SCRS participants

 19.2 Collaboration with other international organizations

 19.3 Consideration of implications of the 9th Meeting of the Working Group on Integrated Monitoring Measures and the Second Meeting of the Working Group on Convention Amendment.

20. Election of SCRS Chair

21. Adoption of report and closure

* The Executive Secretary will list the Contracting Parties and Observer Delegations present. Any statements should be presented in writing only.

** The text to be included in the SCRS report should be very short and presented in writing on or before 1 October. Oral presentations, if any, should be brief and focus on aspects that are not covered elsewhere by the individual species groups.

*** Responses derived from the results of 2014 stock assessments for East and West Atlantic skipjack and western bluefin and eastern Atlantic and Mediterranean Bluefin stock are included in Agenda Item 8.

Appendix 2

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Appendix 3

LIST OF 2014 SCRS DOCUMENTS

Number	*Title*	*Author(s)*
SCRS/2014/010	Report of the 2014 Meeting of the ICCAT Working Group on Stock Assessment Methods (Madrid, Spain - April 7-11, 2014)	Anon.
SCRS/2014/011	Skipjack stock assessment meeting (Dakar, Senegal -June 23- July 1, 2014)	Anon.
SCRS/2014/012	Report of the 2014 Sharks species group inter-sessional meeting (Piriápolis, Uruguay, March 10-14, 2014)	Anon.
SCRS/2014/013	Meeting of the Strategic Plan Group (Madrid, Spain - April 14-16, 2014)	Anon.
SCRS/2014/014	Bluefin data preparatory meeting (Madrid, Spain - May 5-10, 2014)	Anon.
SCRS/2014/015	Billfishes species group inter-sessional meeting (Veracruz, México - June 2-6, 2014)	Anon.
SCRS/2014/017	Report of the 2014 inter-sessional meeting of the Sub-committee on Ecosystems (Olhao, Portugal - September 1-5, 2014)	Anon.
SCRS/2014/018	Report of the 2014 bluefin stock assessment (Madrid, Spain - September 22-27, 2014)	Anon.
SCRS/2014/019	Mediterranean swordfish stock assessment meeting (Crete, Greece- July 21-25, 2014)	
SCRS/2014/020	Identification of the Major Sensitivities In The East Atlantic And Mediterranean Bluefin Assessment	Kell L.
SCRS/2014/021	Distributional and reproductive aspects of the bigeye thresher shark (*Alopias superciliosus*) in the Atlantic Ocean	Fernandez-Carvalho J., Coelho R., Cortés E., Domingo A., Santos M.N. and Yokawa K.
SCRS/2014/022	An update of the results of habitat use of bigeye thresher (*Alopias superciliosus*) and smooth hammerhead (*Sphyrna zygaena*) sharks based on electronic satellite tagging	Santos M.N. and Coelho R.
SCRS/2014/023	A general overview of the Portuguese pelagic sharks research program in the Atlantic Ocean	Coelho R., Santos M.N. and Fernandez-Carvalho J.
SCRS/2014/024	Preliminary results of the LL-Sharks project: a comparison of wire versus monofilament traces in the Portuguese pelagic swordfish fishery	Santos M.N., Coelho R. and Lino P.G.
SCRS/2014/025	Which Came First? The Chicken, The Egg or The Tortilla?	Kell L.T., Fromentin J.M. and Szuwalski C.S.

SCRS/2014/026	Proposals for the improvement of the estimation of the overall longline effort distribution (EFFDis) in the ICCAT area	de Bruyn P., Palma C. and Gallego J.L.
SCRS/2014/027	Updated Species List for Sharks Caught in ICCAT Fisheries	de Bruyn P., Palma C
SCRS/2014/028	The conventional tagging information for sharks species available in the ICCAT Database	de Bruyn P., Gallego J.L. and Parrilla A.
SCRS/2014/029	Age and growth of the blue shark, *prionace glauca*, in the South Atlantic ocean	Hua-Hsun Hsu, Guann-Tyng Lyu, Shoou-Jeng Joung, and Kwang-Ming Liu
SCRS/2014/030	Standardized catch rates of blue sharks caught by the Taiwanese longline fishery in the Atlantic Ocean	Wen-Pei Tsai and Kwang-Ming Liu
SCRS/2014/031	Update of standardized CPUE for blue shark caught by the Japanese tuna longline fishery in the Atlantic Ocean	Mikihiko Kai, Yasuko Senba, Seiji Ohshimo, Koh Shiozaki and Kotaro Yokawa
SCRS/2014/032	Modelling Fisher Response to Management and the Trade-Offs Between Multiple Objectives.	Laurence T. Kell , Alexander N. Tidd , Paul De Bruyn , Rui Coelho, Miguel Neves dos Santos , Jose Maria Ortiz de Urbina
SCRS/2014/033	Mobulid rays by-catch in longline fisheries over the south western Atlantic Ocean	Mas F.,Forselledo R.& Domingo A.
SCRS/2014/034	Skipjack (*Katsuwonus pelamis*) bycatch estimates from the albacore Spanish surface fishery in the North East Atlantic: 2005-2012 years.	Ortiz de Zárate V., Perez B. and Quelle P.
SCRS/2014/035	Characterizing quality of data used in ICCAT assessments	Arrizabalaga H.,Santiago J., Scott G. and Murua H.
SCRS/2014/036	An Example Management Strategy Evaluation of a Model Free Harvest Control Rule	Kell L.T., Hillary R., Fromentin J.M. and Bonhommeau S.
SCRS/2014/037	Comment on the eastern Atlantic and Mediterranean Bluefin tuna	de Cardenas E.
SCRS/2014/038	Evaluation of an Atlantic bluefin tuna otolith reference collection	Dheeraj S. Busawon , Enrique Rodriguez-Marin, Patricia Lastra Luque, Robert Allman, Benjamin Gahagan , Walter Golet , Elise Koob , Matt Siskey, Marta Ruiz Sobrón, Pablo Quelle, John Neilson and David H.Secor

SCRS/2014/039	Indices of stock status from the Canadian bluefin tuna fishery	Hanke, A.R. , I. Andrushchenko, C. Whelan
SCRS/2014/040	Review and analyses of farm harvested size frequency samples of eastern bluefin tuna (*Thunnus thynnus*).	Ortiz M., Justel Rubio A. and Gallego J.L.
SCRS/2014/041	Updated length weight relationship for bluefin tuna caught by Moroccan Atlantic traps	N.Abid, S. Benchoucha, S. El Arraf and C. El Fanichi
SCRS/2014/042	Weight/size structure of Atlantic bluefin tuna fished and/or ranched in the Mediterranean and northeast Atlantic during the period 1995 to 2014 as revealed by trade, market & corporate biometric data	Mielgo R.
SCRS/2014/043	Billfish catch in the Venezuelan artisanal off-shore pelagic longline fleet: past and present (1986-2013)	Arocha, F., Larez A., Pazos A., Gutiérrez X., Marcano L. and Silva J.
SCRS/2014/044	Size composition of Atlantic bluefin tuna *Thunnus thynnus* that farmed and imported to Japan calculated from BCD information	Itoh T. and Suzuki K.
SCRS/2014/045	Updated standardized bluefin CPUE from the Japanese longline fishery in the Atlantic to 2014 fishing year	Kimoto A., Takeuchi Y. and Itoh T.
SCRS/2014/046	Observations on the bluefin tuna trap fishery off southern Portugal (NE Atlantic) between 1998-2013: trends on catches and catch-at-size	Neves dos Santos M., Coelho R. and Gil Lino P.
SCRS/2014/047	Review of the historical and biological evidences about a population of bluefin tuna (*Thunnus thynnus l.*) in the eastern Mediterranean and the Black Sea	Di Natale A.
SCRS/2014/048	Review of the ICCAT-GBYP tagging activities 2011-2014.	Di Natale A. and Idrissi M.
SCRS/2014/049	An update of the ICCAT-GBYP Data Mining and Data Recovery activities.	Di Natale A.
SCRS/2014/050	An unknown bluefin tuna fishery and industry in Tenerife (Canary Islands, Spain) in the early XX century: the Florio's entreprise	Di Natale A.
SCRS/2014/051	ICCAT Atlantic-Wide Research Programme for Bluefin Tuna (GBYP). Activity report for Phase 4 (May 2013-September 2014).	Di Natale A.
SCRS/2014/052	Review of bluefin tuna, *Thunnus thynnus* (L.), catches made by the Spanish baitboat fleet in the Bay of Biscay during the 20th century	Cort J.L., Artetxe I. and Santiago J.
SCRS/2014/053	Length and weight relationships for Atlantic bluefin tuna (*Thunnus thynnus*)	
SCRS/2014/054	Updated standardized bluefin tuna CPUE index of the Bay of Biscay baitboat fishery (1952-2013)	Josu Santiago, Haritz Arrizabalaga, Mauricio Ortiz and Nicolas Goñi

SCRS/2014/055	Standardized catch rates of bluefin tuna, *Thunnus thynnus*, from the rod and reel/handline fishery off the northeast United States during 1993-2013	Matthew V. Lauretta and Craig A. Brown
SCRS/2014/056	Developing new early life history- based fishery independent indices for western Atlantic bluefin tuna	John Lamkin, Barbara Muhling, Joanne Lyczkowski-Shultz, Walter Ingram, Estrella Malca, Glenn Zapfe, Trika Gerard, Andrew Millett, Sarah Privoznik
SCRS/2014/057	Annual indices of bluefin tuna (*Thunnus thynnus*) Spawning biomass in the Gulf of Mexico (1977-2013)	G. Walter Ingram, Jr.
SCRS/2014/058	Update of standardized catch rates of large bluefin tuna (*Thunnus thynnus*) from the U.S. pelagic longline fishery in the Gulf of Mexico 1987-2013 with correction for weak hook effects	Walter J.
SCRS/2014/059	Development of indices of larval bluefin tuna (*Thunnus thynnus*) in the western Mediterranean sea	G. Walter Ingram, Jr., Diego Alvarez-Berastegui, Alberto García, Adam G. Pollack, José Luis López-Jurado and Francisco Alemany
SCRS/2014/060	Updated standardized joint CPUE index for bluefin tuna (*Thunnus thynnus*) caught by Moroccan and Spanish traps for the period 1981- 2013	N. Abid N., Faraj A., de la Serna J.M., Macías D., Saber S. and Ortiz de Urbina J.
SCRS/2014/061	Aspectos reproductivos del pez vela (*Istiophorus albicans*) en el Mar Caribe suroriental y aguas adyacentes del Océano Atlántico	Ariza, L.A., J.G. Núñez, M. Narváez, M. Medina, F. Arocha
SCRS/2014/062	Pêche artisanale des poissons porte epée (*Makaira nigricans*, *Tetrapturus albidus*, *Istiophorus albicans* et *Xiphias gladius*) dans le Golfe de Guinee : evolution des frequences de tailles de 2010 – 2013	Diaha C., Amande M.J., Konan K.J. and Soro Y.
SCRS/2014/063	Faux Poisson landed in Abidjan for the period 1982-2013. Preliminary data.	Chavance P., Dewals P., Amande M. J., Delgado de Molina A., Damiano A., Tamegnon A.
SCRS/2014/064	Sea turtle encounters in the surface longline fishery in North Atlantic areas: 10º-30º N / 15º-35º W	García-Cortés B., Ramos-Cartelle A., Carroceda A. and Mejuto J.
SCRS/2014/065	Standardized CPUE from the Rod and Reel and Small Scale gillnet fisheries of La Guaira, Venezuela	Arocha F.

SCRS/2014/066	Statistiques de la pêche thonière industrielle ivoirienne en 2013	Amandè M.J., Diaha N.C., Konan K.J., Irié B.Y.D. et Dewals P.
SCRS/2014/067	Preliminary occurrence of istiophoridae larvae (perciformes, xiphioidei) in southern Brazil	Rodrigues T., Schmidt R.F. , Pimenta E.G., Hilsdorf A.W.S and Amorim A.F.
SCRS/2014/068	Estimation of age and growth of the longbill spearfish, *Tetrapturus pfluegeri*, in the Western Atlantic Ocean	Pons M., Arocha F., Domingo A., Die D.J., Brazeiro A. and Hazin F.
SCRS/2014/069	Captura incidental de marlín azul (*Makaira nigricans*) y marlín blanco (*Tetrapturus albidus*) por la flota palangrera mexicana en el Golfo de México, durante el periodo de 1994-2012.	Karina Ramírez-López
SCRS/2014/070	Données statistiques de la pêche du marlin bleu aux Antilles françaises Proposition de reconstitution d'une série historique	Lionel Reynal, Olivier Guyader, Sébastien Demaneche, Chloe Le Meur, Patrick Lespagnol
SCRS/2014/071	Different means contributing to anchored FAD's fishing selectivity in the Lesser Antilles (note on an on-going project)	L. Reynal, O. Guyader, C. Pau, H. Mathieu and C. Dromer
SCRS/2014/072	Some Benchmarks Diagnostics	Kell L.
SCRS/2014/073	Indirect estimates of natural mortality rates for Atlantic skipjack (*Katsuwonnus pelamis*), using life history parameters	Gaertner D.
SCRS/2014/074	On the movement patterns and stock structure of skipjack (*Katsuwonus pelamis*) in the Atlantic: how many skipjack stocks in the Atlantic Ocean?	Fonteneau A.
SCRS/2014/075	An overview of skipjack growth in the Atlantic: knowledges & uncertainties	Fonteneau A.
SCRS/2014/076	Statistiques de la pêcherie thoniere guinéenne de 2010 à 2013	Camara Y., Chavance P., Amandè M.J., Dewals P., Tamégnon A., Damiano A.
SCRS/2014/077	Insight from PREFACE & AWA on Tropical Atlantic Tuna ecology and effects on western African fisheries economies	Brehmer P., Schmidt J., Fock H., Ferreria Santos C., Brochier T., Ngom F., Monteiro V., Augier P.A., Machu E., Kraus G. and Keenlyside N.

SCRS/2014/078	Estadísticas españolas de la pesquería atunera tropical, en el Océano Atlántico, hasta 2013	Delgado de Molina A., J.C. Santana J.C. y Ariz J.
SCRS/2014/079	Datos estadísticos de la pesquería de túnidos de las Islas Canarias durante el periodo 1975 a 2013	Delgado de Molina A., Delgado de Molina R., Santana J.C. y Ariz J.
SCRS/2014/080	Statistics of the European and associated purse seine and baitboat fleets, in the Atlantic Ocean	Delgado de Molina A., Floch L., Rojo V., Damiano A., Ariz J., Chassot E., N'Gom F., Chavance P., and Tamegnon A.
SCRS/2014/081	Japanese longline CPUE for yellowfin tuna (*Thunnus albacares*) in the Atlantic ocean standardized using glm up to 2013	Matsumoto T. *et al.*
SCRS/2014/082	Standardized CPUE for bigeye tuna caught by the Japanese tuna longline fisheries operated in the Atlantic Ocean up to 2013	Matsumoto T. *et al.*
SCRS/2014/083	Turtle by-catch in the southeastern Caribbean Sea and adjacent Atlantic waters caught by Venezuelan pelagic longline fishery: period 1991-2013	Arocha, F., Marcano L. and Silva J.
SCRS/2014/084	Actividades desarrolladas en el Programa de Investigación Intensiva sobre Marlines en Venezuela. Período 2012-2013	Marcano, L.A., Arocha F. , Alio J., Marcano I. and Gutiérrez X.
SCRS/2014/085	Enhanced monitoring of large pelagic fishes caught by the Venezuela Artisanal Off-shore Fleet targeting tuna and tuna-like species in the Caribbean Sea and adjacent north-western Atlantic waters: Final analysis	Arocha, F., Pazos A., Larez A. and Gutierrez X.
SCRS/2014/086	Updated standardized catch rates for skipjack tuna (*Katsuwonus pelamis*) caught in the southwest of South Atlantic Ocean	Carneiro V., Fialho E. and Andrade H.A.
SCRS/2014/087	Catch composition of the baitboat fishery in the southwestern Atlantic	Andrade H.A., Guimarães-Silva A.A. and Batista C.H.O.
SCRS/2014/088	Updating of Tasks I and II for Ghanaian industrial tuna fisheries data 2006-2012	Chassot E., Ayivi S., Floch L., Damiano A and Dewals P.
SCRS/2014/089	An analysis of historical tagging data to estimate migration rates for tropical tuna in the Atlantic: an example using bigeye tuna (*Thunnus obesus*)	Sculley M. and Die D.
SCRS/2014/090	Standardized catch rates for bigeye tuna (*Thunnus obesus*) from the pelagic longline fishery in the northwest Atlantic and the Gulf of Mexico	Walter J.
SCRS/2014/091	Standardized catch indices of skijack tuna, *Katsuwonus pelamis*, from the United States pelagic longline observer program	Lauretta M.V. and Walter J.F.

SCRS/2014/092	Feasibility study for an AOTTP	Caillart B., Million J., Fonteneau A. and Sculley M.
SCRS/2014/093	Annual indices of skipjack tuna (*Katsuwonus pelamis*) larvae in the Gulf of Mexico (1982-2012)	Ingram G.W.
SCRS/2014/094	Standardization of the EU PS EU fleet (Spain and France) data for 1990-2012 fishing in the Equatorial area	Andrare H.A.
SCRS/2014/095	Elements d'informations sur la pecherie espadoniere algerienne	Koudri-Krim A. and Bouhadja A.
SCRS/2014/096	Updated standardized catch rates in number and weight for swordfish (*Xiphias gladius L.*) caught by the Spanish longline fleet in the Mediterranean Sea, 1988- 2013.	Ortiz de Urbina J., de la Serna J. M. , Mejuto J. , Saber S. and Macías D.
SCRS/2014/097	Analysis of Turkish swordfish (*Xiphias gladius*) catch rates in the eastern Mediterranean	Ceyhan T., Tserpes G., Akyol O. and Ortiz de Urbina J.M.
SCRS/2014/098	Report of Japan's scientific observer program for tuna longline fishery in the Atlantic Ocean in the fishing years 2012 and 2013	Japan
SCRS/2014/099	Updated Species List for By-Catch Caught in ICCAT Fisheries	de Bruyn P. and Palma C.
SCRS/2014/100	Effects of the introduction of the mesopelagic longline on catches and size structure of swordfish in the Ligurian sea (western Mediterranean)	Garibaldi F.
SCRS/2014/101	Specifying and weighting scenarios for MSE robustness trials	Levontin, P., Leach, A.W., Holt, J. and Mumford, J.D.
SCRS/2014/102	Match and mismatch: a few thoughts about the available bluefin prediction models for the Mediterranean area	Di Natale A.
SCRS/2014/103	Larval bluefin tuna trophodynamics from Balearic Sea (WM) and Gulf of Mexico spawning ecosystems by stable isotope	Laiz-Carrión R., Gerard T., Uriarte A., Malca E., Quintanilla J.M., Mulling B., Alemany F., Lamkin J.T. and García, A.
SCRS/2014/104	Temporal CPUE trends of the Greek drifting longline swordfish fisheries in the East Mediterranean	Tserpes G. and Peristeraki P.
SCRS/2014/105	Standardization of catch rates from the Sicilian swordfish longline fisheries in the Central Mediterranean	Tserpes, G., Di Natale, A, Mangano, A
SCRS/2014/106	Swordfish (*Xiphias gladius l.*) catch composition of the Italian fishing fleet in the period 2007-13	Mariani A., Dell'Aquila M. and Bertolino F.
SCRS/2014/107	Review and preliminary analyses of size, CAS and CAA of Mediterranean swordfish (*Xiphias gladius*).	Mauricio Ortiz and Carlos Palma

SCRS/2014/108	Updated catch rates of swordfish (*Xiphias gladius*) caught by Moroccan driftnet fishery in the strait of Gibraltar, 1999-2001.	Noureddine A. and M. Bakkali
SCRS/2014/109	Analyses Preliminaires Des Donnees De Production Et D'Effort De Peche De L'Espadon *Xiphias Gladius* En Tunisie	Rafik Zarrad et Ridha M'rabet
SCRS/2014/110	Swordfish growth pattern in the Strait of Gibraltar; Implications for mixing among Atlantic and Mediterranean Stocks	Noureddine Abid, Mohammed. Bakkali, George Tserpes and M'Hamed Idrissi
SCRS/2014/111	Swordfish (*Xiphias gladius l.*) fisheries using drifting midwater longline in the Mediterranean Sea by Italian fishing fleet.	F. Bertolino, M. Dell'Aquila, A. Mariani, M. Valastro
SCRS/2014/112	Standardization swordfish catch rates from the Ligurian surface drifting longline fisheries for the period 1991-2009.	F. Garibaldi and G. Tserpes.
SCRS/2014/113	Update of the eastern and Mediterranean Atlantic bluefin tuna stock	Bonhommeau S., Kimoto A., Fromentin J.M., Kell L., Arrizabalaga H., Walter J.F., Ortiz de Urbina J., Zarrad R., Kitakado T., Takeuchi Y., Ortiz M. and Palma C.
SCRS/2014/114	An extended "Extended survivors analysis" of Mediterranean swordfish	Kell L.
SCRS/2014/115	Catch-at-size and age analyses for Atlantic bluefin.	Kell L.
SCRS/2014/116	Histologie des gonades de l'albacore et du patudo dans l'Atlantique: rapport de la formation de perfectionnement	Diaha C.
SCRS/2014/117	Spatial and temporal changes for catch and effort including albacore catch for Japanese longline fishery	Matsumoto T.
SCRS/2014/118	EU Malta updates to Task I nominal catch statistics	Gatt M. and Darmanin M.
SCRS/2014/119	Analysis of ICCAT reported catches of tunas and swordfish in the Sargasso Sea (1992-2011)	Luckhurst B.E.
SCRS/2014/120	A preliminary food web of the pelagic environment of the Sargasso Sea with a focus on the fish species of interest to ICCAT	Luckhurst B.E.
SCRS/2014/121	Preliminary identification of minimum elements to review the effectiveness of seabird by-catch mitigation regulations in tuna RFMOs	ACAP Intersessional Group (Contributors: C. Small, A. Wolfaardt, G. Tuck, I. Debski, W. Papworth, Mi Ae Kim)

SCRS/2014/122	Foraging range and habitat associations of non-breeding Tristan albatrosses: overlap with fisheries and implications for conservation	Timothy A. Reid, Ross M. Wanless, Geoff M. Hilton, Richard A. Phillips, Peter G. Ryan
SCRS/2014/123	Statistics from the Spanish albacore (*Thunnus alalunga*) surface fishery in the North Eastern Atlantic, years: 2012 and 2013	Ortiz de Zárate V., Perez B. and Ruiz M.
SCRS/2014/124	Reflex impairment as a measure of delayed mortality in a tuna purse-seine bycatch species, grey triggerfish (*Balistes capriscus*)	Forrestal F.
SCRS/2014/125	Non-linear environmental forcing of bluefin tuna recruitment	Harford W.J., Karnauskas M., Walter J.F. and Liu H.
SCRS/2014/126	Preliminary review of ICCAT and IATTC progress in applying an ecosystem approach to fisheries management	Maria José Juan-Jordá, Haritz Arrizabalaga, Nicholas Dulvy, Andy Cooper and Hilario Murua
SCRS/2014/127	Update of standardized catch rates of loggerhead sea turtles, *caretta caretta*, caught by Uruguayan and Brazilian longline fleets (1998-2012).	Maite Pons, Bruno Giffoni, Gilberto Sales, Philip Miller and Andres Domingo
SCRS/2014/128	Management units: challenges to promote understanding and conservation of marine turtles in oceanic areas	Sales G., Britto M., Fiedler F.N., Giffoni B., Domingo A., Leite N. and Miller P.
SCRS/2014/129	Results of applying Filters I and II to the statistical information reported in 2013	Palma C. and Gallego J.L.
SCRS/2014/130	Prototype of the new Task I database of ICCAT and implications in terms of data and code migration	Palma C.
SCRS/2014/131	Synopsis of regional mixing levels for Atlantic bluefin tuna estimated from otolith stable isotope analysis, 2007-2014	Secor D.H.
SCRS/2014/132	Preliminary study about the suitability of an electronic monitoring system to record scientific and other information from the tropical tuna purse seine fishery	Monteagudo J.P., Legorburu G., Justel-Rubio A. and Restrepo V.
SCRS/2014/133	Managing tropical tuna purse seine fisheries through limiting the number of drifting fish aggregating devices in the Atlantic: food for thought	Fonteneau A., Chassot E. and Gaertner D.
SCRS/2014/134	On the recent steady decline of skipjack caught by purse seiners in free schools sets in the eastern Atlantic and western Indian oceans.	Fonteneau A.

SCRS/2014/135	Post-capture survival of whale sharks released from purse seine nets: preliminary results from tagging experiment	Escalle L., Chavance P., Amandè J.M., Filmalter J.D., Forget F., Gaertner D., Dagorn L. and Mérigot B.
SCRS/2014/136	Campaña de marcado convencional y electrónico de atún rojo realizada en el estrecho de gibraltar según el diseño adoptado por el programa de investigación GBYP-ICCAT y desarrollado en el "Tagging GBYP-ICCAT 4ª fase, 2013	Serna J.M., D. Godoy, E.Belda, S. El Arraf, E. Majuelos, R.Sanchez, J. Mengual S. Saber, P.Muñoz
SCRS/2014/137	Actividad trófica del atún rojo (*Thunnus thynnus*) en el Estrecho de Gibraltar. variabilidad y causas	Serna J.M., D. Godoy, E. Majuelos
SCRS/2014/138	Electronic eye: electronic monitoring trial on a tropical tuna purse seiner in the Atlantic Ocean	Ruiz, J., Krug, I., Gonzalez, O., Gomez, G., Urtizberea, A., Urrutia, X.
SCRS/2014/139	Contribution to the formulation of a report length/weight on biometric data recorded by the copies of tuna (*Thunnus thynnus*) caught in the months of May/June in the Mediterranean Sea (Tyrrhenian).	Cozzolino G, Pignalosa P. and Lombardo F.
SCRS/2014/140	Bluefin tuna (*Thunnus thynnus*) experimental tagging activity new applicator (smat) and biometric date survey by a syncronized scuba_video taping system, Malta chanel-portoscuso Sardinia	Cozzolino G and Pignalosa P.
SCRS/2014/141	Preliminary review of bluefin tuna (*Thunnus thynnus*) size and weight measures taken with stereo video cameras at caging operations in the Mediterranean sea 2014	Ortiz M.
SCRS/2014/142	Report on the use of research mortality allowance by ICCAT GBYP in 2012, 2013 and the first part of 2014	Di Natale A.
SCRS/2014/143	Inventaire des investissements stratégiques relatifs aux pêcheries artisanales dans la region de l'Afrique de l'ouest	Kebe P.
SCRS/2014/144	SMTYP_Plan de recuperation des donnees historiques et elaboration d'un inventaire de donnees biologiques et bibliographiques	Diaha N.C., Konan K. J. and Amandè M.J.
SCRS/2014/145	Eastern Bluefin tuna (*Thunnus thynnus*) management using a Harvest Control rule based on precautionary approach and maximum sustainable yield principles	de Cárdenas E., Urtizberea A. and García D.
SCRS/2014/146	Understanding Pelagic Stingray (*Pteroplatytrygon violacea*) by-catch by Spanish longliners from the Mediterranean Sea	Báez J.C., Ortuño G., García-Barcelona S., Ortiz de Urbina J.M., de la Serna J.M. and Macías D.

SCRS/2014/147	*In situ* acoustic observations of Atlantic bluefin tuna	Melvin G.
SCRS/2014/148	Updated CPUE from the Canadian swordfish longline fishery, 2003-2013	Andrushchenko I., Hanke A. and Melvin G.
SCRS/2014/149	Can the parasites of the head of juvenile *Thunnus thynnus* help to identify its nursery areas in the Mediterranean Sea?	Rodríguez-Llanos J., Palacio-Abella J., Culurgioni J., Mele S., Macías D., Garibaldi F., Rodríguez-Marín E., Sanna N., Garau S., Merella P., Garippa G., Montero F.E. and Addis P.
SCRS/2014/150	Report of the age calibration exchange within the Atlantic Wide Research Programme for bluefin tuna (GBYP).	Rodríguez-Marín E., Di Natale A., Quelle P., Ruiz M., Allman R. , Bellodi A., Busawon D., Farley J., Garibaldi F., Ishihara T., Koob E., Lanteri L., Luque P.L., Marcone A., Megalofonou P., Milatou N., Pacicco A., Russo E., Sardenne F., Stagioni M., Tserpes G. and Vittori S.
SCRS/2014/151	Una relación talla-peso estacional para el atún rojo, *Thunnus thynnus* (L.), del Atlántico oriental y Mediterráneo	Cort J.L., Estruch V.D., Di Natale A., Abid N. and de la Serna J.M.
SCRS/2014/152	An application of an integrated stock assessment model (stock synthesis) to eastern Atlantic bluefin tuna stock	Irie T. and Takeuchi Y.
SCRS/2014/153	A preliminary assessment of the status of the western Atlantic bluefin tuna stock (1970-2013)	Lauretta M., Kimoto A., Porch C.E. and Hanke A.
SCRS/2014/154	Bluefin tuna (*Thunnus thynnus*) catches and size composition in the western Ligurian Sea (western Mediterranean) for the period 1990 – 2013	Garibaldi F.
SCRS/2014/155	By-catch in the mesopelagic swordfish longline fishery in the Ligurian Sea (western Mediterranean)	Garibaldi F.
SCRS/2014/156	Present and future of reproductive biology studies of yellowfin tuna (*Thunnus albacares*) and bigeye tuna (*Thunnus obesus*) in the eastern Atlantic Ocean	Diaha N.C., Zudaire I., Chassot E., Dewals P., Irié Y.D., Barryga B.D, Gbeazere D.A., Kouadio D., Pecoraro C., Amandè M.J. and Bodin N.

SCRS/2014/157	Composition en taille du faux poissons debarques par les thoniers au port de Dakar	Ngom SOW F.
SCRS/2014/158	Bluefin tuna caught by Senegalese baitboat and landed in Dakar in 2013	Ngom Sow F. and Ndaw S.
SCRS/2014/159	Ejecución del Programa Nacional de Observadores a Bordo de la flota industrial atunera venezolana del mar Caribe y océano Atlántico año 2013	Laurent C., Gassman J. and Marcano J.H.
SCRS/2014/160	Estimation of Atlantic skipjack fisheries' productivity using a catch based method and hypotheses on stock resilience	Merino G., Murua H., Santiag J. , Walter J.F., Arrizabalag H. and Scott J.
SCRS/2014/161	Bluefin tuna juveniles tagging in Croatia – some suggestions for improvement	Katavić I., Cinoti N., Grubišić L. and Tičina V.
SCRS/2014/162	Preliminary evaluations of potential growth of fattened/farmed eastern bluefin tuna (*Thunnus thynnus*) from ICCAT farm size database	Ortiz M.
SCRS/2014/163	EU/Spain Fish Aggregating Device Management Plan. Preliminary data	Alicia
SCRS/2014/164	Resultados de la encomienda de la SGP al IEO para el estudio del atún rojo (*Thunnus thynnus*) del stock del Atlántico este (que incluye el Mediterráneo) considerando las almadrabas españolas como observatorios científicos	de la Serna J.M., Abascal F. Ortiz J.Mª., Godoy D. and Majuelos E.
SCRS/2014/165	Catch, effort, and ecosystem impacts of FAD-fishing (CECOFAD)	Gaertner D., Ariz J., Bez, N., Clermidy, S., Moreno, G., Murua, H. and Soto, M.
SCRS/2014/166	Direct assessment of juvenile Atlantic bluefin tuna: integrating sonar and aerial results in support of fishery-independent surveys	Vanderlaan A.S.M., Jech M., Weber T.C., Rzhanov Y. and Lutcavage M.E.
SCRS/2014/167	A multitude of Byzantine era bluefin tuna and swordfish bones uncovered in Istanbul, Turkey	Puncher G.N, Onar V., Toker N..Y. and Tinti F.
SCRS/2014/168	Standardized CPUE of bluefin tuna (*Thunnus thynnus*) caught by Moroccan traps for the period 1986- 2014	Abid N., Benchoucha S., Malouli M., El Arraf S., El Fanichi C., Bensbai J. and Ben Mhamed A.
SCRS/2014/169	An updated statistical catch-at-length assessment for eastern Atlantic bluefin tuna	Butterworth D. S. and Rademeyer R. A.
SCRS/2014/170	Evaluating the effect of Atlantic bluefin tuna movement on the perception of stock units	Kerr L.A., Cadrin S.X., Secor D.H. and Taylor N.

SCRS/2014/171	Synopsis of regional mixing levels for Atlantic bluefin tuna estimated from otolith stable isotope analysis, 2007-2014	Secor D.H.
SCRS/2014/172	Revision to the catch-at-size and catch-at-age estimates of western Atlantic bluefin tuna used in the 2014 update assessment	Lauretta M.
SCRS/2014/173	Feeding dynamics of Atlantic bluefin tuna (*Thunnus thynnus*) larvae in the Gulf of Mexico	Llopiz J.K., Muhling B.A. and Lamkin J.T.
SCRS/2014/174	Past, ongoing and future research on climate change impacts on tuna and billfishes in the western Atlantic	Muhling B.A., Liu Y, Lee S., Lamkin J.T., Malca E., Llopiz J., Ingram Jr. G.W., Quattro J.M., Walter J.F., Doering K., Roffer M.A. and Muller-Karger F.
SCRS/2014/175	Age and growth of larval Atlantic bluefin tuna, *Thunnus thynnus*, from the Gulf of Mexico	Malca E., Muhling B., Lamkin J., Ingram W., Gerard T., Tilley J. and Franks J.
SCRS/2014/176	Do western Atlantic bluefin tuna spawn outside of the Gulf of Mexico? Results from a larval survey in the Atlantic ocean in 2013	Lamkin J.T., Muhling B.A., Malca E., Laiz-Carrión R., Gerard T., Privoznik S., Liu Y., Lee S., Ingram Jr. G.W., Roffer M.A., Muller-Karger F., Olascoaga J., Fiorentino L., Nero W. and Richards W.J.
SCRS/2014/177	Using electronic tag data to provide transition matrices for movement inclusive population models	Galuardi B., Cadrin S.X., Kerr L., Miller .J.T and Lutcavage M.
SCRS/2014/178	Seventeen years and $3 million dollars later: performance of psat tags deployed on Atlantic bluefin and bigeye tuna	Lutcavage M.E., Lam C. and Galuardi B.
SCRS/2014/179	Activités des thoniers senneurs français en Atlantique durant 1991-2013	Chassot E.
SCRS/2014/180	Investigating the post-release survivorship of whale shark encircled by European purse seiners: first insight from electronic tagging	Murua H., Fraile I., Arregi I., Delgado de Molina A., Santiago J., Arrizabalaga H., Merino G. and Román A.
SCRS/2014/181	Etude de quelques aspects biologiques des thonidés mineurs debarquées au port de Laayoune et Dakhla	Baibbat S.A. and Abid N.

SCRS/2014/182	Analyse des series historiques de données de capture et d`effort des thonidés mineurs exploités au Maroc	Oumarous M., Abid N., Ouakka K., Baibat S. and El omrani F.
SCRS/2014/183	An assessment of the western stock of Atlantic bluefin tuna using a non-equilibrium surplus production model	Hanke, A.R.
SCRS/2014/184	The WWF/GBYP multi-annual bluefin tuna electronic tagging program (2008-2013): repercussions for management	Quílez-Badia G., Ospina-Alvarez A., Sainz Trápaga S., Di Natale A., Abid N., Cermeño P. and Tudela S.
SCRS/2014/185	Catch rates and catch size structure of the Balfegó purse seine fleet in Balearic waters from 2000 to 2014; two years of size frequency distribution based on video techniques	Gordoa A.
SCRS/2014/186	Progress of the IERPBF Program in 2014	Prince E. and Hoolihan J.P.
SCRS/2014/187	Premier bilan du plan de gestion des DCP mis en place par la France en Océan Atlantique	Goujon M. , Claude A. , LecoulsS. and Mangalo C.
SCRS/2014/188	An updated statistical catch-at-length assessment for eastern Atlantic bluefin tuna	Butterworth D. S. and Rademeyer R. A.
SCRS/2014/189	Conventional tagging of adult Atlantic bluefin tunas (*Thunnus thynnus*) by purse-seiners in the Mediterranean – methodological notes	Mariani A.., Dell'Aquila M., Valastro M., Buzzi A.and Scardi M.
SCRS/2014/190	Uruguayan research program for pelagic sharks in the southwest Atlantic Ocean	Domingo A., Forselledo R., Mas F. and Miller P.
SCRS/2014/191	Standardized catch rates of white marlin and blue marlin caught by the Brazilian tuna longline fleet (1978-2012) using generalized linear mixed models (GLMM), with a Delta log approach	Pacheco, J. C.; Alves, I.; Hazin, H. G.; Hazin, F. H.V; Mourato, B. and Carvalho, F.
SCRS/2014/192	T3+: A tool for processing and managing Ghanaian industrial tuna fisheries data	Chassot E., Cauquil P., Ayivi S. and Bannerman P.
SCRS/2014/193	Tropical tunas species group discussions	Tropical Species Group
SCRS/2014/194	Time to plan for the future of GBYP	ICCAT GBYP Steering Committee
SCRS/2014/195	Updates on the SCAL assessment of eastern and western Atlantic bluefin tuna	Butterworth D. S. and Rademeyer R. A.

SCRS/2014/196	Review on Size Sampling Frameworks for North Atlantic Albacore (*Thunnus alalunga*) of Taiwanese Longline Fleets	Chang F. and Yeh S.
SCRS/2014/197	CPUE standardization, using proper albacore subareas and dating from 1967 to 2013, on albacore caught by Taiwanese longliners fishing in the North Atlantic Ocean	Chang F. and Yeh S.
SCRS/2014/198	CPUE standardization, using proper albacore subareas and dating from 1967 to 2013, on albacore caught by Taiwanese longliners fishing in the South Atlantic Ocean	Chang F., Yeh S. and Liu H.
SCRS/2014/199	Data deficiencies and its impact in the 2014 assessments	ICCAT Secretariat
SCRS/2014/200	Evaluating the change in evidence of alternative recruitment scenarios between the 2012 and 2014 western Bluefin VPA using model selection criteria	WBFT Group

Appendix 4

WORK PLANS OF THE SPECIES GROUPS FOR 2015

Tropical Tunas Work Plan

The Group proposes a bigeye tuna assessment in 2015. This is consistent with the strategic plan of the SCRS and is considered a priority because 1) the last assessment was conducted in 2010, 2) the TAC agreement for bigeye ends in 2015, 3) since the last assessment there have been significant changes to the historical data 4) since the last assessment there has been an influx of fishing purse seiners from the Indian ocean and 5) fishery indicators available for the period starting 2010 are insufficient to provide strong indication of changes in stock status that may have occurred since the last assessment. For similar reasons to those presented for bigeye tuna the Group proposes an assessment of yellowfin tuna in 2016 because yellowfin tuna was last assessed in 2011.

The Group also discussed that a data preparatory meeting is mandatory.

The Working Group considered the following work plan elements:

1. Complete the re-estimation of the historic Ghanaian statistics for bigeye and yellowfin tuna by the end of the first quarter of 2015.

2. Preparations for the bigeye data preparatory meeting:
   a. Update of bigeye catches for all CPCs and fleets up until the year 2014.

   b. Update of standardized CPUE indices until 2014 for the Japanese, U.S., Uruguay, Brazil, Chinese Taipei, and Morocco longline fleets, the European baitboat fleets and any other fleet for which appropriate data may be available. Note that indices for fleets that have wide spatial coverage have to also be provided by area (North, Equatorial and South) as agreed in the last assessment and ideally by quarter.

   c. Update of nominal CPUE indices until 2014 for the purse seine fleets separated by fishing mode (FAD and free).

   d. Update of fish size data by fleet.

   e. Update biological information.

   f. Update of tagging information.

3. Data preparatory meeting (end April 2015).

4. Preparations for the bigeye assessment meeting:
   a. Collate all inputs for statistical catch at age models (SS3 or MULTIFAN).

   b. Preliminary runs of statistical catch at age models and VPA.

5. Bigeye assessment meeting (early July 2015).

6. Data preparatory meeting and assessment of yellowfin tuna in 2016. Terminal year should be 2015 if possible.

7. First meeting of the FAD-WG (2015).

8. Update the analysis of the moratoria for presentation at the species group meeting in September 2015.

9. Initiation of the tropical tuna tagging programme.

Albacore Work Plan

During 2013, the north and south albacore stocks were evaluated and an interim Limit Reference Point was proposed for the northern stock, as well as several alternative HCRs that allow the Commission to choose desired levels of risk and recovery timeframes. Several models were used, including age structured and statistical catch at age models that required substantial data preparatory work by the Secretariat and other members of the Group. In the process, the Group identified several recommendations for future work that will guide the work of the Group during the following years. The main objective in 2015 will be to prepare the next assessments for these stocks (not scheduled yet), by reducing uncertainty around datasets and parameters on one hand, and developing robust management procedures that cope with the uncertainty that remains. No intersessional meetings are envisaged.

Following is a list of actions, responsibilities and deadlines:

- Complete and revise French mid-water trawl historical series of catch, effort, catch at size, geographical distribution and other related information.
  Responsibility: EU-France. ***Deadline:*** 31 July. ***Deliverable:*** SCRS document
- Further elaborate North Atlantic Albacore MSE framework to consider a broader range of uncertainties and test alternative management procedures against different indicators. This will allow simplifying the process of updating management advice, as well as enhancing dialogue with the Commission on the most robust HCRs. ***Responsibility:*** EU-Spain, with involvement from the Secretariat and collaboration with swordfish Working Group. ***Deadline:*** September. ***Deliverable:*** SCRS document.
- Revise the Albacore Research Program goals, structure and budget, and establish priorities.
  Responsibility: WGALB. ***Deadline:*** September.
- Collate Mediterranean albacore biological data that have likely been collected in different data collection programs (e.g. EU/DCR). Also, to the extent possible, extend back in time the available CPUE series.
  Responsibility: CPCs. Deadline: September. ***Deliverable:*** SCRS document.
- Development and testing of data poor methods for data poor stocks (i.e. Mediterranean albacore).
  Responsibility: EU-Spain, with involvement from the Secretariat. ***Deadline:*** September. ***Deliverable:*** SCRS document.

Bluefin Tuna Work Plan

Recommendation [10-04] states "In 2012, and thereafter every three years, the SCRS will conduct a stock assessment for bluefin tuna for the western Atlantic and eastern Atlantic and Mediterranean and provide advice to the Commission on the appropriate management measures, inter alia, on total allowable catch levels for those stocks for future years." The Atlantic-wide Research Program for Bluefin tuna (GBYP) and various National programs have produced, and continue to produce, a great deal of new information on the biology and fisheries for bluefin tuna. For this reason the SCRS held a data preparatory meeting to incorporate the new catch and effort information in ICCAT databases and continuing working on new modeling frameworks. However, Recommendation [12-03] for the eastern Atlantic and Mediterranean bluefin tuna required the SCRS to conduct an update of the stock assessment and provide advice to the Commission. Subsequently this Recommendation was extended to include the western Atlantic stock. At that time, the SCRS expressed concern regarding these Recommendations, mostly because it did not have the resources to update the assessments for Atlantic bluefin tuna in 2014 and prepare the new data for the 2015 assessment in the same year. The concerns of the SCRS have materialized and it was evident during the 2014 assessment that much of the available data has yet to be fully processed and reviewed, and the proposed modeling frameworks are not yet fully developed. Therefore the SCRS strongly reiterates that the next assessment should not occur before 2016.

The 2013 SCRS indicated that, if the Commission considered updating the 2014 assessment to be of higher priority than most of the data preparatory activities mentioned in the 2014 work plan, then those data preparatory activities would need to be postponed to 2015. To accommodate priorities to improve the scientific advice by 2016, the SCRS proposes the following work plan for 2015:

1. Update fishery indicators in accordance Rec. [12-03], paragraph. 50 (to be done during the annual species group meeting preceding the SCRS plenary in Madrid in 2015).

2. Conduct an Inter-sessional Preparatory Workshop in early 2015 (6 days) that will focus on the following:

   a. Revise Task II by validating and integrating the catch at size statistics with new information from farms, harvesting and stereoscopic cameras, and other sources of information.

   b. Review tagging past and recent data for bluefin tuna.

   c. Review progress on developing age-length keys.

   d. Review progress on life history studies such as fecundity schedules, stock structure and mixing rates (otolith microchemistry, genetics, etc.).

   e. Continue a series of workshops and related activities (to be sponsored by the GBYP and various national programs) in accordance with recommendations from the Core Modeling Group to continue the development of new modeling frameworks that can better take into account various sources of uncertainties.

3. Conduct an Inter-sessional meeting of a small working group with 1-2 scientific representatives from Canada, Japan, Mexico, and the USA to investigate approaches for combining raw catch/effort data for the CPUE from each country into a new index (or indices) of abundance for Atlantic bluefin tuna.

There is thus a considerable amount of work to be done in 2015, i.e., validating and incorporating 10,000s of new files into the current ICCAT databases, calibrating and updating all the size and age conversion methods and continuing the development of new modeling frameworks. A second data preparatory workshop will be needed in 2016 to incorporate data collected in 2015 for the 2016 assessment.

Billfish Work Plan

Important sailfish catches occur in the tropical and subtropical central Atlantic where they are caught by some CPCs artisanal fisheries. Obtaining standardized estimates of abundance indices from these fisheries requires assistance from experts with skill sets in CPUE standardization techniques. Hence, acquiring this assistance will be needed in order to prepare for Atlantic-wide sailfish assessments in 2016.

Considering that important research on stock structure and reproduction are still taking place, the 2015 work plan should focus on resolving the above issues prior to a potential sailfish assessment in 2016. Therefore major efforts to prepare the Atlantic-wide data bases for sailfish during the 2015 species group meeting should be made.

The Working Group recognizes the variability in catchability of the historical Japanese longline time series that requires further investigation relative to blue marlin, white marlin, and sailfish catches.

To prepare data for the sailfish assessment (2016), the tasks to be accomplished during 2015 and presented at the Species Group meeting are as follows:

a) Further work on estimation of catches from artisanal fleets where there are known gaps.

b) Standardized Catch Rates from east sailfish artisanal fisheries to be accomplished for Ghana, Côte d’Ivoire, and Senegal (keeping in mind that all standardized CPUE documents should be brought forward with the necessary information to evaluate whether or not they meet the criteria established by the Methods Working Group).

c) Assistance for developing standardized CPUE’s for the artisanal fleets (Senegal, Ghana, Côte d’Ivoire) needs to be determined early in 2015. Assign groups to review data and conduct analyses. A support workshop will be organized and funded by the ICCAT Data Improvement Project.

d) Standardized catch rates are needed for sailfish west from artisanal, recreational, and longline fisheries from the West Atlantic.

i. Brazilian scientists will provide a standardized CPUE series of sailfish using the new method which includes fishing strategy as a factor in the models and will also compare the different recent trends between logbook and observer data sets.

ii. Venezuelan scientists will update standardized CPUE series of sailfish from artisanal, recreational, and longline fisheries.

iii. U.S. scientists will update standardized CPUE series of sailfish from artisanal, recreational and longline fisheries.

e) Standardized CPUE's are also needed for both east and west stocks from the industrialized longline fleets from Japan, EU and Chinese Taipei.

f) In an effort to utilize the available data, investigate the possibility of increased complexity in the assessment models for the sailfish stock assessment. Special attention should be placed in gathering biological and life history parameters.

g) Complete work on stock structure and reproductive capacity relative to sailfish for the 2016 stock assessment. For stock structure, the collection of tissue samples from west sailfish and east sailfish will be needed. For the west stock, samples will be collected from Brazil, Venezuela, Mexico, and USA, and for the east stock, samples will be collected from EU, Ghana, Côte d'Ivoire, and Senegal. Brazilian scientists will be responsible for the genetic analysis. Funding from the Billfish Program will be used to collect and ship samples to Brazil.

h) Reproduction parameters will be analyzed by combining data on reproduction for sailfish in the west Caribbean and southwest Atlantic. Brazilian and Venezuelan scientists will be responsible of these tasks.

Swordfish Work Plan

Assessments for North and South Atlantic swordfish were conducted in 2013. The next assessment is proposed for 2016.

For the Mediterranean stock, the last assessment was conducted in 2014. The next assessment should take place during 2017, using data up to 2016 to allow a preliminary evaluation of the imposed management measures after 2008.

Proposed work

North and South Atlantic

A list of recommended work was identified as high priority areas where continued efforts are required.

Catch and effort data and reporting deadlines. All countries catching swordfish (directed or by-catch) should report catch, catch-at-size (by sex) and effort statistics by a small an area as possible, and by month. These data must be reported by the ICCAT deadlines, even when no analytical stock assessment is scheduled. Historical data should also be provided.

CPUE series. It is recommended that scientists from Japan, Chinese-Taipei, Canada, Spain, Portugal and the United States (North Atlantic) and Japan, Chinese-Taipei, Spain, Uruguay and Brazil (South Atlantic), as well as any others CPCs, coordinate their work before future data preparatory meeting (possibly using videoconference), with the goal of updating the index prior next assessment. Future data preparatory meetings should focus on resolving the conflicting indices to the extent possible prior to the next assessment. Consideration should be given to aggregating the CPUE trends by area (rather than the current method of aggregating by nation). For the South Atlantic in particular, some attempt should be made to use stock assessment methods that can reconcile the contradictory trends in the target and by-catch CPUE series for the south (e.g., age/spatially-structured models).

Discards. Information on the number of fish caught, and the numbers discarded (dead and released alive) should be reported in order to quantify discarding in all months and areas so that the effect of discarding and releasing can be fully included in the next stock assessment. These data must be reported by the ICCAT deadlines for submission of Task I and II data.

Target species. All fleets should record detailed information on log records to quantify which species or species group is being targeted. Compilation of detailed gear characteristics and fishing strategy information (including time of set) are very strongly recommended in order to improve CPUE standardization. The Group recommended the investigation of alternative forms of analyses in the South Atlantic, that deal with both the By-catch and Target patterns, such as age- and spatially-structured models.

Weight-length relationships. The Group recognized that the newly-adopted length-weight relationships for swordfish require validation with new field information. National scientists are requested to collect and submit observed values of length (LJFL) and round weight data to the Secretariat to facilitate this task.

South Atlantic Swordfish Research Plan. Given the poor understanding of population dynamics of swordfish in the South Atlantic, the Group should develop a long term plan for an enhanced program of research, focussing on independent estimates of fishing mortality, fraction mature by age, growth by sex and stock, movement and migrations, and improving available indices of abundance. This deficiency could be addressed within the context of the SCRS Strategic Plan.

Environmental effects. Given the possibility of spatial and environmental effects being partially responsible for the conflicting directions of some of the influential indices of abundance, the Group should further study into this hypothesis during the coming years, use existing PSAT data to compliment this work, and to determine how best to formally including these environmental covariates into the overall assessment process. The U.S. has taken a lead role in this investigation and likely collaborators would include scientist from Canada, Japan, EU (Spain and Portugal) as their indices were the most appropriate for this work. Moreover, the review of historical size data and fishery data is necessary to decide appropriate modelling structure, which should be conducted by National Scientists and the ICCAT Secretariat. Expected deliverables would include quantified reduction in the conflicting indices of abundance from the temperate and tropic regions, which in turn should lead to a more stable assessment. Other products could include an increased understanding of the distribution of Swordfish and perhaps a revisiting of the geographic structure of the data and the assessment. These works should be done before the next stock assessment.

Informative priors for carrying capacity. Given the sensitivity of assessment results in general to prior distributions for carrying capacity in situations where the data are uninformative, the Group recommends that informative priors for K be developed based upon factors such as habitat area, population density and other life history factors. While borrowing a prior based upon the posterior for K from another assessment, e.g. using the posterior for K from the North for the South may be scientifically justified, the Group recommends that future decisions such as this be based upon scientific analyses similar to the development of a prior for r.

Mediterranean

Given the questions raised during the latest assessment the Group should develop a work plan aiming:

- To achieve the collection and recovery of historical data to increase the period covered by time series, the nominal data presented in past studies (e.g. De Metrio *et al*. (1999)) should be recovered and evaluated for possible standardization.

- To better identify the effects of the environment on swordfish biology, ecology and fisheries. Future CPUE analyses should focus on developing additional methods to explicitly incorporate environmental variability into the model, and the influence of environment on the distribution of spawners and juveniles.

- To improve stock delimitation and quantify stock mixing between the Mediterranean and North Atlantic swordfish stocks through multi-disciplinary research, including tagging (both electronic and conventional) and genetic investigations. A review of the existing relevant information (e.g. tagging and genetics) should be presented to the next working group meeting to identify current gaps and facilitate the development of future research regarding those issues.

Small Tunas Work Plan

The following recommendations should be taken into account for improving statistical and biological data as well as the structure of small tuna populations. The improvement in the data would allow conducting assessment in the future in order to provide ICCAT with appropriate management advice for fisheries targeting small tuna:

- National scientists should analyze historical Task I and Task II data on small tunas and present the results to the 2015 SCRS meeting: trends of historical catches, effort and CPUE, develop simple indicators of stock sustainability such as proportion of juveniles within the catch;

- Improvements to the existing data and information in 2014 reinforce the request made in 2013 to hold an intercessional meeting in 2015 to take an inventory of the information as well as allow preliminary analyses of these data. The terms of references for this inter-sessional meeting is included as **Addendum** to this work plan.

- Encourage studies on stock structure and species distribution;

- Collaborate, as much as possible through joint working groups, with RFOs (GFCM, CRFM, and CECAF) to improve and exchange basic fisheries data on small tunas.

Addendum

2015 Data Preparatory Meeting for SMT

Context:

The last meeting held by the SMT working group goes back to 2008. Since 2012, then many effort were deployed in the frame work of the SMTYP to improve the Task I and Task II data to allow conducting some analyses on these species in the perspective of conducting a preliminary assessment at least for the main species identified by the group. These efforts are still going on.

In order to conduct such analyses and inform the Commission on the stocks status based on the fisheries indicators, the group proposes to organize a 5 days data preparatory meeting during 2015.

Objectives:

The main objectives of this meeting are summarized as follow:

- Identify information gaps and uncertainties in the data.
- Analyzing existing small tuna data (Task I and Task II)
- Analyzing the diverse range of studies that have been conducted on biology and other aspects of small tuna life-history, for use in future evaluations.
- Develop a strategy to obtain the information required for assessment.
- Discuss appropriate approaches to be adopted for the future assessment of the small tunas.

Identified Tasks:

- The revised Task 1 and Task II of small tunas should be submitted to the secretariat at least one month before he date of the meeting, including the data for 2014 if possible (Responsible: **National scientists**)
- Preparation of the Task I and Task II: Responsible: **ICCAT Secretariat**
- Update of the Catalogue for small tunas: Responsible: **ICCAT Secretariat**

Sharks Work Plan

The Group will hold two intersessional meetings to assess the status of blue shark in the Atlantic. The first meeting will be a Data Preparatory meeting to collate and analyze all existing information required for stock assessment and the second meeting will be the stock assessment session. Prior to the first meeting the following tasks will be required:

- Use the EUPoA Sharks project (SCRS/2013/165) to estimate potential shark catches in the ICCAT Convention Area as an alternative method to estimate BSH catches for the 2015 BSH stock assessment. To that end, national scientists should assist in the application of this methodology by providing expert knowledge on metier changes and information from observer programs to fine tune the ratios of shark catch: target species catch [H. Murua]
- Gather and analyze available size information by sex and region for BSH [R. Coelho]
- National scientists should update analysis of abundance indices for BSH up to 2013 [National scientists]
- Review all life history information for BSH in the Atlantic [A. Domingo]

In addition, the Secretariat will invite the ICES WGEF (Working Group on Elasmobranch Fishes), GFCM (General Fisheries Commission of the Mediterranean), the West African SRFC (Sub-Regional Fisheries Commission), and the SEAFO (Southeast Atlantic Fisheries Organization) to provide data for the BSH assessment.

There is also a need to revise Task I catch tables with records flagged as questionable. The Secretariat will prepare these updates in consultation with the relevant CPCs.

Addendum

A proposal for a 2-year implementation of the Shark Research and Data Collection Program (SRDCP)

Overview

Knowledge of the life history, movement patterns, habitat utilization, and the impact of commercial tuna and other fisheries on populations of elasmobranch fishes in the ICCAT Convention area is still limited. Significant gaps in available catch and effort data of the ICCAT fisheries capturing sharks further contribute to concern on their conservation status and management. The limited quantity and quality of information available thus affects the provision of scientific advice to the Commission.

The Shark Species Group has been working to improve this situation and has undertaken several collaborative studies on several aspects of the biology and fishery of this group of fishes in recent years, leading to the elaboration of the general guidelines of the Shark Research and Data Collection Program (SRDCP) in 2013. The SRDCP addresses the following aspects: (a) a general background of existing fishery and biological data for the main pelagic Atlantic Ocean and Mediterranean Sea sharks, highlighting the main gaps in knowledge; (b) the main objectives of the Program; (c) priorities in fisheries data collection; (d) research priorities on biological information; (e) research priorities on mitigation measures; and (f) other considerations for the SRDCP. During the 2014 inter-sessional meeting the Group updated the SRDCP, which will be framed within the 2015-2020 SCRS Strategic Plan, and is aimed at the development and coordination of science and science-related activities needed to support provision of sound scientific advice for the conservation and management of sharks in the Atlantic and the Mediterranean.

To achieve the objectives of the SRDCP, it is now time to start implementing it. As an initial step, we propose to focus for the first two years on biological aspects relevant to stock assessment for an important species where such information is still relatively poor. The proposed project has wide geographical sampling coverage, including both the Atlantic and Mediterranean, and its ultimate goal is to contribute information that can be used in future ICCAT shark stock assessments.

Focus species considering current knowledge and future ICCAT shark stock assessments

The Group considers that for this first two-year period, a high priority should be given to the shortfin mako shark - SMA. The main reasons are as follows:

- SMA is one of the 3 major ICCAT shark species;
- SMA was identified as a high priority species in the 2008 and 2012 Ecological Risk Assessments, given its low productivity and high susceptibility to ICCAT fisheries;
- SMA was identified in the SRDCP revision as a species with important biological information still missing;
- SMA was assessed by the Shark Group in 2012, but results were highly uncertain;
- A two-year research project for SMA would allow the Group to obtain vital biological information in time for the next stock assessment

Project and proposed tasks for a two-year implementation of the SRDCP

Given the gaps in biological knowledge that were recently identified in the SRDCP revision (2014 Intersessional Meeting of the Shark Species Group), and the contribution that such studies can provide to future stock assessments, the Group identified several high priority areas for the next two-year period. Tasks should be carried out during 2015 and 2016, in time to provide inputs for the next SMA stock assessment. All project tasks include a capacity building component related to biological sample collection and data analysis.

Project	Participating CPCs	Budget (€) 1st year	Budget (€) 2nd year	In-kind contributions from CPCs (€)*
Life history (Age, growth and reproduction)	Brazil, EU, Japan, Uruguay, US, Venezuela, ...	5,000	15,000	20,000
Post-release mortality (PSATs)	Brazil, EU, Japan, Uruguay, US, Venezuela, ...	40,000	10,000	55,000
Stock boundaries (Genetics and PSATs)	Brazil, EU, Japan, Uruguay, US, Venezuela, ...	80,000	20,000	100,000
Isotopes (Trophic relations)	Brazil, EU, Japan, Uruguay, US, Venezuela, ...	10,000	20,000	20,000
Total		**135,000**	**65,000**	**195,000**

* In-kind contribution from CPCs includes portion of investigator salaries, fishery observer time, and research vessel time.

- **Total program costs for 2 years (€): 200,000€ + 195,000**

- **Total requested for 2 years (€): 200,000**

Proposed Schedule

The following timeline is proposed by the Group to implement this two-year program. After completion of the program, to be conducted in 2015-2016, the final results will be used in the next ICCAT SMA stock assessment.

			Year 1 - 2015				Year 2 - 2016			
Project	**Participating CPCs**	**Task**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Life history (Age, growth and reproduction)	Brazil, EU, Japan, Uruguay, USA, Venezuela,…	Sample collection for life history								
		Vertebrae processing and reading								
		Data analysis								
Post-release mortality (PSATs)	Brazil, EU, Japan, Uruguay, USA,Venezuela,…	Acquisition and programing of tags								
		Tag deployment								
		Data analysis								
Stock boundaries (Genetics and PSATs)	Brazil, EU, Japan, Uruguay, USA,Venezuela,…	Sample collection for genetics								
		Acquisition and programing of tags								
		Tag deployment								
		Tag data collection from ARGOS								
		Processing tissue for genetics								
		Data analysis								
Isotopes (Trophic relations)	Brazil, EU, Japan, Uruguay, USA, Venezuela,…	Sample collection								
		Sample processing								
		Data analysis								
Reporting to the SCRS	All	Report to the SCRS species meetings								

Work Plan for Working Group on Stock Assessment Methods (WGSAM)

The Working Group on Stock Assessment Methods (WGSAM) met in Dublin, Ireland in 2014. The next meeting is planned for early in 2015 at a location that has yet to be determined.

WGSAM Proposed work in 2015

1. The WGSAM plans to continue making progress on MSE, Harvest Control Rules, Limit, Threshold and Target Reference points; identify next species to address. The WGSAM will discuss and attempt to solidify and formalize a generalized framework from which to conduct future MSEs.

2. The WGSAM will analyze ways to facilitate the dialogue with the Commission about the concepts referred to in paragraph 1 (MSE, HCR, RP) to be considered for the Standing Working Group to enhance dialogue between fisheries scientists and managers.

3. The WGSAM plans to conduct a simulation study on how best to bring spatially changing oceanographic and environmental conditions into the assessment process. This will be conducted by forming separate operating model and estimation model teams. The study will be designed during the 2015 meeting with the results and recommendations planned for the 2016 meeting.

4. The WGSAM will develop a template for the task of the unifying the North Atlantic swordfish CPUE data towards the development of spatially explicit indices of abundance. This template will outline the various fields required and how areas are to be assigned. It will also will take into account all applicable confidentiality requirements inherent in set-by-set data and will have accompanying it a description of how the confidentiality of the participating CPCs will be respected.

5. The WGSAM plans to review the CPUE protocol for inclusion criteria arrived upon during the 2012 meeting (SCRS/2012/039). Several Species Groups have used these criteria to decide whether or not CPUE time series should or should not be included in the assessment model and the WGSAM believes it's time to evaluate the effectiveness of these criteria and recommend if any revisions are warranted.

6. The WGSAM plans to continue cooperation with EFFdis re-estimation effort. This will entail participating in a small sub-group whose task will be to draft a call for external support to conduct the next EFFdis estimations.

7. The WGSAM plans to continue to increase the ICCAT WGSAM involvement, cooperation, and interaction with other tuna RMFO Methods Working Groups and the Strategic Initiative on Stock Assessment Methods (SISAM). The WGSAM will extend an invitation to the Chair of the various tuna RMFOs to attend the next WGSAM meeting in order that a cooperative project can be designed to promote harmonization of assessment methods with the intent to be carried out in 2015.

8. The WGSAM plans to evaluate the appropriateness of the WGSAM role in the reevaluation of the ICCAT glossary.

Sub-Committee on Ecosystems Work Plan

Work Plan pertaining to ecosystems

The Sub-Committee determined that the following ecosystem related activities would be important to address in 2015:

1. Continue to assess the importance of the Sargasso Sea ecosystem to ICCAT species as per Resolution 12-12.

2. Review the progress that has been made in implementing ecosystem based fisheries management and enhanced stock assessments.

3. Develop a list of ecosystem objectives that are practical and measureable to present to the Commission so that they can guide the Group as to which objectives are of highest priority. This will inform the generation of the tool/framework used to manage the system.

4. Request input from the other SCRS working groups and the Commission with regard to the implementation of EBFM.

Work Plan pertaining to by-catch

The Sub-Committee determined that the following by-catch related activities would be important to address in 2015:

1. Determine the methodology to be used to update the longline EFFDIS data and develop similar effort information for other major gears.

2. Determine "best practices" for estimation of total extrapolated by-catch.

3. Map sea turtle by-catch rates against EFFDIS effort estimates.

4. Review and compile indirect by-catch mortality estimates for sea turtles, and the estimation methodologies.

5. Review the efficacy of seabird by-catch mitigation measures [Rec. 11-09].

    a) Review the extent that ICCAT mitigation measures reflect best practices.

    b) Propose candidate indicators to evaluate the efficacy of mitigation measures.

    c) Identify data insufficiencies.

6. Review data received by CPCs reporting by-catch. Make recommendations to revise the data collection forms as needed.

Work Plan of the Sub Committee on Statistics

The Secretariat noted the intensive work load in 2014. Although most tasks were completed, they were accomplished only by use of extensive overtime work. Indeed, some tasks fell by the way side in an effort to prioritize. Issues with VBA in the current version of Microsoft Office caused some slowdowns in the migration of database applications to the updated Microsoft platform (.NET). The Task I database redesign was initiated but still needs completion. Complete revision of the database will cost time and funding (€150k). There is an inherent incompatibility between older and newer version of MS programming platforms, making migration to the new version necessary. Choices need to be made with regard to contracting the work out or completing the work in-house. All the work outlined for FY15 is contingent on the amount of assessment work scheduled for the coming year. See the following **Table** which shows details on the work plan:

Type	*Priority order*	*Major tasks*	*Current status*	*Portion (%) implemented*	*Timer to finish (proxy)*
Projects	1	Integral redesign of T1 database (T1NC and T1FC modules including history and manuals): "stTask1"	Ongoing	90%	2 months
	2	ICCAT-DB documentation framework (writing Reference manuals and User guides of each database)	Ongoing (frozen 2014)	20%	W. Plan (3yrs)
	3	Fine tuna T2 databases (T2CE & T2SZ) to synchronize with work from #1 (new DB "stTask 1")	Ongoing (frozen 2014)	40%	1 month
	4	Tune CAS database (storage of 2013 and 2014 estimations) and adapt for yearly Publication (SCRS)	Ongoing (frozen 2014)	50%	1 month
	5	Develop database for farmed BFT samples	Postponed	20%	1 month
	6	Replace t2ce.mdb and t2sz.mdb (MS-ACCESS) with MySQL (publication of databases on the ICCAT cloud)	Postponed	10%	4 months
	7	Redesign/update the tagging database (new module for elect. Tagging, integration of last 4 years, checks, etc.)	Postponed (3rd year)	0%	5 months
	8	GIS database design (including shapefiles)	Postponed	10%	2 months
	9	Species list and taxonomy revision	Ongoing	80%	1/2 months
	10	New database design for bycatch (observer programs data)	Externalized?	0%	5 months
	11	New database design for stereoscopic data on BFT	New	0%	?
	12	New database design for ISSF unloads (canning)	Externalized?	0%	2 months
	13	Migrate all VBA applications (30 applications, ~100.000 lines of code) to ".NET"	Partially externalized?	10%	6 months
	14	EFFdis update (1950-2013)	Externalized?	0%	2 months
Continuous tasks	15	Task I and Task II yearly update (includes publication and various outputs)	Yearly work	n/a	n/a
	16	Support on ICCAT-DB to other departments (development, training, etc.)	Yearly work	n/a	n/a
	17	Update of Compliance related databases (including publication and various outputs)	Yearly work	n/a	n/a
	18	Database maintenance (updates, error corrections, backups, code tuning, etc.)	Yearly work	n/a	n/a
	19	CATDIS update (1950-2013) - include all revisions made to T1 and new T2CE data	Yearly work	n/a	n/a
	20	Capacity building of the Statistical Department personal (programming on current and new technologies)	Yearly work	n/a	n/a
	21	Improvements on the ICCAT Web site	Yearly work	n/a	n/a

In light of the limited man power and time required for completion, choices will obviously have to be made with regard to how to prioritize the projects in the table. The current rate of tasks is unsustainable and the Sub-Committee reiterates prior recommendations to increase staff to conduct this work so as not to further reduce the required support of SCRS.

Appendix 5

ICCAT ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (GBYP) ACTIVITY REPORT FOR THE SECOND PART OF PHASE 4 (2013-2014)

1. Introduction

The Atlantic-wide Research Programme for Bluefin Tuna was officially adopted by SCRS and the ICCAT Commission in 2008, and it started officially at the end of 2009, with the objective to:

a) Improve basic data collection, including fishery independent data;
b) Improve understanding of key biological and ecological processes;
c) Improve assessment models and provision of scientific advice on stock status.

The total budget of the programme was estimated at about 19 million Euros in six years, with the engagement of the European Union and some other Contracting Parties to contribute to this programme in 2009 and in the following years; the budget officially approved by the ICCAT Commission in 2008 was 19,075,000 Euro for 6 Phases. The initial year had costs for 653,874 Euro (against the original approved figure of 890,000 Euro), the second phase had costs for 2,318,849 Euro (against the original figure of 3,390,000 Euros), while the third phase had costs for 1,769,262 Euro (against the original approved figure of 5,845,000 Euro). The fourth phase has a total budget of 2,875,000 Euros (against the original approved figure of 5,195,000 Euros). The overall GBYP operating budget for the first three phases (a total of 4,742,086 Euro) is about 46.84% of what was requested by the SCRS (10,125,000 Euro). If we include the fourth Phase (estimating the full budget as used), then the total of the first four Phases reaches 7,491,086 (against the original figure of 15,320,000 euro), equal to about 48.9% of what had been approved by the Commission. These budget reductions had an impact on all activities carried out so far.

Phase 1 and Phase 2 activities were jointly committed by the European Union (80%), Canada, Croatia, Japan, Libya, Morocco, Norway, Turkey, United States of America, Chinese Taipei and the ICCAT Secretariat. Other CPCs joined the funders in Phase 3 and 4, but some of them did not paid their contribution, even limiting the use of available funds, because the EU has a maximum percentage of contribution of 80%. Several private or public entities provided funds or in kind support.

The GBYP activity is supported by a twin programme carried out by NOAA-NMFS, which is focusing the research activities on the western Atlantic Ocean.

2. Coordination activities

Phase 4 officially initiated on 21 January 2013 and will be completed by 9 December 2014.

Nine Calls for Tenders were issued in Phase 4, signing a total of 23 contracts. A total of 44 scientific papers and reports have been produced in Phase 4. GBYP participated in 17 meetings in various countries. The detailed report is available in document SCRS/2014/051. The activity was very reduced in 2014 due to budget constraints.

In total, the number of contracts provided by GBYP in the first four Phases is 69, including 82 entities, localised in 23 different countries; many hundreds of researchers and technicians have been working so far in the various GBYP activities; this large and open participation to ICCAT GBYP activities is considered to be one of the best results of this research programme.

The administrative and desk workload behind all coordination duties was extremely heavy and since the beginning of 2014 the GBYP staff was reduced to the Coordinator only.

A mid-term review of ICCAT-GBYP was carried out in Phase 4 and the report is available on SCRS/2013/178.

3. Steering Committee

The members of the Steering Committee are the Chair of SCRS, Dr. Josu Santiago, the BFT-W Rapporteur, Ph.D. Clay Porch, the BFT-E Rapporteur, Ph.D. Sylvain Bonhommeau (who replaced Ph.D. Jean-Marc Fromentin from December 2013), the ICCAT Executive Secretary, Mr. Driss Meski, and the external expert, Ph.D. Tom Polacheck, who was contracted for this duty.

The activity of the Steering Committee included continuous and constant e-mail contacts with the GBYP coordination, which provided the necessary information, issuing also a monthly report. In the Phase 4 the Steering Committee held two meetings (September 28-29, 2013 and September 22-26, 2014), discussing various aspects of the programme, providing guidance and opinions. The SC reports are available on http://www.iccat.int/GBYP/en/scommittee.htm.

4. Data mining and data recovery

The data mining and data recovery activity continued following the objectives recommended by the Steering Committee. A complete and detailed overview of the data recovered so far is available (see documents SCRS/2013/073, SCRS/2013/169, SCRS/2014/042 and SCRS/2014/049). The market and auction data provided to GBYP as a donation in kind have been preliminary validated (SCRS/2014/042) and they will be examined by SCRS. Task II data collect by GBYP are now on the ICCAT BFT data base.

5. Aerial survey

ICCAT-GBYP issued a Call for tenders and four contracts were awarded in 2013. A training course for pilots, professional spotters and scientific observers was held at the Secretariat on 6 June 2013. The survey was conducted in most of the Mediterranean areas thanks to the cooperation of various ICCAT CPCs, but permits were not available for Algeria, Libya, Albania, Montenegro and Syria air spaces. Besides several operational difficulties and constraints and thanks to the strong cooperation of the four Companies in charge of the survey, finally it was possible to get all final reports.

The aerial survey data have been analysed, providing an external contract, and the final report was recently made available (see http://www.iccat.int/GBYP/en/asurvey.htm). The data collected in Phase 4 confirmed the validity of the approach adopted in Phase 1 and 2 and showed an increasing abundance of spawners in the areas where the time frame was within the usual limits. At the same time, this last survey was extremely useful for better planning future aerial surveys. No aerial survey was conducted in 2014 due to budget constraints.

6. Tagging

Thanks to the tags acquired in previous Phases, it was not necessary to buy additional conventional tags in Phase 4, while it was necessary to buy a total of 9,845 applicators for double-dart conventional tags and 35 mini-PATs, for carrying out the activities in Phase 4.

6.1 Conventional and electronic tagging activity

The tagging activity in Phase 3 was partly reported during the SCRS and the Commission meeting in 2013, because it was completed during the extension period. The final report of the tagging activity is on http://www.iccat.int/GBYP/Documents/TAGGING/PHASE%203/GBYP_TAGGING_FINAL_REPORT_PHASE_3.pdf. The tagging activity in Phase 3 faced several operational problems, mostly due to causes of "*force majeure*" (bad weather, lack of fish at the surface in the selected areas, fishery technical accidents, etc.).

The tunas conventionally tagged in each area in Phase 3 are as follows: 3,413 in the Gulf of Biscay (41% double tagging), 1,489 in the area of the Strait of Gibraltar (80.4% double tagging); 313 in the western Mediterranean, including the opportunistic tagging by sport fishers (27.8% double tagging), and 97 in the central Mediterranean Sea. In total, 7,995 conventional tags were implanted, on 5312 bluefin tunas.

The tagging activity in Phase 4 was defined by the Steering Committee on 12-14 December 2012, including tagging by baitboats for juveniles and tentative tagging by purse-seiners for juveniles, by purse-seiners for adults and in traps for adults, in various areas of the Atlantic and the Mediterranean. 5 contracts were awarded to four Consortia and one Company.

Even in the fourth year the field activity had some problems, mostly caused by the high level of technical difficulties and the experimental nature of some activities, but at the end the tagging was very successful; complimentary tagging in traps and by sport fishermen was also included. Further complimentary tagging activities were carried out in 2014. The tagging activities in Phase 4 so far are as follows: Bay of Biscay (3009 tagged fish, 53.4% double tagged); Canada (5 tagged fish, 100% double tagged); Morocco (273 tagged fish, 50.2% double tagging), Portugal (29 tagged fish, 58.6% double tagged), Strait of Gibraltar (2681 tagged fish, 53.1 double tagged), western Mediterranean (420 tagged fish, 1.7 double tagged) and central Mediterranean (1308 tagged fish, 38.1 double tagged). Double tagging includes also electronic tags.

Electronic tagging in Phase 4 was conducted in Morocco, Bay of Biscay, Strait of Gibraltar, Adriatic Sea and Canada. Complimentary activities were carried out by Ph.D. Barbara Block and her team (Stanford University) and by Ph.D. Alex Hanke and his team (St. Andrews Biological Station). A total of 40 miniPATs, 12 internal archival tags and 8 acoustic tags have been implanted in the various areas. Some of the tags had a premature detachment, but those of success are improving over the years.

The results provided by these tags are confirming that only a variable percentage of the bluefin tuna spawners arriving in spring to the Moroccan coasts are entering into the Mediterranean Sea, while the others move to various Atlantic areas. Some of the tagged tunas also went to very far areas from where bluefin tuna remained unnoticed for decades (Norway), and one of the tunas had recently reached Greenland. Intra-Mediterranean movements so far show that none of the tagged tunas went to the eastern Mediterranean areas. These results are clearly showing the great interest in going on with electronic tagging activities in the future Phases of GBYP, in order to provide inputs for a more realistic management of the bluefin tuna stocks and populations.

So far the ICCAT GBYP implanted a total of 24,236 tags of various types on 16,630 bluefin tunas of various sizes, mostly juveniles. The tagging activity was conducted both in the Atlantic Ocean and in the Mediterranean Sea.

6.2 Tag awareness and tag reporting campaign

According to the recommendations provided by the Steering Committee in all meetings, the GBYP continued the tag awareness campaign, for the purpose of improving the tag recovery and reporting rates. Thousands of awareness materials in 12 languages (posters and stickers) were produced and distributed in Phase 4. Details can be found on http://www.iccat.int/GBYP/en/AwCamp.asp. The tagging awareness campaign is coupled by a tag rewarding campaign strongly recommended by the Steering Committee, including high rewards, special T-shirts and increased annual lottery prizes. It is also considered very important to provide immediate feedback to the tagging teams and the tag recovery person, informing both of them about the history of each tag and this work is continuously carried out by GBYP. A field tag awareness programme was developed in 2014, after a Call for tenders and several countries have been visited, contacting local authorities directly, fishermen organizations, tuna factories, tuna traps, observers and sport fishermen. Specific training was provided to ICCAT ROPs, requesting them to pay the maximum attention to tags (including natural marks) when observing harvesting in cages or any fishing activity at sea.

For improving information and awareness about the tagging programme, ICCAT-GBYP is developing contacts with various stake-holders organizations and with journalists. Information on GBYP is now present on various web pages, while some articles on the press have been promoted and several articles were published in local newspapers.

A total of 216 tags (188 conventional tags, 17 mini-PATs, 7 archival tags and 4 commercial tag) from bluefin tunas have been reported to ICCAT-GBYP up to the date, showing a very substantial improvement of the total number of reported tags (see detail on documents SCRS/2014/048 and SCRS/2014/051).

7. Biological and genetic sampling and analyses

An SCRS meeting was organized in May 2013 in Tenerife for reviewing the bluefin tuna biological parameters and the report is available in http://www.iccat.int/Documents/Meetings/Docs/2013-BFT_BIO_ENG.pdf. The results are also on documents SCRS/2013/074, SCRS/2013/080, SCRS/2013/089, SCRS/2013/94, all presented at the Tenerife meeting. The last data are in SCRS/2014/051.

In total, 8,482 bluefin tunas have been sampled between Phase 2 and 4, providing 4,165 otoliths, 3,480 spines, 626 gonads, 6,107 muscles/fins, for a total of 14,378 biological samples. 40% of the samples were already analysed so far. A large Consortium of 13 entities and 7 sub-contracted entities, belonging to 13 countries carried out the duties in Phase 4.

The first results, that can be still considered preliminary, are extremely interesting and very promising:

- Genetic analyses shows that there are possibly several sub-population components of the eastern bluefin tuna stock, including at least two components in the Mediterranean Sea, but results need to be confirmed by a larger number of samples, further extending the sampling to areas which have not been sampled;
- Microchemistry analyses showed that current stock components are well identified; mixing in the Mediterranean Sea is minimal, but the presence of important percentages of bluefin tuna from different areas in central-North Atlantic and in Atlantic Ibero-Moroccan area needs to be much more investigated and checked before having more solid results; it is possible that intra-Mediterranean components can be further discriminated.
- Otolith shape is providing the first, very preliminary results and even here it seems that bluefin tuna population components are showing some differences, but many other analyses are needed to better study the differences.
- A first ageing calibration was carried out in 2014, with a large participation of scientific institutions and scientists belonging to several CPCs; the first results are showing good improvements and similar exercises, which are essential for more correctly ageing bluefin tuna, must be continued for smoothing the biases.

8. Modelling approaches

A Call for tenders was issued in Phase 4, including three activities: a) quantitative risk assessment, b) a study on statistically based stock assessment methods and, c) development of biological hypotheses for the use within MSE. Two contracts were awarded and the results are already available in http://www.iccat.int/GBYP/en/modelling.htm

In Phase 4, two meetings were held on modeling: a first one in May 2013 in Tenerife (EU-ESP) for preparing a first discussion draft document (see:
http://www.iccat.int/GBYP/Documents/MODELLING/PHASE%204/tenerife_Modelling.pdf,
and
http://www.iccat.int/GBYP/Documents/MODELLING/PHASE%204/Tenerife_gbyp-modelling_draft_proposal.pdf) and a second was held in July in Gloucester (USA), where a detailed planning of bluefin tuna modeling activities have been agreed for the submission to SCRS (http://iccat.int/Documents/Meetings/Docs/2013_BFT_METHODS_REP_ENG.pdf).

A modeling coordinator and a modeling technical assistant have been contracted in Phase 4, after two Call for tenders, according to the decision taken by the Bluefin Tuna Species Group, the GBYP Steering Committee and the SCRS. A GBYP Modelling Steering Group was also formed. The work necessary for developing new modeling approaches will take several years.

9. Research Mortality Allowance

ICCAT adopted the Rec. 11-06 in its meeting in Istanbul on November 2011, which allows for a “research mortality allowance” of 20 t of bluefin tuna by year for GBYP and for the use of any fishing gear in any month of the year in the ICCAT Convention area for GBYP research purposes. For implementing the recommendation, the ICCAT Secretariat is releasing a circular in each year of GBYP activity.

A total of 63 ICCAT-GBYP RMA certificates have been issued so far, using a total of 5,155.48 kg of bluefin tuna over two years. The details are reported in SCRS/2014/142.

10. Cooperation with ROP

The GBYP coordination, together with the ICCAT Secretariat, is maintaining and improving the contacts with the ROP observers, for strengthening the cooperation and providing opportunities. The ROPs observers are engaged for directly checking bluefin tuna at the harvesting for improving the tag recovery and reporting and for noticing any natural mark. Specific forms were provided to ROPs and the GBYP Coordinator provided specific training to the ROPs.

11. GBYP web page

The ICCAT-GBYP web page http://www.iccat.int/GBYP/en/), which (was created in the last part of Phase 1, is usually regularly updated with all documents produced by GBYP; in some cases, due to the huge workload, some sets of documents are posted all together. The updating also includes the budget page, where all contributions (monetary of in kind) are regularly listed, to ensure full transparency. The ICCAT-GBYP web page was recently fully revised and improved.

12. Following activities

The GBYP Steering Committee, the mid-term review and the various GBYP meetings provided a list of recommendations on various issues; several of them are essential for fulfilling the duties. Further recommendations will be provided this year by SCRS and then will be forward to the Commission.

In addition, GBYP considers essential better defining the following points:

a) *Evolution of the Atlantic-Wide Research Programme for Bluefin Tuna*: according to the current situation, which demonstrated the impossibility to reach the funding level approved by the ICCAT Commission for the various years of the GBYP and, as a consequence, the impossibility to carry out the various activities as originally planned, considering the need of having a sufficient number of years for obtaining the necessary results, a programme revision is now necessary, finding the right balance among funding possibilities, research needs and duration. The GBYP funding system shall be better defined, stabilised and improved, in order to ensure the regular development of the activities.

b) *Data recovery and data mining*: Task II data will be finally included in the ICCAT BFT data base; several data conflicts were resolved, but some others must be revised as soon as possible by the concerned CPCs and national scientists. Market and auction data shall be fully validated according to the recommendation provided by the SCRS Data Preparatory Meeting in 2014 and made available to scientists as soon as possible. Now it seems finally possible to recover genetic data from ancient samples coming from the Marmara Sea, possibly representing the ancient bluefin tuna population which was usually migrating from/to the Black Sea and the analyses of these samples is recommended for finally solving the uncertainties about this sub-population. If reliable additional data on longline bluefin tuna fisheries in the Mediterranean for the last decade are detected and not already included in the official Task II data, then these data should be recovered and used for improving our understanding of this fishery.

c) *Aerial survey*: it is considered essential continuing the survey on spawning aggregations in selected areas, for providing a trend to be used in advanced models; a minimum of 6/7 years of survey is needed; data should be tested for standardisation; the prediction model using the SST data should be further developed and improved.

d) *Tagging*: electronic tagging should be strongly improved, while conventional tagging should be carried out taking advantage of the experiences in the first part of Phase 4. In particular, electronic tagging should be carried out in the eastern Mediterranean. The tag awareness activity shall be firmly continued, improving media communication.

e) *Biological and genetic sampling and analyses*: sampling should be continued, covering the less sampled areas; the analyses of the available samples should be improved; age analyses should be cross checked for validation. The recovery of old ICCAT BYP samples should be defined.

f) *Modelling*: new additional efforts should be devoted for finding the best approaches for using fishery independent data and innovative approaches for better quantify uncertainties. The proposed plan should be adopted and enforced as soon as possible.

For GBYP Phase 5, the Steering Committee recommended the following activities:

1. *Data recovery*: the data analysis shall continue; an important recovery of ancient bluefin tuna bones and the following genetic analyses will be carried out in the eastern Mediterranean.
2. *Biological and genetic sampling and analyses*: it will be necessary to improve the analyses of the samples already collected and stored, developing sampling in the areas where it was not_possible to sample so far or where sampling was not sufficient. The ageing calibration will continue and further improved. The GBYP will co-fund a workshop on bluefin tuna larvae.
3. *Conventional tagging*: it is necessary to ensure a continuation of the activities, following the same strategy adopted in Phase 4 and extending the tagging activities (both electronic and conventional) in the eastern Mediterranean Sea. The baitboats in the Bay of Biscay will be used also for assessing the recapture rates.
4. *Electronic tagging*: will be continued, using both miniPATs and internal archival tags, with a priority for the Moroccan traps and the eastern Mediterranean. *Tag awareness and recovery:* must be further strengthened, through the effective support and assistance of national scientists, more focused activities and by contracting various persons to specifically increase awareness in all areas.
5. *Aerial survey on spawning aggregations*: shall be continued, revising the “outside” areas and slightly extending the “inside areas”, possibly including some important southern Mediterranean areas which were not surveyed in Phase 4. A calibration exercise will be necessary, along with another training course.
6. *Modelling approaches*: An external high-level expert shall continue as coordinator of the modelling group; an external expert shall continue for initial model development and coding; two meetings will be necessary in Phase 5.

The total necessary budget for Phase 5 is set at 2,825,000 Euro.

The GBYP will continue encouraging and supporting additional research activities carried out by various CPCs.

Addendum 1 to Appendix 5

TIME TO PLAN FOR THE FUTURE OF GBYP

ICCAT GBYP Steering Committee

The ICCAT GBYP is now in its fifth year of activity. While the GBYP has yielded several significant achievements and demonstrated the value and need for a large scale, international and coordinated research program, there is still a large amount of work that is required to achieve its primary objectives which were identified by the Commission, the SCRS and, more recently, by the Mid-Term Review. This is in part due to a combination of factors that include the shortage in the resources made available to the program, the complexity of the issues being addressed, the needed for extended and/or on-going time series of data for many of the objectives to be realized (e.g. index of abundance from aerial surveys, which need at least 7/8 years before providing a trend) and political/external factors which constrained some of the activities. It is time to plan for the long term future of the GBYP both to capitalize on the work already done and to ensure continuity in the data and activities requiring a long term time series of data. The stock assessment and provision of management advice for the Atlantic Bluefin is challenging and difficult because of the long-lived nature of the species, not well elucidated stock and sub-stock structure and dynamics, poor understanding of its life history (e.g. reproductive biology and natural mortality) and a complex mixture of fisheries targeting different components of the stocks. Some of these difficulties require targeted medium-term research program (e.g. improved understanding of reproductive biology, spatial stock dynamics) while others require an ongoing commitment to the collection of relevant data for input into the stock assessment (e.g. length-age keys, fishery independent indices of abundance). The Steering Committee believes that the future GBYP needs to be conceived and designed to accommodate both the on-going and medium-term component of the stock assessment research undertaken by ICCAT. The document SCRS/2014/194 includes all detailed research proposals made by the Steering Committee for biological studies, reproductive biology, fishery-independent indices of abundance, stock structure and spatial dynamics, analyses and modelling and for the long-term multi-year funding and management of this important and complex programme. According to these needs, the Steering Committee is proposing an extended programme, according to the attached table (**Appendix 1 to Addendum 1 to Appendix 5**) and recommends the adoption of a scientific quota, as it was proposed in 2013 by the SCRS Chair (**Appendix 2 to Addendum 1 to Appendix 5**). It should be emphasized that the planning and implementation of the current GBYP have been consistently hampered by uncertainties regarding funding levels and the timeframe for availability of funds and within which they needed to be spent. There is an urgent need to improve the funding situation of the GBYP in terms of the level of funding, the timeframe in which funds are made available and a firm commitment to a multi-year timeframe. To this end the GBYP Steering Commitee recommends the adoption of a scientific quota, as it was proposed in 2013 by the SCRS Chair (**Attachment 2 to Addendum 1 to Appendix 5**). The Steering Committee also considers that there is a need to clarifying the roles, responsibility and decision making process for the program and some changes/ improvements to the operational and staffing arrangements for the program. These are detailed in document SCRS/2014/194 and the Steering Committee recommends that these be undertaken.

Document Attachment 1 to Addendum 1 to Appendix 5

Table 1. Revised timetable for an extended and revised ICCAT GBYP programme, according to the research needs identified by the Steering Committee, the minimum number of years needed for obtain trends for fishery independent data and the calendar adopted by the SCRS for the new Modelling approaches. The first year of the programme (2009) was not included due to the lack of activity. The fishery independent data shall be collected continuously also in future years, while tagging can be done periodically.

ICCAT GBYP Revised Research Programme												
Activity	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*
Coordination												
Data mining & recovery												
Biological studies												
Aerial survey*												
Tagging activities *												
Fishery independent indices*												
Modelling												
ABFT GBYP Conference												

*Aerial survey and tagging activities have been included under the item "fishery independent indices" for the next years.

Document Attachment 2 to Addendum 1 to Appendix 5

Updated Recommendation for GBYP Scientific Quota
(previously presented to the 2013 Commission Meeting)

DRAFT RECOMMENDATION BY ICCAT ESTABLISHING A SCIENTIFIC QUOTA FOR THE FUNDING OF THE ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (GBYP)

Document presented by the SCRS Chair

RECALLING the Commission decision in 2008 to adopt the Atlantic-wide Research Programme for the Bluefin Tuna (GBYP), endorsing the proposal made by the Standing Committee on Research and Statistics (SCRS).

RECALLING the Commission decision in 2009 to initiate the GBYP, endorsing the reviewed and updated SCRS proposal.

RECALLING also the *Resolution by ICCAT Concerning Atlantic Bluefin Tuna Scientific Research on Stock Origin and Mixing* (Res. 08-06).

RECOGNIZING that the research results obtained by GBYP in the initial three phases of the programme, in particular fishery independent data by aerial surveys and/or tagging activities need to be continued for a medium/long period.

FURTHER RECOGNIZING that the Recommendation 11-06 provides the framework to facilitate the practical execution of diverse research activities, including the allowance of some Bluefin tuna mortality with research purposes.

CONSIDERING that the GBYP Research Program is a multiyear program, and that it is essential to conduct research over several consecutive years so as to get the expected results.

FURTHER CONSIDERING that the current funding mechanism of the GBYP Research Program does not guarantee multiyear funding at the level required by the programmed research plan.

RECOGNIZING that the SCRS, in 2012, has investigated alternative funding mechanisms of similar Research Programs, and requests the Commission to adopt a Scientific Quota eastern Atlantic bluefin tuna, to cover the GBYP research activities in 2013 and in following years.

ACKNOWLEDGING the importance of conducting the GBYP research as it was requested by the Commission under a clear economic framework.

TAKING INTO ACCOUNT the provisions of paragraph 27 of the *ICCAT Criteria for the Allocation of Fishing Possibilities* [Ref. 01-25] and considering that the GBYP is not defined as a qualifying participant under the terms of the Criteria;

THE INTERNATIONAL COMMISSION FOR THE CONSERVATION
OF ATLANTIC TUNAS (ICCAT) RECOMMENDS THAT:

1. In order to secure multiyear funding for the GBYP Research activities, a multiannual constant Scientific Quota be set at 300 t per year, for the period 2015-2021. This scientific quota, set over and outside the total quota shared by CPCs, will not affect the quota sharing even in the future.

2. This quota be sold according to the "Management of the Scientific Quota" (paragraph 3), and the funds generated be used to fund the ICCAT GBYP Research activities.

3. The Secretariat shall elaborate the terms of reference for the call for bids. The terms of reference shall clearly state the requirements for the bidder and circulated to all CPCs.

4. Management of the scientific quota:

4.1 Each year, before 15th January, the ICCAT Secretariat shall announce the public auction of the Scientific Quota, and the deadlines for receiving bids. The interested public and private entities belonging to CPCs that are members of ICCAT Panel 2 shall bid for a fraction or for the entire Scientific Quota. The minimum quantity for submitting partial bids is set at 50 tons.

4.2 The day after the deadline, the ICCAT Secretariat shall communicate to all concerned CPCs the detailed of the interested entities together with the corresponding bids.

4.3 Immediately after the consultation with the concerned CPCs, the ICCAT Secretariat shall communicate to all CPCs the details of the selected bids (bidders and amount bided).

4.4 Each entity awarded for any BFT Scientific quota level shall follow the normal fishing, monitoring and compliance procedures established by ICCAT, and particularly those established within the Multi-annual Recovery Plan for Bluefin Tuna in the Eastern Atlantic and the Mediterranean Sea (ICCAT Rec. 06-07, 07-04, 09-06, 10-04, 12-03, 13-08 and any future amendment) and any other applicable ICCAT and/or domestic rules.

4.5 The selected entities shall make the corresponding payment to ICCAT Secretariat within 15 days after the adjudication.

4.6 These funds shall become automatically available for the activities of the GBYP Research Program.

4.7 The funds available through the Scientific Quota shall provide a basic funding level to GBYP, without preventing any additional voluntary contribution by the CPCs or public or private entities, for ensuring the necessary level of funding for carrying on the GBYP activities decided by the Commission.

Appendix 6

ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH

(Expenditures/Contributions 2014 & Program Plan for 2015)

Summary and Program objectives

The ICCAT Enhanced Research Program for Billfish continued its activities in 2014. The Secretariat coordinates the transfer of funds and distribution of tags, information, and data. The General Coordinator of the Program is Dr. David Die (USA); the East Atlantic coordinator is Mr. Paul Bannerman (Ghana), and the West Atlantic coordinator is Dr. Eric Prince (USA).

The original plan for the ICCAT Enhanced Research Program for Billfish (IERPB, SCRS 1986) included the following specific objectives: (1) to provide more detailed catch and effort statistics, particularly for size frequency data; (2) to initiate the ICCAT tagging program for billfish; and (3) to assist in collecting data for age and growth studies. During past Billfish Species Group meetings, the Billfish Species Group requested that the IERPBF expands its objectives to evaluate habitat use of adult billfish, study billfish spawning patterns and billfish population genetics. The Billfish Species Group believes that these studies are essential to improve billfish assessments. Efforts to meet these goals continued during 2014 and are highlighted below.

The program depends on financial contributions, including in-kind support, to reach its objectives. This support is especially critical because the largest portion of billfish catches is coming, in recent years, from countries that depend on the support of the program to collect fishery data and biological samples. In recent years most of the financial support came from ICCAT funds but since 2009 there were also annual contributions from Chinese Taipei.

2014 Activities

In Venezuela, six observer trips, representing 81 longline sets onboard longline vessels, were monitored by July 2014. Sampling of Venezuelan artisanal catches also continued in the central coast of Venezuela and about 1,600 trips on the first half of 2014. Recoding of information on catch and effort from sport fishing tournaments continued during 2013/2014 but in 2014 only one tournament was held. Biological sampling from both the pelagic longline and artisanal Venezuelan fisheries has continued collecting biological samples of white marlin, spearfish and sailfish for reproductive studies, and for genetic identification. This year this program recovered 10 tagged billfish in Venezuela by July 2014 and 16 in total in the western Atlantic.

The IERPB supported characterization of billfish catches on-board small scale vessels in Brazil, tissue sampling for genetic identification in Brazil and Uruguay and biological sampling for reproduction and growth in Bermuda, and Venezuela.

In West Africa the program continued to support a review of billfish statistics in Ghana, Senegal and Côte d'Ivoire. In Côte d'Ivoire there has been a focus on the biological sampling of blue marlin, the most commonly caught species by the artisanal fishery. Improvements of catch and effort records from these countries are reflected in the Task I tables for billfish that were used in the recent marlin assessments 2011 and 2012.

The program has distributed genetic sampling kits to a number of fleets to help identify the percentage of white marlin, longbill spearfish and roundscale spearfish in the mixture of landings that represent these three species. Fleets that have received these kits are the Mexico, Venezuela, Morocco, Senegal, Portugal and Spain longline and the Spain and Ghana purse seine. Once samples are collected from these fleets they will be provided to Nova Southeastern University in Florida USA for processing.

The Coordinator of the program traveled to Cuba to help recover statistics on billfish CPUE and catch from artisanal and sport fishing fleets, to seek the help of Cuban scientists to collect genetic samples on white marlin and spearfish, and to facilitate electronic tagging of billfish in Cuban waters.

More details on these activities can be found in documents SCRS/2014/043, SCRS/2014/061, SCRS/2014/062, SCRS/2014/068, SCRS/2014/083, SCRS/2014/084 and SCRS/2014/186 that were produced with the benefit of direct or indirect support of the IERPB.

2015 Plan and activities

The highest priorities for 2015 are to support those established by the billfish work plan, specifically preparing the information required for the next sailfish assessment, the collection and preparation of data relevant to the identification of white marlin and spearfishes and the collection of biological data on spearfishes:

- support the collecting and processing of samples of billfish for genetic studies,
- support the monitoring of the Uruguayan, Venezuelan and Brazilian longline fleets through onboard observers, reporting of conventional tags, and biological sampling,
- support the collection of biological samples in West Africa
- support the monitoring of billfish catches from West African artisanal fishing fleets.

All these activities depend on successful coordination, sufficient financial resources and adequate in-kind support. Details of IERPB funded activities for 2015 are provided below. Some of these will complement general improvements in data collection made with the support of the ICCAT data improvement program and the new Japanese capacity building program that are especially relevant to the collection of billfish statistics from fleets from West Africa and the Caribbean.

Shore-based sampling

Sampling of artisanal and small scale fisheries to support the estimation of catch and effort statistics will be focused on fleets contributing the largest parts of the catch and/or those having traditionally provided the higher quality data in the past, to ensure the preservation of an uninterrupted time series of catch and relative abundance indices.

West Atlantic
Sampling at landing sites will be conducted for gillnet landings in central Venezuela.

Eastern Atlantic
Monitoring and sample collection will be supported for the artisanal fisheries of Ghana, Côte d'Ivoire, Sao Tomé and Senegal.

At-sea sampling

West Atlantic
Continued support will be provided to the sampling made onboard the Venezuelan, and Brazilian vessels.

Tagging

The program will need to continue to support the conventional tagging and recapture reporting conducted by program partners.

Biological studies

The biological sampling program for collecting and processing genetic samples from billfish, particularly white marlin and spearfish, will continue in 2015. This program aims to determine the ocean-wide ratio of white marlin to roundscale spearfish, including how this ratio has changed through time. The later will be done by processing samples from as broad a collection of fishing fleets as possible. During the 2015 the program, as required, will continue to provide sample kits for collection of mucus samples for genetic identification of white marlin and spearfish. Samples collected this way will be processed for genetic identification by IERPB experts based in the USA. In addition, tissue samples from both recognized stocks of sailfish will be collected during 2015 to conduct analysis on stock structure. Samples will be collected from West African countries with important billfish catches as well as samples from countries in the West Atlantic. Samples collected this way will be processed for genetic analysis by IERPB experts based in the Brazil.

Efforts to collect biological samples for reproduction, age and growth studies requires IERPB support to facilitate cooperation from fleets that are monitored with IERPB funds. In preparation for the next sailfish assessment, the emphasis of biological sampling for age, growth, and reproductive studies will be directed at sailfish and spearfishes.

Coordination

Training and sample collection
Program coordinators need to travel to locations not directly accessible to promote IERPB activities and ICCAT data requirements regarding billfish. This includes travel to West African countries, as well as the Caribbean and South America by the general coordinator and the coordinator from the west. Strong coordination between activities of the IERPB, the JDMIP and the ICCAT data fund will continue to be required.

Program management
Management of the IERPB budget is assumed by the program coordinators, with the support of the Secretariat. Reporting to the SCRSC is responsibility of the coordinators. Countries that are allocated budget lines for program activities need to contact the respective program coordinators for approval of expenditures before the work is carried out. Invoices and brief reports on activities conducted need to be sent to the program coordinators and ICCAT to obtain reimbursement. These funding requests need to be done according to the ICCAT protocol for the use of funds from ICCAT (see Addendum 2 to Appendix 7 to the 2011 SCRS Report).

2014 Budget and Expenditures

This section presents a summary of the contributions and expenditures for the ICCAT Enhanced Research Program for Billfish during 2014. The Billfish Working Group developed a budget of €50,800.00 for the IERPB. The contributions made to the IERPB for the 2014 program were €31,212.00 from the regular ICCAT budget and €8,000 from Chinese Taipei. Carryover funds remaining from previous year were €20,052.13 thus total funds available for 2014 were €59,264.13 **(Table 1)**. As a consequence all planned activities of the program were able to be carried out. Expenditures to date in 2014 have been €12,449.29 but €38,425.00 are already committed to other activities that have either taken place in 2014 or will take place between October and December. One of the main reasons for the smaller expenditures has been the delays that have been registered in the genetic program and the processing of samples has not yet started. The estimated balance of the program at the end of 2014 will be €8,389.84 **(Table 1)**.

In-kind contributions to the program continued to be made during 2014. INIA and the University of Oriente (Venezuela), *Universidade Federal Rural de Pernambuco* (Brazil), and *Instituto Dirección Nacional de Recursos Acuáticos* (Uruguay) have provided personnel time and other resources as in-kind contributions to the at-sea biological sampling program, thereby reducing the amount of funds needed for this activity from the ICCAT billfish funds. Some of the travel costs and personnel time of the program coordinators were absorbed by the U.S. National Marine Fisheries Service, University of Miami, Ghana department of fisheries and by the ICCAT Data fund.

Table 1. Summary budget for 2014 for the Billfish Program.

Balance transferred from previous year	€ 20,052.13
Income (ICCAT Regular Budget and others)	€ 39,212.00
Expenditures and obligations (for details see **Table 3**)	€ (50,874.29)
Estimated BALANCE at the end of year	€ 8,389.84

2015 Budget and requested contributions

The summary of the 2015 proposed budget, totaling €46,800.00 is attached as **Table 2** and details are provided in **Table 4**. The program is predicted to have a balance of €8,389.84 by the end of 2014 and therefore requests the Commission to provide a contribution of €31,836.24 for 2015. The requested contribution from ICCAT is necessary to fully implement the IERPB 2014 working plan. To achieve all its objectives for 2015 the program will continue to require contributions of €8,000.00 from other sources, such as those so generously provided lately by Chinese Taipei.

The consequence of the Program failing to obtain the requested budget will be to stop or reduce program activities for 2014 including: (1) sampling and processing of genetic, age and growth collection and processing of genetic samples important, (2) at-sea observer trips in Venezuela and Brazil; (3) biological sampling and collection of statistics of catches from fleets in the western and eastern Atlantic, (4) promotion of conventional tagging activities, including distribution of tag recovery incentives. All these activities are critical to continue the improvement of the information. available to the SCRS for the assessment of billfish, including the preparation for a sailfish assessment in 2016.

Table 2. Summary budget of the ICCAT Enhanced Research Program for Billfish for 2015.

Balance transferred from previous year	€ 8,389.84
Income (ICCAT Regular Budget and others)	€ 39,836.24
Expenditures (for details see **Table 4**)	€ (46,800.00)
Estimated BALANCE at the end of year	€ 1,426.08

Conclusion

The IERPB is an important mechanism towards completing the goal of having the highest quality information to assess billfish stocks. The IERPB has been credited for major improvements in the data supporting the last ICCAT billfish assessments. As the IERPB is the only program that exclusively focuses on billfish. The Program needs to continue to facilitate the collection of biological and fishery information on all billfish; however, in 2015 it will focus on improving the biological information on sailfish, spearfishes and the identification of white marlin and roundscale spearfish. The IERPB Program will continue to require support from ICCAT and other sources to operate and to address the needs of the Commission.

Table 3. Detailed 2014 expenditures (as of 23 September 2014).

Income		
Balance transferred from previous year		€ 20,052.13
	ICCAT Commission	€ 31,212.00
	Chinese Taipei	€ 8,000.00
Total income		€ 39,212.00
Total Budget		**€ 59,264.13**
Expenditures		
	Sampling Venezuela	€ (7,932.00)
	Sampling Senegal	€ (3,000.00)
	Travel by Coordinator	€ (1,480.29)
	Bank charges	€ (37.00)
Current expenditures Jan-Sep		€ (12,449.29)
Funds obligated until end of the year		
	Sampling Cote d'Ivoire	€ (3,000.00)
	Sampling Brazil	€ (5,000.00)
	Sampling Sao Tome	€ (2,000.00)
	Sampling Uruguay	€ (2,000.00)
	Sampling Ghana	€ (3,000.00)
	Sampling Venezuela	€ (2,825.00)
	Tag reward	€ (500.00)
	Processing genetic samples	€ (20,000.00)
	Bank charges	€ (100.00)
Obligated expenditures Oct-Dec		€ (38,425.00)
Total estimated expenditures for whole year		**€ (50,874.29)**
Estimated balance by end of year		**€ 8,389.84**

Table 4. Detail of expenditures planned for 2015.

Income		
	Balance transferred from previous year	€ 8.389,84
	ICCAT Commission	€ 31.836,24
	Chinese Taipei	€ 8.000,00
	Total income	€ 39.836,24
Total Budget		**€ 48.226,08**
Planned expenditures		
	West Atlantic shore-based sampling:	
	Venezuela	€ (6.000,00)
	West Atlantic at-sea sampling:	
	Venezuela	€ (6.000,00)
	Brazil	€ (5.000,00)
	Other fleets	€ (3.000,00)
	East Atlantic shore-based sampling:	
	Senegal	€ (3.000,00)
	Ghana	€ (3.000,00)
	Sao Tome	€ (2.000,00)
	Côte d'Ivoire	€ (3.000,00)
	other fleets	€ (3.000,00)
	Processing of genetic samples *	€ (5.000,00)
	Collection of genetic samples *	€ (2.000,00)
	Mailing genetic samples	€ (1.000,00)
	Lottery rewards - tagging billfish	€ (500,00)
	Coordination travel	€ (4.000,00)
	Bank charges	€ (300,00)
Total Expenditures		€ (46.800,00)
Estimated balance at the end of the year		€ 1.426,08

Authorization of all these expenditures depends on sufficient funds being available by ICCAT and from other contributions.
* Number of samples collected and processed will depend on the final budget of the program.

Appendix 7

ICCAT SMALL TUNAS YEAR PROGRAM (SMTYP)

Overview

The status of small tuna stocks in the ICCAT Convention area is generally unknown. Nevertheless, these species have a high socio-economic relevance for a considerable number of local communities at the regional level, which depend on landings of these species for their livelihoods.

Fisheries statistics and biological data, which can provide a basis for assessing these resources thus providing the Commission with appropriate scientific advice for their sustainable exploitation, are generally unavailable for these species.

To deal with this issue and to achieve the objectives established by the 2008 Joint ICCAT GFCM Working Group (Anon. 2009a), an ICCAT Year Research Program for Small Tunas (SMTYP) was proposed by the SCRS in 2011 and adopted by ICCAT in its annual meeting in Agadir (Morocco). The main objective of the first two years of this program is the recovery of historical statistical and biological data in the main fishing areas, with a focus on the priority species identified by the ICCAT/GFCM in 2008. This program has a wide geographical sampling coverage:

- Mediterranean and Black Sea: Bullet tuna, Atlantic bonito, little tunny and plain bonito;
- West Africa: Atlantic bonito, little tunny, tuna, West African Spanish mackerel, frigate tuna, wahoo;
- Caribbean area and south-west Atlantic: Blackfin tuna, king mackerel and Serra Spanish mackerel and dolphinfish.

Planned activities for 2015

For the third year of this program, it is planned to continue the recovery of historical task I and task II data of small tunas in other areas: West Atlantic and the Mediterranean Sea. This reinforcement of data mining would be necessary as well as an intercessional meeting in 2015. For the analysis and identification of gaps in the current data. It is also highly recommended to support biological sampling, including the size sampling of the 4 main species in the whole Atlantic and the Mediterranean. Nevertheless, these objectives could not be achieved without a financial support from ICCAT. **Table 1** gives the estimated costs related to the activities planned for 2015.

Table 1. Estimated costs related to activities planned for 2015 under the ICCAT SMTYP.

Planned activities	*Species*	*Estimated costs (€)*
1. Recovery Task I and Task II data: - Eastern Mediterranean: EU.Greece, Turkey - Central Mediterranean: Tunisia, EU-Italy - Western Mediterranean: EU-Spain - South West Atlantic & Caribbean sea: Venezuela, Brazil - East Atlantic: Mauritania	 Atlantic bonito (BON) Little tunny(LTA) King mackerel (KGM) Frigate tuna (FRI)	 €15,000 €15,000 €7,5000 €15,000 €7,5000
2. Supporting biological sampling in the Atlantic: size and biological data: - Senegal - Côte d'Ivoire - Morocco - Mauritania - Venezuela - Mexico	 Atlantic bonito (BON) Little tunny(LTA) King mackerel(KGM) Frigate tuna (FRI)	 €7,500 €7,500 €7,500 €7,500 €7,500 €7,500
Total		**€105,000**

Appendix 8

2014 REPORT OF THE SUB-COMMITTEE ON STATISTICS

(ICCAT Secretariat, 22-23 September 2014)

1. Opening, adoption of Agenda and meeting arrangements

The Sub-Committee on Statistics met at the ICCAT Secretariat (Madrid, Spain) on September 22-23, 2014. The meeting was chaired by Dr. Gerald Scott (EU) while Dr. Michael Schirripa (US) and Dr. Shannon Cass-Calay (US) served as rapporteurs. The Agenda was discussed, accepted and adopted as modified by the Sub-Committee **(Addendum 1 to Appendix 8).**

2. Review of fisheries and biological data (new and historical revisions) submitted during 2014

The Secretariat presented information contained in the 2014 Secretariat Report on Statistics and Coordination of Research (SCI-008) related to fisheries and biological data submitted for 2013, including revisions to historical data.

The activities and information included in this report refer to the period between 1 December 2013 and 5 September 2014 (the reporting period). All the basic fisheries, biological statistics and data compliance related information have been presented by the Secretariat to the SCRS Working Groups during SCRS inter-sessional and species meetings. The Secretariat continues to note the improvements in terms of data submission using the ICCAT electronic forms. Regarding the activities conducted by the Secretariat, in the most recent years, in addition to the normal activities developed on statistics, publications, data funds management and others, the Secretariat is dedicating (apart from the usual preparation of the majority of the datasets required by each assessment) a lot of additional work to stock assessment activities, whether participating actively in the assessment or coordinating and managing external support to the SCRS work. Also, the statistical work requested to the Secretariat in the last five years, together with the lack of adherence to deadlines established for data submission, have constituted an enormous amount of work for the Secretariat, which is not sustainable.

The Secretariat applied, for the first time, to the 2013 datasets reported, the SCRS filtering criteria to accept/reject statistical forms (2013 Report of the Sub-Committee on Statistics, Addendum 2 to Appendix 8, Filters 1 & 2) adopted in 2013. The results are based in a total of 68 flags (from 49 CP's & 4 NCC's: 47 CP's + 13 EU members + 4 UK-OT members + 4 NCCs) with possibly reporting obligations. The forms impossible to be corrected were considered unreported data, and Flags reporting "zero" catch were understood as accomplishing the reporting task. Among the 4 scenarios presented, scenario 2 (gives the most optimistic scenario on filter application) was the one chosen by the Group. Detailed results can be found in SCRS/2014/129.

2.1 Task I (nominal catches and fleet characteristics)

The Secretariat presented 2013 data reporting status (**Table 1 and 2** of SCI-008) of the two datasets of Task I statistics (T1FC: fleet characteristics; T1NC: nominal catches). Overall, the results of applying the filters to accept/reject the data reported in forms ST01-T1FC and ST02-T1NC were not very encouraging, but should improve after several iterations. For T1FC, only 39 flags (57% of 68 flags) did report (37 in time and 2 after deadline) this dataset in good conditions (passing at least filter 1). Data from 10 flags didn't pass the filtering criteria and had to be corrected (directly or indirectly through a revision request) by the Secretariat, in order to be accepted by the SCRS. This process of correction took a significant amount of staff time and effort. Information on T1FC from 19 flags had not yet arrived at the time of the meeting.

The T1NC dataset was presented by major ICCAT species (major tunas, major sharks, and, any of the 13 small tuna species and dolphin fish). The reporting status shows that only 39 flags (57% of the total) did report data for all the species in good condition (35 timely and 4 after deadline). The data submitted from 16 flags that were not in acceptable condition (11 flags on all species and 5 only on a few species), but which were corrected by the Secretariat at considerable expense of staff time and effort. The T1NC information from 13 flags at the start of the Sub-Committee meeting were still missing.

The Secretariat also informed the Group that two sets of historical revisions of Task I catch series are pending approval of the SCRS.

The first one (**Table 8a** of SCI-008) compiles the catch series of the major revisions reported to ICCAT by EU-Malta (SCRS/2014/118, covering several species and gears) from 1920 to 2010, and, EU-Spain (SCRS/2014/052, Spanish bluefin tuna catches from baitboat fishery in the Cantabrian Sea from 1900 to 2000 (work financed by the GBYP project). In addition, there are some updates related to the estimations of T1NC catches of "*faux poissons*" (SCRS/2014/063) which covers the tropical purse seine fisheries of EU-Spain and EU-France (bigeye, yellowfin and skipjack) in two distinct periods: a) from 1982 to 2004 in which Task I catches have flags combined (Mixed flags (FR+ES)); b) from 2005 onwards which have Task I catches separated by flag. Except the Maltese revisions, all the revisions have scientific documents and were presented to (and used by) the respective species group, and therefore, the SCRS approval should be straightforward.

Document SCRS/2014/118 was presented to the Group by the Secretariat (in the absence of the author). The majority of the information is new to Task I. In addition, those historical Maltese catch series, based on FAO statistics and many carry overs, are fully eliminated with the revision presented. The Group acknowledged the work of EU-Malta for such a large revision, and congratulated the author. All the new series were accepted by the Group and endorsed to the respective species working group for further final adoption.

The second one is another set of T1NC data (covering both, historical revisions and recent years) that, for various reasons (no scientific document, Secretariat doubts of double counting catches, GBYP related catch series re-estimated due to problems found, GBYP research mortality allowance, etc.), were not integrated into the ICCAT-DB system. Those series (**Table 8b**) require SCRS guidance and approval. The Group considers that, the ones related to GBYP re-estimations (including the GBYP Research Mortality allowance) are eligible for approval because they were already used in the assessment. The ones from Angola, EU-France (overseas territories) and Sierra Leone requires further analyses from the respective species group.

The Sub-Committee also noted that a number of CPCs are currently explicitly reporting "zero" catch in Task I (**Table 8c** of SCI-008), which is now mandatory. The Sub-Committee acknowledged the improvements attained over the last 3 years.

2.2 Task II (catch & effort and size samples)

The 2013 data related report cards of the two datasets of Task II statistics (T2CE: catch & effort; T2SZ: size samples) were also presented (**Table 3 and 4** of SCI-008). The reporting status of Task II, after applying the filtering criteria agreed by SCRS in 2013, shows worse results for T2CE than for T2SZ datasets. In general, those datasets have poor (less information) reporting ratios than for Task I. Both T2CE and T2SZ datasets are analysed by major ICCAT species (major tunas, major sharks, and, any of the 13 small tuna species and dolphin fish).

The T2CE dataset reporting status shows that only 27 flags (40% of the total) reported data for all the species in acceptable condition (24 timely and 3 after the deadline). The data from 23 flags that were not in acceptable condition (18 flags on all species and 5 only on a few species) were properly corrected by the Secretariat which required significant time and effort. However, T2CE information from 18 flags were not yet reported. The Sub-Committee noted that almost one quarter of the flags required to report failed to provide any information. On the other hand, T2SZ dataset reporting status shows that 35 flags (51% of the total) reported data for all the species in good conditions (33 in time and 2 after deadline). The data from only 6 flags with poor conditions (4 flags on all species and 2 only on a few species) were properly corrected. The T2SZ information from 27 flags still missing. The Group acknowledged the progress in reporting T2SZ in good conditions, despite the continuing high number of flags (40%) missing size data reports.

The Secretariat also presented the historical revisions of T2CE data (**Table 9** of SCI-008) made by EU-France, Ghana and Turkey, and, to T2SZ data (**Table 10** of SCI-008) made by EU-Spain and EU-Portugal. In addition, the Secretariat informed that, all the GBYP Task II information recovered was integrated into the ICCAT-DB system. The Sub-Committee considered that these revisions should be entered into the appropriate data bases, conditional on acceptance by the relevant species group.

The question was asked if a CPC needs to report catch and size for all species to get a solid green? The answer was, yes; there was one color coding which was not species specific. The point was raised then that perhaps the representative colours could or should be species specific (i.e. different species have different requirements). Furthermore discussion resulted from the question that was asked, why are there different data requirements for different species? The answer was one of history. It was noted that there are currently only one out of five species that require catch-at-size data. However, based on the time that has elapsed from the original designation of which species require reporting of extended data (such as size data), the Working Group on Stock Assessment Methods might want to pick up on the question of matching the model with the data; are our current requirements suitable to the assessment needs?

2.3 Tagging

Conventional and electronic tagging information (release and recovery data) continues to be reported to ICCAT on a regular basis. During the reporting period, ICCAT CPCs have reported tagging data from 12,843 specimens released (various species, being bluefin tuna the majority - GBYP) and recovery data from 256 individuals (**Table 5a** of SCI-008). As in previous years, the ICCAT Secretariat has, at disposal of the ICCAT scientific community (scientists or scientific Institutions from ICCAT CPCs), conventional tags for tagging experiments. During 2013/2014 the Secretariat distributed about 2,000 tags to the ICCAT scientific community (**Table 5b** of SCI-008). A large portion was directly associated with GBYP.

The Secretariat also informed about the problems with the tagging reports of USA (the largest supplier of tagging data to ICCAT). The ICCAT/USA data exchange protocol (created in 2008), which was applied with success only for one year, wasn't used in 2013 and 2014 to report the USA conventional tagging. In turn the entire database is sent. The Secretariat reiterates that this is impractical (currently, impossible to integrate that information into the ICCAT tagging database) and it is very time consuming to work with those databases. The Secretariat is working with USA tagging agencies in order to reactivate the available protocol.

2.4 GBYP data and information (Trade information and others)

Following the request from the 2014 Bluefin Tuna Data Preparatory meeting (Madrid, 5-10 May 2014), the Secretariat informed that all GBYP fishery data recovered in the last three years were integrated into the ICCAT-DB system. In addition, provisional estimations of “wild equivalent” bluefin tuna size samples obtained from species harvested (SCRS/2014/040) on farms, were also entered into a data base for use by the Bluefin Tuna Species Group.

2.5 ICCAT Biometric Relationships and other conversion factors revision and update workplan

During 2013 and 2014 different species groups have identified important deficiencies and/or inconsistencies in some biometric relationships and other conversion factors currently used by the SCRS and posted in the ICCAT web site. For most of the stocks, the values used were obtained a long time ago and have not been updated. In other cases, the values are not well documented and/or were obtained from limited data series.

It was brought to the Sub-Committee’s attention that the Shark Group has reviewed new relevant shark statistics and morphometric data on shark. This new data should be used and replace the ones currently expressed in the *ICCAT Manual*. These revisions are reflected in document SCRS/2013/033 and SCRS/2013/046. It was noted that there should be no difficulty when trying to accomplish this task.

The Sub-Committee encourages the species groups which have not yet done so, to review the current values and to elaborate a multi-annual work plan to update the biometric relationships and other conversion factors. The work plan should establish priorities by species and/or factor.

The Sub-Committee was also presented with statistics pertaining to the characteristics of the fishing fleets participating in the ICCAT. These vessels were to be characterized both by vessel tonnage (GRT) and vessel length (LOA). Although well populated, there were a number of missing data within the database. Because there is likely a meaningful relation between vessel tonnage and vessel length, the Sub-Committee suggested that perhaps some of this missing data could be filled in via extrapolation between the two variables of GRT and LOA.

The Sub-Committee recommended that a work plan be elaborated to develop such conversions for the vessel types extant in the ICCAT vessel list. In addition to LOA and GRT metrics, the work plan should consider other metrics such as FHV (fish hold volume) to allow for consistent comparisons between different oceans, especially for purse seiners.

2.6 Other relevant statistics

For the reporting period, the Secretariat has received discard information for 35 teleost and shark species/categories. Very little information was received under statistics reporting requirement S40 and thus for this reporting period, information was only obtained from T1NC data forms. Similarly catch information for by-catch species (in particular sharks) was not obtained from requirements S29 - S31, S33 – S36 but also from TINC submissions. For sea turtles, in 2014 more information was submitted in accordance with Rec. 10-09, however due to comments and recommendations by the Sub-committee on Ecosystems and By-catch, detailed confidential information on sea turtle interactions was also supplied directly to the Secretariat. For the 2013 reporting period, the Secretariat has received seabird interaction information along with a release fate from 13 CPCs and for nine species or groups.

At the 2014 Sub-Committee on Ecosystems and By-catch the Secretariat presented newly developed observer data reporting forms for recording catch and effort data. It was noted at that time, that the vast majority of by-catch information recorded by CPCs comes from observer programmes and thus these forms provide a means for not only capturing observer data, but for the submission of by-catch data as well (i.e. any data not already submitted at a species specific level in the TI and TII data collection forms). The Sub-Committee on Ecosystems reviewed the forms and discussed issues related to how these forms could accommodate the reporting of both aggregated and non-aggregated data and recommended their use in 2015.

In accordance with Recs. 12-03 and 13-07, data collected under the national bluefin tuna observer programmes was also submitted to the Secretariat. No format has been developed for this data submission as of yet, although potentially the observer data collection forms described above could be used.

In *Recommendation by ICCAT on a Multi-Annual Conservation and Management Program for Bigeye and Yellowfin Tunas* [Rec. 11-01] it is stated that by July 1 of each year, CPCs with purse seine and baitboat vessels fishing for bigeye and yellowfin tunas in association with objects that could affect fish aggregation, including FADs, shall submit to the Executive Secretary, Management Plans for the use of such aggregating devices by vessels flying their flag. A new form (ST08-FadsDep) was created and distributed in response to Rec. 13-01, paragraph 2. This form was designed to capture information on the number of FADs actually deployed on a quarterly basis, by FAD type, indicating the presence or absence of a beacon associated to the FAD. Thus far, the submission of these forms has been very low.

In order to address Rec. 11-03, paragraph 14, CPCs which operated pelagic longline fisheries in the Mediterranean have been requested to submit specific information for the fishing vessels that were authorized to carry out pelagic longline fisheries and harpoons in the Mediterranean during the preceding year. The Secretariat further presented a proposal to consolidate information on vessels into a single form, reducing redundancies and streamlining reporting.

The Sub-Committee noted that in 2013, the Secretariat informed the SCRS of redundant (partial and different in structure) reporting obligations for ICCAT CPCs in terms of fishing vessel information. Form ST01-T1FC (for T1FC fleet characteristics) provides a distribution of the number of vessels, by LOA and GRT classes, of each CPC fishing fleet from the previous year. Under the ICCAT vessel registry (positive list of vessels allowed to fish for ICCAT species, with LOA>= 20 m) the CPCs should also report the list of individual vessels which operated in the previous year (form CP38-VessAuth), in the tropical fisheries [11-01], Mediterranean swordfish [11-03], and, Eastern bluefin stock [12 03/13-07].

Reporting both forms, with the same data but structured differently is a duplication of effort for the ICCAT CPS. In consequence, the Secretariat presented a proposal to the Sub-Committee aimed to merge both forms by creating a new form that covers the data from both forms. In summary, it changes the current CP38 form by adding the required elements to the details section:

a) Vessel identification section: Radio call sign, Gear and GRT,
b) Two new fields to record the effort (fishing days) from the Atlantic and the Mediterranean Sea.
c) Replaces the three columns for "Vessel Registry (Previous Year)" by a column specifying the fishery (currently: ETRO, SWO-M and BFT-E). This field could freely accommodate more fisheries (i.e.: BFT-W, ALB-N, ALB-S, SWO-N, Sharks, etc.) in the future. Optionally it could have more than one option (Fishery1 & Fishery2) to account for multi fisheries authorisations in a given year.

The Sub-Committee analysed the proposal and acknowledged the work of the Secretariat in facilitating/simplifying the work of the CPCs. In addition, the Sub-Committee noted the potential increase in quality of both reporting methods and recommended that, this form be adopted by the SCRS, but enlarged to accommodate fishing vessels smaller than 20 meters (LOA).

The Sub-Committee agreed with the proposal by the Secretariat. The Sub-Committee also noted that the reduction in redundancy could have implications for those CPCs concerned about data confidentiality as vessel specific information will be requested.

Data on discards was presented by the Secretariat. More data on more species are being reported but large gaps in the data still exist. It is likely that the observer program is a better means for reporting bycatch data rather than the catch reporting. Improved bycatch data is becoming more important to groups such as the Subcommittee on Ecosystems and By-Catch and the Sharks species Working Group. The data form was presented to and accepted by the Subcommittee on Ecosystems and By-Catch. The Observer data collection forms are quite extensive and may need some revisions based on feedback from the users. Since that Subcommittee has already approved these forms, there was no need to discuss it any further.

The Secretariat presented the document Streamlining ICCAT conservation and management measures and associated reporting requirements (SCI-078), which included a list of reporting requirements for the SCRS and comments summarizing potential issues with each recommendation. In many cases, the existing requirements are redundant and/or require additional clarifications to reduce uncertainty as to what exactly is required for submission. To clarify and simplify these reporting obligations, SCI-078 includes the following general suggestions:

- Check that the requirement is not already covered (e.g. Specific requested for data that are already covered by the usual submission of Task I and Task II data).
- If requiring specific data, indicate the format to be used.
- Ensure that the request is clear and unambiguous. It should be obvious what data should be submitted and by whom.
- Indicate in the text of the measure the purpose of the information required.
- Check with SCRS or Species Group chairs to ensure that the data requested would be sufficient for the analysis required.

The Sub-Committee agreed that these were valuable and sensible suggestions and recommended that they be presented to the Commission.

The Sub-Committee also reviewed a document (SCRS/2014/141) describing the use of stereo-cameras. Size frequency data of bluefin tuna from stereo video camera systems at caging transfer operations was compiled, revised and preliminary analysis done to estimate size at catch of farmed fish. Preliminary results indicate a multimodal size distribution for bluefin destined to farming in 2014; with a large mode of small fish of about 75 FL cm, and two modes for medium 120 FL cm and large 210 FL cm. Comparisons with alternative catch at size estimates from prior years (2010-2013) indicate significant differences of density and cumulative size frequency distributions by flag. At present, however it is not possible to conclude if these differences are due to changes in the catch of 2014 compare to prior years or to the methodology for estimating catch at size from the size at harvest reports. Weight estimates from the stereo video systems need to revise and standardize the size-weight relationship used in the video algorithms.

The Sub-Committee noted that the preliminary comparisons suggest that the quality of length frequency of bluefin tuna obtained by stereo-cameras is encouraging. However, it is clear that different CPCs have used various length-weight conversions, which has complicated comparisons. The Sub-Committee recommended that length-weight conversions be reviewed and standardized across CPCs. The Sub-Committee also noted that stereo cameras be used at delivery to the cage and at harvest to facilitate estimation of growth in cages.

Summary of Sub-Committee Discussion of Elements in Section 2

The Sub-Committee noted the several updates to the Task I and II data, which were presented. Updates to fleet size and characteristics were presented with several updates and improvements made from previous years. The presentation pointed out that the number of data revisions is down considerably from last year, which was looked upon favorably. It was apparent from the figures presented that the number of longline vessels in 2013 was an obvious outlying data point and was viewed an error which required further revision. The overall increasing trend in the overall number of vessels apparent in the graphs were characterized as inaccurate due to historic reporting issues, and as such should be interpreted accordingly.

The Sub-Committee reiterates to the CPCs the Commission's requirement of using the standard electronic forms for data submission and complete all the information requested.

A relatively more detailed discussion was entered into with regard to the proper and formal characterization of "Revision", vs. a "Partial Revision", vs. a "Full Revision". Importantly, the CPCs need to decide what to call the revision, not the ICCAT Secretariat. But most importantly, the CPCs need to be explicit and clear with regard to the type of revision that is being submitted to the Secretariat. Definition of terms is important and having those definitions recorded on the ICCAT Web site is necessary.

Several new "Filters" were presented in an effort to reduce redundancy in reporting obligations of the CPCs, increase efficiency in the data processing steps taken by the Secretariat, and to permit increased rapidly in evaluation of data gaps. There was discussion on the timeline and starting this in 2015. Some felt it was too early. But it was recognized that this is a stated need, knowing full well that 2015 is early to expect full adherence to these rules. So the term "in force" was modified to "fully applied". It will take some time to get the application fully adhered to. To this end, the Secretariat recommended that:

- Filter 1 & 2 be used as mandatory, following the schedule below:

  - Filter 1: fully applied from 2015 onwards, with the following change:
    - Moving item (d) to the forms (header section) in the fields with options: (NEW data; FULL revision; PATRIAL revision)
    - Scenario 3 specifications should be applied
    - Reporting date shall be the one with the "good" data

- Filter 2: "testing" mode in 2015, in which:
  - Accomplishments should be analyzed by the Secretariat, and,
  - Filter 2 adjusted by the SCRC if required

Filters 1 & 2: Fully applied in 2016, with scenario 4 specifications (SCRS/2014/129) fully utilized so this effort needs to get started early in 2015. The Sub-Committee endorsed this recommendation.

3. Review of criteria applied to ICCAT statistics

These criteria are provided in SCI-008.

3.1 New sampling areas proposal

The Secretariat presented a proposal to simplify the current biological sampling areas (SAs) (www.iccat.int/Data/ICCATMaps2011.pdf) of the major ICCAT species, noting that SAs are now mandatory for Task I. The Group noted that, the ICCAT SAs lack nowadays the proper biological knowledge of the fisheries of ICCAT. They were created many decades ago, and while the Secretariat proposal could partially eliminate some duplication (in particular bigeye and yellowfin) it considers that a long term goal for the geographical classification of Task I should be to adopt a 5 by 5 degree square grid in all fisheries (and a 1 by 1 in surface fisheries). Nevertheless, the Group endorsed this and recommended the respective ICCAT species groups identify length/weight range limit criteria for use in Filter 2 applications (see below).

The Secretariat made a number of recommendations to simplify and/or improve the species-specific ICCAT sampling areas. The Sub-Committee did not recommend any changes to the current sampling areas, but instead recommends that the Species Groups evaluate these proposals and suggest improvements.

The Sub-Committee also recognized the WG-SAM recommendation to require Task 1 and 2 data be reported at a finer scale, and consistently (at a minimum by 5° by 5° and quarter) thus eliminating the need to reevaluate species-specific ICCAT sampling areas in the future. The Sub-Committee also recognized the complexities of calculating landings in weight based on the number of fish landed and catch-at-size which may be reported by CPCs in different spatial strata. However, the Sub-Committee recognized that currently similar assumptions are routinely made by the Secretariat, and that the estimations would likely be better made by those most familiar with the data.

3.2 Application of Filters 1 and 2 on data submission

The Secretariat presented SCRS/2014/129, which included the results of applying Filter I and Filter II to data reported. The utilization of the filtering criteria resulted in a complex exercise for both the Secretariat and the ICCAT CPCs, mainly because of being used for the first year. The Secretariat hasn't yet completed the filtering infrastructure inside the database system and some CPCs had some doubts on how the filters would apply.

The major problems identified were the forms incompleteness, the improper (or no) use of ICCAT codes, and, not following the basic standards of the dataset structures adopted by the SCRS. However, the Sub-Committee considered the filtering criteria a powerful tool, which could potentially improve the way fishery data is reported to ICCAT, by requiring ICCAT CPCs to verify/validate the information prior to the submission. In the long run, they could definitely improve the quality of fishery statistics data, and benefit the SCRS long term strategic plan in terms of data availability/quality. The Sub-Committee reiterated their support for their future use, and considers that they should be fully applied (both filters) in a period of two years (being the next year an additional testing year for filter 2). The Secretariat should present the results of the filter application and the progress made on this matter at the next meeting.

The importance of complete and timely reporting was reflected in the additional following three Sub-Committee recommendations:

1. Updating the ICCAT guide book to reflect these terms and conventions.

2. Capacity building to maintain these updates is also important.

3. Workshops were recognized as a good way to teach CPCs exactly how to report landings and the Sub-Committee recommended conducting regional workshops starting early in 2015.

The Sub-Committee noted numerous times during the meeting that the various Species Groups are better suited to review the available Task I and II data to ensure the highest degree of accuracy and completeness.

3.3 Recommendation of WGSAM on spatial strata for Task II catch and effort data

The Sub-Committee discussed and endorsed the recommendations of the WGSAM regarding the spatial strata for Task II catch and effort data. This recommendation encouraged CPCs to report their Task II catch and effort data at a finer geographical stratification (e.g. 1 x 1 degree) instead of 5 x 5 degrees.

3.4 Proposal for updating the definition of tuna and tuna-like species under the ICCAT Convention as defined when the Convention was adopted in 1969

The Commission recently asked "What constituted tuna and tuna-like species when the Convention was adopted in 1969 and how is this list of species best characterized today, given that taxonomic categories and names can change from time to time and the Convention cannot be modified frequently?".

With regard to this question, the Sub-Committee prepared a response to the Commission, which is included in item 18.10 of the SCRS report.

3.5 Species covered by the term "oceanic, pelagic and highly migratory elasmobranchs"

The Sub-Committee noted and endorsed the response to the Commission prepared by the Shark Working Group addressing the question: "Which species should be covered by the term "oceanic, pelagic and highly migratory elasmobranchs"? This response is provided in item 18.10 of the SCRS report.

3.6 Consideration of methods to display/calculate catches on the 'high seas'

The Sub-Committee noted the need to fully utilize the 'high seas' data. Examples of new maps from the ICCAT web site were presented to the Group. The new web page design was noted to be an improvement as it added convenience and ease of getting directly to the desired material. It was pointed out that what constitutes "high seas' versus "other" needs to be made, which is not always obvious and/or easy.

4. Review of ICCAT-DB

A presentation was made on the progress of the ICCAT-DB transition. Several improvements were made this year to various aspects of the ICCAT-DB. These include Task II database, CATDIS, EFFDis, CAS, and vessel registry. There was also a creation of a new GBYP database. Statistical forms were updated, but were not yet finished. SQL code revisions were made for various improvements. To date, the Secretariat has completed 80-90% of the proposed work on the full redesign of the Task I database. Further details of this work can be found in SCRS/2014/130. The Sub-Committee noted, however, that progress on all components has been slowed due to inordinate demands on the limited staff available.

4.1 Development status

The Secretariat described the current development status of the ICCAT-DB system, detailing the overall improvements made, and also, the various ongoing projects (databases developments, refinements on the system, etc.). Important refinements (mostly code programming) were made to the Task II, CATDIS, EFFDis, and, CAS databases. A new database for the GBYP was also created to facilitate the integration of current data into the ICCAT-DB system and future updates. The full redesign of the Task I database (due to its age and some new SCRS requirements) is one of the most important projects that the Secretariat is working on. It is not yet finalized (finished about 80%) but it is planned to end in about two months.

The Secretariat noted that, the majority of the improvements made were planned to accomplish the major tasks of the SCRS, in particular the bluefin tuna assessment.

The Sub-Committee thanked the Secretariat for this effort and expressed their appreciation and great satisfaction for these useful revisions. The revisions were an obvious improvement on the past status as it uses more up to date techniques, software, and programming languages. User books are available for assistance in utilizing the ICCAT-DB and for documentation purposes.

4.2 ICCAT-DB documentation and its publication (ICCAT cloud status)

The Secretariat informed that, this project was postponed one year due to inordinate demands on limited staff time. Therefore, no major progress was made. In consequence the three year work plan has to be extended to 2016.

During 2014 the ICCAT cloud-computing servers (http://rscloud.iccat.int) were used for hosting working group datasets (http://rscloud.iccat.int/kobe/) and the development of R packages to read and process these data e.g. to provide advice in the Kobe framework (http://cran.rproject. org/web/packages/kobe/index.html) and provide model diagnostics (http://flr-project.org). In addition tools for running assessment (http://rscloud.iccat.int:3838/swo-med-xsa/), evaluating management options (http://rscloud.iccat.int:3838/swo-med/) over the web have been developed. Several R packages were also developed that use parallel computing ASPIC, Biodyn, FLash) for developing management advice and conducting MSE. The cloud is also being used to host tutorials and courses see http://rscloud.iccat.int/Tutorials/MSE/html/programme.html for a course on MSE. The Atlantic bluefin assessment was conducted inter-sessionally using ownCloud (www.owncloud.com) to make the data, methods and results available. The cloud platform tests made were considered successful in allowing SCRS scientists to collaborate inter-sessionally and to conduct the many tasks required by stock assessment Working Groups. These cloud computing trials have shown its potential for modeling and various types of collaborative work. The next steps are to make the system a widely used tool by SCRS Working Groups.

4.3 ICCAT-DB migration from Microsoft-ACCESS to other platform

Regarding the VBA code migration of the 13 applications that interact with various databases of the ICCAT-DB system, the Secretariat has started the process in 2014 with one of the ICCAT databases (the vessels list). This work is outsourced and must be continued next year until the complete migration of all ICCAT databases. The statistical department has scheduled (inside this project) an intensive training course of two weeks.

The Sub-Committee agreed the need of doing this migration and strongly recommended to finalize this task as soon as possible in order to ensure the full operation of the ICCAT-DB system. The Sub-Committee noted that to complete it a financial support of around 150,000 Euros will be required.

5. National and international statistical activities

The Sub-Committee supported the participation of ICCAT in various international efforts to harmonize data collection and coordination.

5.1 International and inter-agency coordination and planning (FAO, CLAV, CWP, FIRMS)

The Secretariat's involvement in coordinating and inter-agency planning is summarized in SCI-008. A new initiative, IMARINE, is an opportunity for scientific collaboration on ecosystem data and analysis. This effort would make available tools and data that ICCAT could find useful. A high degree of technical expertise is needed to get involved in this initiative. The effort maybe more than ICCAT needs at this time and its utility should be further considered by the Sub-Committee on Ecosystems and By-catch. The Secretariat also informed the Sub-Committee of the revision and improvement of the Data Collection Regulation (DCR) that the EU is conducting. This revision is important for ICCAT because it directly affects the data collection criteria and quality of the data submitted by the EU to ICCAT. In particular, the collaboration with the Regional Co-ordination Group for Large Pelagics was recommended. Also, the Secretariat informed on the process of revision and update of the FIRMS web site in which the participation of the SCRS would be greatly appreciated.

5.2 National data collection systems and improvements

No discussion was conducted under this item.

6. Report on data improvement activities

SCI-008 reported upon these activities.

6.1 ICCAT-Japan Data and Management Improvement Project

The Coordinator of the JDMIP presented the Coordinator's Report on Activities of the ICCAT/Japan Data and Management Improvement Project (JDMIP) 2014 (SCI-009) to the Sub-Committee that describes the activities of the JDMIP since its inception in December 2009. The ICCAT/Japan Data Management Improvement Project (JDMIP) trust fund has been dedicated to assist developing CPCs to effectively implement ICCAT measures including those related to the monitoring, control and surveillance of tuna fishing activities as well as the improvement of data collection, analysis and reporting. Document SCI-008 provides the progress report of activities carried out in the fifth year of the JDMIP as well as a summary of the general outcome as 2014 is a final year of the project. Specifically, the report summarizes 2014 activities including Steering Committee meetings, training programs in Cape Verde and West Africa, enhancement of data collection capabilities in Belize and São Tomé and Príncipe and observer programs in Ghana. The JDMIP program also supported attendance at ICCAT meetings throughout the year.

The Coordinator noted that 2014 is the final year of the JDMIP program, but announced the initiation of a new project, the ICCAT-Japan Capacity Building Assistance Project (JCAP) and invited the Sub-Committee to communicate ideas for possible activities to be funded under this new project. The Sub-Committee expressed its appreciation for Japan's generous support of JDMIP activities during the 5-year program and looks forward to an ongoing and important collaboration with Japan during JCAP.

6.2 Observer data from Venezuela (SCRS/2014/085)

The objective of this JDMIP-funded project was to create an enhanced species-specific monitoring of the VAOS medium and long range fishery, 2011-2014. The VAOS is an artisanal longline fleet that supplies a generally local market. A total of twenty five species were identified, but mostly dolphin and sailfish. Approximately 82% by weight of all billfish species were sailfish. Of sharks, 51% was silky shark, and 31% scalloped hammerhead. Targeted species include dolphin, sailfish, sharks, and blackfin tuna.

The Group discussed the readiness of these data for the potential upcoming sailfish assessment. The data would in fact be ready for a sailfish assessment, and some of it has already been used for other billfish assessments. Despite a consistent manner in setting of the gear over the years, the species composition of the catch has changed considerably.

The Sub-Committee recommended that these new data should be added to the ICCAT database for future use in the general assessment process. There was also discussion on Captain differences, how Captains were selected, and the consistency of Captains participation.

6.3 Funds from [Res. 03-21], [Rec. 13-19] and other ICCAT funds

The Secretariat provided a summary table of the use of various data funds for 2013, as follows:

Use of Data Funds from [Res. 03-21], [Rec. 13-19] and other ICCAT funds in 2014. This Table does not include the activities funded by GBYP, EBRP or JDMIP.

Participation at meetings	*SCRS meetings*	*Meetings 9* *Countries 16* *Scientists 35*
Improvement of statistics	Participation of one Ghanaian scientist in the Tropical Tuna coordination meeting on data processing under the IRD-MFRD collaboration project for the improvement of statistics on tropical tunas in the Gulf of Guinea, approved by the SCRS in 2011.	
Support to the work of the SCRS	Participation of an expert to teach the training course on Bayesian Surplus Production (BSP) for stock assessments.	
	Hiring of an external expert to carry out an inventory of strategic investments related to artisanal fisheries in the western part of Africa. The inventory is presented to the Committee as document *Inventaire des investissements stratégiques relatifs aux pêcheries artisanales dans la region de l'afrique de l'ouest* (SCI-072) (SCRS/2014/143).	
	Participation of an expert in Bayesian Surplus Production models (BSP2) in the Mediterranean swordfish stock assessment meeting.	
	An ad-hoc training on techniques used in tropical tuna fecundity studies, for a scientist from Côte d'Ivoire in the IRD Centre in the Seychelles. Document *Rapport de la formation de perfectionnement : Histologie des gonades de l'albacore et du patudo dans l'Atlantique* (SCI-073) (SCRS/2014/116) presents a report on the work undertaken during the placement.	
	Co-financing the participation of an expert in the application of assessment methods in data poor stocks at the Atlantic Skipjack Stock Assessment meeting.	
	Co-financing the contract of a team of experts to carry out a feasibility study on an Atlantic Ocean Tropical Tuna Tagging Programme which is presented in document etude de *Faisabilite du programme de marquage de thons tropicaux de l'ocean Atlantique* (SCI-068) (SCRS/2014/094).	
	Small tuna biological data inventory and recovery for Côte d'Ivoire under the SMTYP.	

The Sub-Committee noted the support provided through the Data Funds applications and recommended continued use and refreshing of these funds by the CPCs, since they have become a vital portion of supporting the work of the SCRS.

6.4 Data recovery activities

The Sub-Committee deferred discussion until advice from Species Groups is received.

6.5 BFT-E VMS data

No discussion of these data were held by the Sub-Committee pending advice from the Bluefin Tuna Species Group.

6.6 BFT-E Observer data

No discussion of these data were held by the Sub-Committee pending advice from the Bluefin Tuna Species Group.

However, in response to a query, the Secretariat verified that it had received observer forms in due course from Morocco.

6.7 BFT-E weekly and monthly catch reports

Tables 12a and 12b document SCI-008 contain this data. However, the manner in which the data is formulated now does not appear to provide any additional scientific information at this time. Further evaluation of these data was referred to the Bluefin Working Group.

6.8 Transhipment observer data

The Secretariat informed the Sub-Committee that in 2013, a very small fraction (26 t) of the 2013 bluefin tuna catch was recorded by transshipment observers.

6.9 Electronic monitoring

The Sub-Committee considered two documents pertaining to electronic monitoring systems.

SCRS/2014/132 describes an Electronic Monitoring System (EMS) that can be used in some fisheries to collect the same type of scientific information that human observers can collect, and in some cases for compliance with existing regulations. An EMS system was tested previously onboard a tropical tuna purse seiner in the Atlantic Ocean and it showed that the system could perform very well in many tasks. Since then, 17 purse seine vessels operating in the four RFMO’s, have been equipped with a different EMS that has been developed recently by SATLINK (SeaTube). In this paper, the authors present preliminary analyses comparing information collected by human observers from the IEO and recordings of the SeaTube system reviewed by DOS (Digital Observer Services) of 103 sets made along four trips in two different vessels in the Atlantic Ocean. The authors, in particular, also compare estimates of catch per set (for target and non-target species), amounts of discards, fishing effort type and set location, and comment on other potential uses of the electronic system including for compliance purposes.

The authors concluded that EMS systems are capable of delivering and validating many types of information that observers provide, and could also be useful to monitor compliance. However, they also concluded that the SCRS should develop technical standards and submission protocols.

The Sub-Committee noted that observers are not perfect, thus a 1:1 ratio of catch per set by observers and by EMS is not expected. Also, some species were rarely observed which confounds comparisons (e.g. sea turtles).

SCRS/2014/138 describes the Electronic Eye (EE), an electronic monitoring systems based on the automatic photo taking and developed by Marine Instruments S.A. This system was developed with the aim of being an alternative, or a complement to human observers. The overall objective of this study was to test the use of EE on a tropical tuna purse seiner in the Atlantic Ocean, and determine the feasibility of the EE to reliably document fishing effort, set-type, catch, and bycatch on the tuna purse seine fishery. To achieve these objectives, EE and an observer were deployed simultaneously on a complete fishing trip. Based on this research, EE is a valid tool for monitoring number of sets, set-type and total tuna catch within the tropical tuna purse seine fishery; however some future adjustments are still needed for the monitoring of the by-catch. Thus, the EE system could be a complement to observers or even a real alternative, according to the final goals of a monitoring program.

The authors conclude that the EE is quite accurate at classifying fishing operations (i.e. FAD and Free School sets) and that EE and observer data were equally reliable methods to determine total catch per set. However, some difference in species composition exists and EE consistently underestimated by-catch species since they were not always handled on the fishing deck. Including an EE system below deck would significantly improve by-catch estimates.

With regard to EMS systems in general, the Sub-Committee reviewed a presentation by ISSF of the minimum requirements to ensure the reliable operation of EMS systems. Documents SCRS/2014/132 and SCRS/2014/138 show that EM systems can provide very useful information on fishing trips and be a complement to port sampling and human observer programs for tropical tuna purse seine fisheries. Given that there are several vendors and multiple possible system configurations, it was noted that SCRS should develop minimum standards for Electronic Monitoring Systems. The Sub-Committee agreed that the SCRS should also adopt minimum standards, using the ISSF guidelines as a starting point. These would aim to standardize the implementation of EM systems and to ensure that the systems can result in collecting useful information for fisheries monitoring. ISSF's technical report 2014-08 "Updated guidance on Electronic Monitoring Systems for tropical tuna purse seine fisheries" could be used as a starting point for this objective. The Sub-Committee also noted the need to determine best practices for the integration of information from EMS, human observer, and port sampling programs. Furthermore, the Sub-Committee noted that EMS could be improved by the use of stereo-cameras to improve quantification of length frequency, such as has been demonstrated for bluefin tuna at the point of transfer into farms (SCRS/2014/141).

It was questioned if skilled scientific observers could provide more information than a camera system, and if EMS systems could also reduce employment opportunities for trained observers. Some members expressed concern that the current use of EMS tends toward compliance rather than scientific observation, although it was noted that human observers can (and do) serve multiple purposes. It was noted that EMS can be more powerful for some functions, equal to others, and less powerful than others conducted by humans, and so, they are not considered to be a substitute for but rather a complement to human observer programs, when these are possible and may, in fact, be the only realistic option to collect at-sea data of this nature. Advantages of EMS systems include minimal processing time (e.g. one week for a two-month deployment of a human observer), and the ability to operate in conditions that do not allow human observers. The use of EMS also requires skilled personnel to operate and maintain systems and process and report data. This creates job opportunities that may be more attractive and higher paying than continuous work at-sea, although it was noted that analysis of the EM data, especially the imagery, requires at-sea experience.

The Sub-Committee also discussed the relative cost-benefits of EMS systems compared with human observers or other forms of monitoring. EMS provides detailed position information that does not require satellite transmission (it is saved to hard drive), thus they may represent a more cost-effective option than VMS and with a much higher reporting rate. Compared to human observers, EMS systems may be more cost-effective when observer deployment is expensive. However, the initial set-up costs could be difficult for some developing nations.

7. Review of Secretariat yearly based fishery datasets estimations and dissemination (SCI-008)

Of course, the Secretariat has done an ongoing, outstanding job of providing data for the purposes of stock assessment. However, as usual, their efforts can only move as fast as the CPC's reporting of the data, which is an ongoing effort.

7.1 CATDIS

FAD versus free school catch distribution. The Sub-Committee noted the improvement in CATDIS made by adding fishing mode to the data used for showing catch distributions. Purse seiners, primarily in the eastern tropics, have transitioned from free schools to FADs. As transitions within the other gear groups are made, the Sub-Committee recommends that CATDIS be updated to also reflect these change to the degree possible.

7.2 CAS and CAA

SCI-008 provided a summary of recent efforts to standardize the provision of CAS and CAA in support of SCRS requirements. The Sub-Committee noted these efforts and encourages continues Secretariat support in this activity.

7.3 Others (e.g. EffDIS)

The Sub-Committee noted that some concern about the methods and assumptions applied to develop the EffDIS data. Both the Sub-Committee on Ecosystems and the Working Group on Stock Assessment Methods (WGSAM) recommended that work on re-estimation of EffDIS needs to be continued as it is critical to both groups and to assessment efforts in general. Discussion on exactly which group should take on the task of methodology was brought into question. This is an ongoing question for which the Sub-Committee could not arrive at a firm resolution. The methodology was presented to the WGSAM to seek recommendation for any improvement to the current methodology.

The Sub-Committee recommended formation of a small, inter-sessional group, including members from both the Sub-Committee on Ecosystems and the Working Group on Stock Assessment Methods, to arrive at an avenue to improve the estimates and to work out details on exactly what is needed.

8. Review of publications and data dissemination

The Sub-Committee was presented with an update of the various ICCAT publications and was most appreciative of the efforts made by the Secretariat. The new deadline for documents was met with less than stellar success. Currently, the deadline is six and three days before the meeting to submit titles and documents for the Species Groups. However, more than 50% of the documents have been submitted after the deadlines.

The Sub-Committee agreed that deadlines help the rapporteurs to better organize the meetings and noted that it would be helpful to note in the meeting announcement exactly why these deadlines are in place and the "consequences" of missed deadlines and recommended the Secretariat introduce such language in announcements as a matter of course.

8.1 Revise alternatives to the ICCAT-Aquatic Living Resources publication agreement

The Sub-Committee discussed potential partnerships with peer-reviewed journals to facilitate the publications of ICCAT working products. Previously, ICCAT had a six-year arrangement with Aquatic Living Resource (ALR), but that arrangement was temporarily interrupted. The Secretariat informed the Sub-Committee that a new ICCAT-ALR agreement is now possible, and that the scope of the journal will be broadened, including fisheries management in general. The Bulletin of Marine Science (BMS) also expressed an interest in collaboration with ICCAT with some specific conditions (**Appendix 2** of SCI-008). Both of these opportunities request a higher implication of the SCRS in the review process and have financial implications in the case of BMS. The Sub-Committee recommended that we continue our collaboration with Aquatic Living Resources but investigate ways to accelerate the process of publication.

8.2 ICCAT publications

The Secretariat informed the Sub-Committee about two issues related to publication of SCRS working papers: 1) the need for authors to follow the ICCAT publication guidelines when submitting documents, and 2) the submission of presentations without a corresponding document. With regard to these issues, the Sub-Committee made two recommendations. First, that SCRS documents submitted with improper formatting be excluded from *CVSP*, but maintained with an electronic link on the ICCAT website, and second, that a new identifier be established to reference presentations made to working groups without a corresponding document. This identifier would be used within inter-sessional reports to reference the presentation and the presentations should be held in the archive of the meeting proceedings (also see discussion above in Agenda 8).

8.3 Development of web based tutorial for ICCAT data submission

The Secretariat is considering the development of web-based tutorials (e.g. a video tutorial with voice-over in official language) to train users in the proper use of data-reporting forms. The Sub-Committee agreed that this is sensible and supported that effort.

9. Future development plan for the *ICCAT Manual*

Work continues to complete the *ICCAT Manual*. Currently, there is a desire to improve information about fleet and vessel characteristics. The Sub-Committee also discussed the need to review and update the glossary which has become outdated and recommended this work proceed under the guise of WGSAM.

10. Consideration of recommendations from the 2014 inter-sessional meetings

A number of recommendations made during various inter-sessional meetings in 2014 of pertinence to the Sub-Committee were made. The following were reviewed and endorsed by the Sub-Committee.

Sub-Committee on Ecosystems

- An update of the EffDIS dataset is critical. Many tasks have been assigned to the SCRS which are reliant on this dataset, especially with regard to by-catch evaluations. The Sub-Committee on Ecosystems strongly recommends hiring a contractor to assure that this update is completed prior to the 2015 Sub-Committee on Ecosystems meeting.

Billfish

- The Group observed that there has been an increase of the proportion of unclassified billfish landings reported since 2011. The Group recommends that the CPCs make greater efforts to identify by species the unclassified captures of billfishes.

- The Group recommends that the catches from Anchored FADs be identified as specific gear in Task I. If available Task II information from Anchored FADs should also be provided (e.g. location, effort, fish size, etc.).

- In line with the Recommendation of the 2014 Working Group of Stock Assessment Methods, the Group recommends to encourage CPCs to report their Task II catch and effort data in a timely manner and at a finer geographical stratification (e.g. 1° by 1°) instead of reporting these data at 5° by 5°.

Albacore

- The Albacore Species Group recommends increasing efforts to obtain French mid-water trawl and other fisheries historical series of catch, effort, catch at size, geographical distribution and other related fisheries information. In addition, the Group reiterated the SCRS requirement to report CAS together with the size samples when submitting Task II size information.

- First estimates of albacore tuna discards in Uruguayan longline fisheries were made available during the 2013 data preparatory meeting (SCRS/2013/067). The Group recommended to extend these studies to other longline fisheries to obtain estimates of the amount of albacore tuna being discarded. It was also recommended that CPUE series be constructed using data from both retained and discarded albacore tuna.

- Several countries with important albacore fisheries were not represented in the 2013 data preparatory meeting. This limited the ability of the Group to properly revise the basic fishery data and some standardized CPUEs that were submitted electronically. This resulted in unquantified uncertainties and negatively affected the successfully for achieving the objective of the meeting. To overcome this, the Group recommends that CPCs make additional efforts and be made aware of capacity building funds available for participation in and contributing to Working Group meetings.

Tropicals

- With the aim of characterizing the fishing effort associated with the two main fishing modes (free school sets and FAD sets) used by the tropical purse seiners and baitboats, the Working Group recommended that the catch and number of sets (total and successful ones) by fishing mode (FAD and school sets) on a 1° square/month basis be submitted by each CPC to ICCAT. For major Purse Seine fisheries (e.g., Ghana) for which the fishing mode was classified as unknown in the CATDIS ICCAT file, the Working Group is recommending that these unclassified catches should be assigned to FAD or free schools, based on the scientific knowledge on each fishery and periods.

- According to Rec. 13-01 which stated that CPCs shall ensure that all purse-seiners, bait-boats and supply vessels flying their flag, when fishing in association with fish aggregating devices (FADs), shall collect and report all FAD activities in a FAD-logbook, the Working Group recommended that the information on the numbers of FADs and buoys in activity on a quarterly basis and related activities developed from supply be analyzed and incorporated into the standardization procedure.

- Considering the volume of catch and size of tropical tunas not included in task I and II by a number of fleets (e.g., due to landing this catch for the local African markets, as in Abidjan), the Working Group recommended that CPCs establish adequate logbook and sampling programs to assure the total catch composition and disposition of the catch is fully quantified and reported as part of national statistic reporting obligations. The data collection of logbooks and samplings should be based on a full cooperation between the concerned CPCs and the Cote d'Ivoire scientists in charge of the faux poisons sampling program conducted in Abidjan.

Swordfish

Atlantic

- *Catch.* All countries catching swordfish (directed or by-catch) should report catch, catch-at-size (by sex) and effort statistics by a small an area as possible, and by month. Recognizing the differential growth and distribution between sexes, collecting catch-at-size information by sex is particularly important. These data must be reported by the ICCAT deadlines, even when no analytical stock assessment is scheduled. Historical data should also be provided.

- *Timely submission of Task I and II data.* Considering that a substantial amount of data, (including revisions of many years of historic size information) was received after the deadline and taking into account the time that the Secretariat needs to incorporate, validate and compile to generate the datasets requested, the Group strongly reiterates the need for respecting deadlines and providing the data in the ICCAT standard formats. This recommendation is particularly important as the SCRS moves to incorporate more complex methods than those normally used and for which the request of data is much higher.

- *Unreported Catches.* The 2009 stock assessment report noted that the summarized form in which the information from the ICCAT Statistical Document Program (SD) is currently reported to ICCAT (bi-annual summaries of direct imports and re-exports) does not give the sufficient detail for improving estimates of potential NEI and volume of Atlantic swordfish in international trade largely due to uncertainty about the year and area of capture for swordfish products in trade, the general lack of product to live weight conversions, and the potential for double counting catches submitted on the re-export certificates. These estimates could be greatly improved if the corresponding *individual* statistical documents and re-export certificates were made available. These detailed data exist at National levels (with identification numbers) and an effort should be made to recover this important information, if the Commission wishes to improve the utility of the SD Program for validating Task I data. SCRS has reiterated this advice over the past decade (see General Recommendations to the Commission, on the SCRS Reports of 2000, 2001, 2002, 2003 and 2004), but as of yet none of the detailed swordfish SD information has been received by the Secretariat.

Mediterrranean

- *Historical data*. The Group noted that new CPUE series have been developed and recommended the collection and recovery of historical data to increase the period covered by these time series.

- *Task II*. The Group recommended EU-Italy mesopelagic longlines and traditional drifting surface longlines to be considered as different gears by the ICCAT Secretariat, and separate Task II series be developed in the future.

- *Next Mediterranean swordfish stock assessment.* It is recommended that the next swordfish stock assessment be conducted no sooner than 2017, as long as there is no signal from the stock indicating decline. This allows time to increase the time series of catch and effort data, and to advance basic research and assessment methods. It should be noted that the data required for that session should be up to and including the year prior to the meeting.

Bluefin tuna

- Fishery independent information is needed, either through a large-scale tagging program or by developing fishery independent indices of abundance (e.g., aerial surveys), to better track trends in biomass and fishing mortality rates. Fishery-independent information is furthermore crucial to avoid biases due to management regulations in the models based on catch and CPUE.

- It is essential to obtain representative samples of otoliths and other tissues from all major fisheries in all areas. Otoliths, spines and vertebrae can be used to provide direct estimates of the age composition of the catch, thus avoiding the biases associated with determining age from size. Moreover, otolith microconstituent data can be very useful to determine stock origin with relatively high accuracy, and thus could be a key factor to improve our ability to conduct mixing analyses.

West

- The Committee acknowledged that there were several attempts to analyze the historical catch and effort for the West Atlantic data from the Japanese longline fleet by main areas and groups of years presented at past bluefin stock assessments, which include the Gulf of Mexico, the waters off Brazil and the Florida-Bahamas areas from 1960 through the 1980s. Although the Committee notes that further information by mining of the data is unlikely, the Committee welcomed continued work by Japanese scientists to improve their analysis on those historical catch and effort for Japanese longline fleet.

East

- The Group recommends continuing the analysis of VMS data to get better estimates of the spatial and temporal variations in the fishing effort of the main fleets and to obtain an index of abundance of the Mediterranean purse seine fleet through state-space modeling. For that purpose, the Group also recommends that VMS data be provided at the highest temporal resolution (1 hour or less) possible.

Sharks

- The Secretariat, in consultation with the relevant CPCs, should revise Task I catch tables with records flagged as questionable

- CPCs should provide catch statistics (including Task I, task II, and CPUE) of all ICCAT fisheries, and to the extent possible non-ICCAT fisheries, capturing pelagic species, including recreational and artisanal fisheries. Task II C/E and size data in particular are lacking;

- Call for electronic and conventional tagging data to all CPCs conducting such research in the Atlantic. The SCRS Tagging Working Group has developed a form for reporting electronic tagging data to ICCAT.

Small tunas

- All countries should report Task I and Task II data;

- National scientists should review their small tuna catches and try to classify them by species using the ICCAT identification sheets;

- CPCs should report frigate tuna (FRI) catches in the Mediterranean as Bullet tuna (BLT)

WGSAM

- To expedite the completion of the EffDIS revision database, the WGSAM recommends that a Call for Tender be developed to hire a technical expert to assist the Secretariat on a short term basis. The expert would, under the direction of the Secretariat, develop a database of historic and current fishing effort distribution that meets the stated needs of the various Subcommittees and Species Groups. The Group expects that this task could be completed within a 12-month time frame, and should begin no later than spring 2015.

- In the interest of ongoing ICCAT CPC capacity building, the WGSAM recommends a formal course in CPUE standardization be conducted by the Secretariat. Many of the countries who would benefit most from this course do not have sufficient travel funds, and as such, should have their travel supported by the Secretariat.

11. Evaluation of data deficiencies

The Sub-Committee agreed that these deficiencies should be discussed by each species group, particularly by those that conducted an assessment this year (skipjack, bluefin (East and West), and the Sub-Committee on Ecosystems. Information provided by the species groups to the Sub-Committee is reflected in section 18.7 of the SCRS report.

12. Review of existing data submission policy

The current data submission policy is described in SCI-008. The forms (ST-01 to ST-06) have been updated this year and CPCs are reminded to download the most recent versions. Two additional forms were also developed and are now mandatory: 1) Information regarding FAD Deployments (ST-08) and 2) Supply Vessels (ST-07). The Sub-Committee noted that the information included in the FAD Deployment forms are important to facilitate the work of the Tropical Tunas Species Groups, and also noted that it is necessary to capture information from the deployment of both anchored and drifting FADs. Anchored FADs may be used more commonly in the future to support artisanal fisheries, and data from these activities is likely to become an increasingly important source of information.

12.1 Formats (e-FORMS improvements to account with current fishery practices)

Changes to some e-FORMS formats were discussed under Agenda items above.

12.2 Improvements to the ICCAT coding system

Improvements to by-catch reporting codes were developed by the Secretariat and distributed to the Sub-Committee on Ecosystems during its 2014 inter-sessional meeting. They are currently under evaluation by the Sub-Committee on Ecosystems and are expected to be revised (as needed) and accepted in 2015. These improvements shall be reviewed in the future.

12.3 Rules applied to historical data revisions

The Sub-Committee recommended maintaining current requirements for admitting such revisions into the ICCAT data bases.

12.4 Review of deadlines for submitting statistics to SCRS inter-sessional meetings

No revisions were made to submission deadlines, but the Secretariat noted and the Sub-Committee agreed that deadlines, while clearly described, are frequently not met. This lack of compliance complicates and increases the workload of the Secretariat, causes undue stress, and delays the timely provision of information to Species Groups. The Sub-Committee expressed its disappointment that few CPCs have routinely met the data submission requirements, and reiterates that these deadlines are crucial to the function of the Secretariat and the SCRS, and urges the CPCs to comply.

12.5 Other related matters

No other matters were discussed.

13. Review of the inventory of ongoing and recent investments in the tuna artisanal fishery in West Africa area

The ICCAT Scientific Committee (SCRS) has lamented the absence of artisanal fisheries data or their low reliabilities during the different stock assessment sessions, and the most immediate consequence is that the scientific advice intended for the Commissioners is subject to much uncertainty, which hinders management decisions. Therefore, to reduce these drawbacks, ICCAT took the initiative in 2003, by adopting Res. 03-21, to use some of the funds collected from Contracting Parties to help improve the collection of tuna fishery statistics by Parties which do not have sufficient capacity to meet some of their obligations. Moreover, recently, these strategic funds have enabled improved knowledge of small tunas in the countries of some Contracting Parties such as Morocco, Senegal, Côte d'Ivoire and Venezuela. Other Contracting Parties have also benefited from these funds to recover historical data or conduct surveys in the context of the artisanal fishery.

Ten years after implementation of Res. 03-21, ICCAT wished to strengthen its financial assistance strategy by extending it to developing countries through the adoption of Rec. 13-19. However, it has been noted that other international institutions, national cooperation agencies in developed countries, non-governmental organizations and regional fishing bodies act in the artisanal fishing sector with similar objectives but that the various initiatives are not coordinated. The support is technical in nature as hardware, software and other logistic materials are supplied, or courses and training courses are run for people who collect and analyse fisheries data. Investment is also provided for institutional support which aims to build the capacity of States to meet data collection requirements in their fisheries.

To avoid duplication of effort, and to improve the efficacy of the use of these funds, ICCAT wished to conduct a comprehensive inventory – instead of an assessment – of strategic investment in the artisanal fishery data collection system in West Africa. SCI-072 provided the first inventory of this nature for ICCAT.

The Sub-Committee discussed the several new funding opportunities not mentioned in the presentation of SCI-072 and recommended the document be forwarded to the Commission for further discussion and used to provide guidance in deciding the best strategies for future investments into improving the information from the artisanal fisheries affecting tuna and tuna-like species.

14. Other matters

The Sub-Committee reviewed actions taken on the following, which were recommendations made by the Sub Committee in 2013 and provided several additional recommendations to progress the work of the Sub-Committee into the future:

- More focused discussions on artisanal fisheries be conducted inter-sessionally. Strategic investments in the short term may make improvements, but greater discussion made to avoid duplication and improve utility should be undertaken. Generally, artisanal fisheries do not have by-catch or discards and are usually multi-specific. These discussions should draw on expertise of other sub-regional and regional management bodies and evaluate how best to coordinate with other ongoing initiatives.

The Sub-Committee favorably reviewed the report on investigation into current and recent investments by various groups aimed toward improvement of information from artisanal fisheries of West Africa which exploit tuna and tuna-like species. It is obvious from the work described in SCI-072 that multiple and large investments have and are being made, which seem not well coordinated. The Sub-Committee recommends that broader oversight of these programs by groups such as FAO and/or ATLAFCO to improve their efficiency and efficacy.

- A task group be formulated to identify better ways to characterize uncertainty in unquantified aspects of data utilized in assessments. This should be done in a way that builds upon the SCRS capacity to advise the Commission on how this uncertainty impacts the robustness of scientific advice for fishery management that can be provided.

The Sub-Committee noted that a discussion of this topic occurred during the WGSAM meeting, based upon a proposal developed by a task group and provided in SCRS/2014/035. The Sub-Committee recommended broad application of this methodology to species stocks undergoing assessments into the future.

- The Sub-Committee noted that continuing difficulties are experienced due, in some cases, to Statistical Correspondents lacking adequate knowledge and expertise in providing the full dimension of data within the time-frames that CPCs are obliged to produce. The Sub-Committee recommends that CPCs take steps to assure that Statistical Correspondents are fully versed and equipped to meet data reporting obligations and that those individuals attend the Sub-Committee on Statistics Annual meeting, at a minimum.

The Sub-Committee notes that a proposal by the Secretariat to develop web-based training videos was discussed and recommended. It was also noted that in addition to the three official languages, translation into other languages (e.g. Arabic, or others) could facilitate data reporting. The Sub-Committee recommended that in addition to web-based training videos, a series of regional workshops be implemented starting in early 2015 to assure that adequate training in the currently adopted reporting obligations and proper utilization of electronic reporting forms be undertaken.

15. Future plans and recommendations

15.1 2015 Work Plan

The work plan for 2015 is included in item 16.1 of the SCRS report.

15.2 Recommendations

Recommendations with financial implications and other recommendations are included in items 17.1 and 17.2 of the SCRS report.

16. Adoption of the report and closure

The Sub-Committee thanked the Secretariat for their excellent work during the year and acknowledged that high quality work was again achieved in spite of the increasing burden of even greater workloads on staff. However, it was noted that a number of priority items previously identified in need of completion were postponed due to the increasing workload. This is viewed as a lowering of support for the work of SCRS.

The Sub-Committee agreed to adopt the report in the plenary and the meeting was adjourned on 23 September 2014. The Convener thanked all participants for their work.

Appendice 9

REPORT OF THE SUB-COMMITTEE ON ECOSYSTEMS

An Inter-sessional Meeting of the Sub-Committee on Ecosystems was held at the Real Marina Hotel and Spa in Olhão, Portugal, 1-5 September 2014. *The Instituto Portugues do Mare e da Atmosfera* (IPMA) graciously hosted the meeting. Participation at this meeting eclipsed what has been witnessed in the past four years and consequently the body of expertise available to address the work of the Sub-Committee resulted in very fruitful discussions for both the by-catch and ecosystems components of the meeting. During this meeting, the Sub-Committee discussed the following:

Tasks pertaining to by-catch:

1. Review the inputs to the ERA, ensuring the best possible information
2. Review the suggestions made in Section 9.3 and 9.4 of the 2013 Sub-Committee on Ecosystems Report and incorporate these improvements where possible/relevant.
3. Provide revised advice based on the updated ERA.
4. Review seabird by-catch mitigation measures as described in Rec. 11-09.
5. Review observer data reporting forms.

Discussion

New productivity information for sea turtles was provided by several CPCs to improve the Sea Turtle Ecological Risk Assessment (ERA). In addition, the Sub-Committee was made aware of detailed nesting data provided by the International Convention for the Protection and Conservation of Sea Turtles (IAC). We acknowledged the usefulness of this information, and thanked the IAC for their generous collaboration. With regard to the susceptibility of sea turtles to ICCAT fisheries, the Sub-Committee reviewed four SCRS documents, one peer-reviewed publication and a presentation from the Trans-Atlantic Leatherback Conservation Initiative (TALCIN).

The Sub-Committee also briefly reviewed the information compiled and/or provided by CPCs and contractors since our efforts to assess the impact of ICCAT fisheries on sea turtles began in 2012. Since that time, numerous contributions pertaining to by-catch rates, total by-catch, by-catch mitigation, productivity and susceptibility of sea turtles have been provided. In addition, three comprehensive review documents were prepared as a result of the short-term contract awarded to Rui Coelho. The Sub-Committee also discussed the preliminary ICCAT Sea Turtle ERA that was contracted and delivered in 2013. Unfortunately, the scope of that contract did not permit extensive revisions to the ERA, and the SCRS decided that the results were insufficient to inform the Commission at that time. As a whole this body of work represents a significant contribution to the Sub-committee’s effort to assess the impact of ICCAT fisheries on sea turtles. After reviewing the available data and ancillary information, the Sub-Committee agreed that at this time, there was insufficient information to improve the sea turtle ERA developed in 2013. However, the Sub-Committee did agree on a plan to continue to assess the impact of ICCAT fisheries on sea turtles pursuant to [Rec. 10-09]. This plan is discussed in detail in the 2014 Report of the Sub-Committee on Ecosystems.

With regard to seabird bycatch mitigation, the Sub-Committee reviewed one SCRS document and a peer-reviewed document. The Sub-Committee also noted that paragraph 8 of Rec 11-09 requires the SCRS to conduct a review in 2015 of the efficacy of Rec 11-09, and agreed upon a work plan that should be initiated in 2015. This work plan is further described in the 2014 Report of the Sub-Committee on Ecosystems.

Finally, the Sub-Committee agreed upon a set of forms that could be required to report data from the various national observer programs. The Sub-Committee agreed to present these forms to the SCRS for adoption. Once the forms are formally approved, the Sub-Committee strongly recommended that CPCs use these forms to report both current and historical observer data.

Tasks pertaining to ecosystems:

1. Assess the importance of the Sargasso Sea ecosystem to ICCAT species as per Resolution 12-12.
2. Review the progress that has been made in implementing ecosystem approaches in enhanced stock assessments (e.g. multispecies models) or EBFM.
3. Explore environmental factors that affect the global distribution of highly migratory fish and their productivity.

Discussion

The subcommittee reviewed 2 papers speaking to the issue of the importance of the Sargasso Sea ecosystem for ICCAT managed species and related species as per Resolution 12-12. These papers defined both the dependencies of ICCAT species on the ecosystem and their trophic status, as well as contrasted the historical catches within the Sargasso Sea against the total. The subcommittee recognized the value of the information contributed to date but also identified topics towards which future study should be directed.

In reviewing the progress that has been made globally in implementing ecosystem based fisheries management, the subcommittee was presented with an update on the integrated ecological assessment of the Gulf of Mexico ecosystem. Through the experiences of this group, it was recognized that implementation of a management system is facilitated by marrying clear management objectives for elements of an ecosystem with indicators that reflect the state of the system as well as the pressures on it. This philosophy is consistent with that of the subcommittee which has indicated in past sessions the need for clear management objectives from the Commission in order to advance the implementation of the EBFM approach. In order to expedite the process, the subcommittee developed management objectives for four basic elements that ICCAT would have the capacity to manage and it was proposed that they be vetted at the next annual meeting of the Standing Work Group for the dialogue between Science and Managers in 2015.

The impact of environmental factors on the distribution of highly migratory species was demonstrated to the subcommittee through the association between the phases of the Atlantic Multi-decadal Oscillation and the trajectory of relative abundance indices of North Atlantic Swordfish. This analysis stressed the importance of involving environmental variables in the assessments when appropriate and the need to be able to organize the data by geographic area rather than flag.

Appendix 10

2015-2020 SCRS SCIENCE STRATEGIC PLAN

MISSION

The Standing Committee on Research and Statistics (SCRS), on which each member of the Commission may be represented, is responsible for providing scientific advice to the ICCAT Commission.

The SCRS develops all policy and procedures for the collection, compilation, analysis and dissemination of fishery statistics of tuna and tuna-like species in the Atlantic Ocean and adjacent seas; ensuring that the Commission has the most complete and current statistics available concerning fishing activities in the Convention area as well as biological information on the stocks that are fished. The SCRS also coordinates various national research activities, guides and develops plans for special international cooperative research and capacity building programs, carries out stock assessments, and advises the Commission on the need for specific conservation and management measures in support of the Commission's objective of implementing science-based fishery management. The Committee also advises the Commission on such other scientific matters as may be referred to it.

VISION

A Scientific Committee with broad participation of competent scientists all the CPCs that fish tuna and tuna-like species in the Atlantic Ocean and adjacent seas, working cooperatively in an effective and transparent way, with a solid scientific and technical support of the Secretariat, to provide objective, reliable and robust scientific advice to the Commission in support of the Convention objectives.

SWOT ANALYSIS

Strengths

- Transparency
- Openness
- International collaboration-cooperation
- Welcomes diversity of participation
- Diversity of the analytical approaches
- Secretariat support
- High scientific competence
- Credibility and international recognition
- Open to innovation
- Open to dialogue
- Independence
- Adaptability

Weaknesses

- Low attendance in many cases
- Insufficient technical capacity in some areas
- Heavy workload leading to inefficiencies in organization intra-SCRS and mismatch between the COM requests and the SCRS capacities
- Insufficient financial support
- Insufficient quantity and quality of data in many cases
- Gaps in data collection in many cases
- Lack of "critical mass" especially in view of increasing workload. Insufficient dialogue and channels of communication with the COM
- Limited specific guidance from the COM regarding management goals and risk tolerances
- Limited standardized products to provide information and advice to the COM
- Language barriers

Opportunities

- Scientific collaboration and coordination among CPCs
- Broader participation from G77 countries
- Collaboration with other tRFMOs
- Collaboration with other organizations
- Peer review of stock assessments and science of the SCRS
- Broader external support to the work of the SCRS
- Use of new technologies
- Funding opportunities
- Support from the commission
- Improvement of fishery statistics & methods
- Broader dissemination of scientific results

Threats

- Reduced financial support
- Increase in demands to the SCRS with fewer resources
- Reduced contribution from CPCs in SCRS (participation, research, data collection)
- Low priority/value attached to science (application of science) in some jurisdictions
- Insufficient support for science activities from the Secretariat
- Incidence of regulations in the collection of required data and information
- Lack of scientific interest on the SCRS matters from the scientific community
- Potential lack of expertise in expanded interest areas of the Commission
- Focus efforts on a limited number of stocks
- Undue influence by stakeholders, ideological or political pressure or by economic or financial interests groups

VALUES

I	**INTEGRITY**: The SCRS applies the highest ethical standards to all its scientific work. **INDEPENDENCE**: The SCRS provides advice that is objective and based on the best scientific information available and not unduly influenced by stakeholders, ideological or political pressure groups or by economic or financial interests.
C	**COOPERATION**: The SCRS values and encourages the participation of scientists from all CPCs, acting through scientific collaboration and cooperation to cultivate a diverse set of expertise and to promote best available scientific practices.
C	**COMMITMENT**: We are totally committed to provide the best scientific advice in support of the Commission's objective of implementing science-based fishery management.
A	**ABILITY**: The SCRS strives to ensure the work of the Committee conforms to the highest scientific standards and state of the art methodologies, constantly improving the foundation of knowledge to support the mandate.
T	**TRANSPARENCY**: The SCRS conducts its work in open sessions and encourages the participation of national scientists and external experts; the information, analyses and decision-making process are well-documented and easily accessible to all interested parties.

GOALS, OBJECTIVES AND STRATEGIES

DATA COLLECTION

GOAL 1 **IMPROVE FISHERY DATA COLLECTION AND REPORTING FROM ALL FISHERIES THAT CATCH TUNA, TUNA-LIKE AND OTHER SPECIES UNDER PURVIEW OF THE COMMISSION IN THE AREA OF THE CONVENTION. TO HAVE A REPRESENTATIVE VIEW OF WHAT IS ACTUALLY HAPPENING IN THE FISHERY, SO THAT THE STOCKS CAN BE PROPERLY EVALUATED**

OBJECTIVES

1.1 Strengthen the collection of High Quality Task I and II data and to address data gaps that are identified

Strategies

1.1.1 Analysing the effectiveness of existent Recommendations and Resolutions for improving data bases in support of the provision of scientific advice and recommend improvements to enhance effectiveness, as needed.

1.1.2 Collaborating with other tuna RFMOs and research institutes with tuna interests to assure that best practices are in place.

1.1.3 Refining protocols for data collection and species identification for target species and bycatch species (commercial and non-commercial) from industrial fishing fleets and non-industrial forms.

1.1.4 Designing and conduct data evaluation meetings on a regular basis, to review data quality, geographic resolution and misreporting of catches and landings through direct interaction with data providers.

1.1.5 Investing in capacity building and cooperation to improve both the quantity and quality of the collected data to ensure collection of enough data to have a representative view of what is actually happening in the fishery, so that the stocks can be properly evaluated.

Measurable targets

- A 20% reduction in missing or lacking data items in the Secretariat's annual report on statistics.
- List of specific data elements that are lacking for each stock over a 5-year span.

1.2 Improve resolution and precision of total catch composition and distribution and fishing effort data across CPCs

Strategies

1.2.1 Demonstrating through simulation modelling, improvement in precision of estimates of exploitation with different levels of information and cost/benefits of collecting such data.

1.2.2 Pursuing broad-based application of electronic monitoring systems and other automated data collection methods which provide near real-time data on catch/effort by: i). Monitoring the experiences already in place in tuna fleets, ii). Proposing minimum requirements for electronic monitoring.

1.2.3 Utilising VMS data for all tuna fisheries for which VMS is required in the Convention Area at the highest temporal resolution possible (1 hour or less) by i). Advocating for adoption by the Commission, collection and recording of VMS data at 1 hour resolution as a minimum, and ii). Obtain access to high resolution VMS data through national scientists or through the Secretariat.

1.2.4 Compiling comprehensive data on floating object sets (especially on FADs) and on fishing operations by i). Cooperating with the industry for obtaining detailed FAD information (historical and present), under agreed confidentiality rules, ii). Proposing and adopting revisions to confidentiality protocols as needed.

Measurable target

- Fishery catch/effort maps at 1x1^{o} resolution, by month by major gear type by 2020, in support of fine scale (time and space) fishery management advice.

1.3 Improve the fulfilment of the CPC´s data reporting obligations

Strategies

1.3.1 Discouraging provision of low/no quality data by i) Clearly identifying and communicating best practices for data collection and reporting, ii) Strengthen mechanisms to highlight providers of "good" vs "bad" data, iii) As needed, work directly with CPCs to identify methods to address data collection/reporting inadequacies and employ strategic investments to overcome inadequacies, and iv) advocating adoption of recommendations towards "no data, no fish".

1.3.2 Implement quality characterisation methodology with which to inform CPCs of inadequacies in data quality provided to the Secretariat and to inform the Commission on the adequacy of the information available for formulating management advice.

1.3.3 Investing in capacity building and cooperation to improve both the quantity and quality of the collected data to ensure collection of enough data to have a representative view of what is actually happening in the fishery, so that the stocks can be properly evaluated.

Measurable target

- 20% reduction in of non-compliance with CPC reporting obligations according to Secretariat's compilation report within 5 years.

GOAL 2 **INSTITUTE BIOLOGICAL SAMPLING PROGRAMS COMMENSURATE TO THE NEEDS FOR THE ASSESSMENT OF THE DIFFERENT STOCKS UNDER THE CONVENTION**

OBJECTIVES

2.1 Identify the types of biological data that is needed (stock structure, growth, maturity, fecundity, etc.) for the assessment of the different stocks

Strategies

2.1.1 Using approaches such as MSE to determine the relative value of collecting different types of data / information to evaluate stock status and productivity.

2.1.2 Advising the Commission with regards to the types and quality of data that should be required from CPCs. Identify through Ecological Risk Assessments, stocks for which improvements in biological information are necessary for assessing stock status.

2.1.3 Identify through Ecological Risk Assessments, stocks for which improvements in biological information are necessary for assessing stock status.

Measurable target

- Application of MSE to the main ICCAT stocks to evaluate biological data needs by 2018 & Conduct Ecological Risk Assessment (ERAs) for those species for which lack of information prevents quantitative assessments of stock status, by 2020.

2.2 Elaborate sampling designs and evaluate the representativeness of samples of length (age) needed for each stock

Strategies

2.2.1 Demonstrate, through simulation modelling, the sampling required of a stock to achieve sufficient levels of precision in estimates of exploitation.

Measurable target

- Sampling designs for all the main stocks under Commission responsibility elaborated by SCRS by 2020.

2.3 Develop coordinated biological sampling programs for ICCAT stocks

Strategies

2.3.1 Institute regular and representative collections of biological samples as necessary to determine the age and stock structure of the catch to reduce the uncertainties.

2.3.2 Cooperate with National Scientists and CPCs to develop appropriate biological sampling programs for ICCAT stocks.

2.3.3 Dedicate more effort and budget by ICCAT CPCs toward programs for collecting biological information necessary to more fully characterise stock status.

Measurable target

- Increase of 50% in biological sampling programs within a 5-year time frame.

GOAL 3 DEVELOP PROGRAMS FOR THE COLLECTION AND COMPILATION OF ADDITIONAL DATA NECESSARY TO IMPROVE THE SCIENTIFIC ADVICE TO THE COMMISSION

OBJECTIVES

3.1 Develop a comprehensive bycatch & observer data set

Strategies

3.1.1 Identifying the extent of the fisheries that catch tuna and tuna-like species for which CPCs should report catch and bycatch data, e.g. specify, shark and other species for which catch, effort, and size (age) data must be reported.

3.1.2 Defining standardised and flexible forms for reporting bycatch with an associated comprehensive electronic form, ensuring the form is consistent with a data base structure that allows CPCs to report bycatch at levels of aggregation in a way that ensures data confidentiality rules are met.

3.1.3 Compiling and maintain meta-data on observer programs and observer data collected by CPCs. Implement mandatory reporting of observer data collected by CPCs.

3.1.4 Enhancing coordination between the CPC's to cover the objectives of observer data collections. Conduct regular reviews of data provided through joint analysis and working group discussions.

3.1.5 Including in the national observer sampling programs the collection of gear and vessel characteristics, and other information, that can be used to standardise CPUE and estimate fishing capacity and changes in effective fishing effort.

3.1.6 Improving estimation of dead and live discards through collection of comprehensive data on total catch composition and disposition through observer (human and/or electronic, as appropriate).

Measurable target

- Representative observer and bycatch data set from 80% of the ICCAT fleets by 2020 and evidence of increase in analyses of CPC observer data through the number of papers submitted to SCRS annually.

3.2 Elucidate data needs for Provision of Ecosystem Based Fishery Management Advice

Strategies

3.2.1 Defining data collection needed for the implementation of EBFM through application of integrated ecosystem models to identify key ecosystem components which need to be monitored in order to more broadly apply EBFM.

3.2.2 Include in the national sampling programs the collection of socio-economic information from the large pelagic fisheries by developing protocols for the collection of socio-economic data for large pelagic fisheries and upgrading ICCAT databases to include data other than biological data.

Measurable target

- Developing protocols for the collection of socio-economic data. Application of Integrated ecosystem models.

DIALOGUE AND COMMUNICATION

GOAL 1 **IMPROVE THE DIALOG WITH THE COMMISSION**

OBJECTIVES

1.1 Elevate science-management dialogue in support of defining critical elements of the decision framework policies of Rec [11-13]: "high probability" and "as short a period as possible"

Strategies

1.1.1 Implementing the Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers (SWGSM) [Rec. 13-18].

1.1.2 Promoting dialogue of SCRS scientists with their CPCs or Regional Organizations, enabling greater coordination and capacity.

1.1.3 Fully utilising possible GEF-ABNJ funding intended to promote such dialogue.

1.1.4 Focusing on stocks which give cause for concern while management advice is sought for those stocks.

Measurable target

- To provide mechanisms to the Commission so as to be able to adopt probabilities and deadlines for stocks before 2020 (50% percent of cost to be covered by GEF/ABNJ project).

GOAL 2 **PROMOTE OPEN DIALOG WITH THE COMMISSION AND INTERESTED PARTIES**

OBJECTIVES

2.1 Institute periodic meetings with decision makers, SCRS scientists, and stakeholder with more opportunity for free interchange (i.e., not in the usual Commission format)

Strategies

2.1.1 Instituting periodic meetings with Commissioners and stakeholders to discuss how they can tangibly contribute their knowledge of the fishery to the assessment.

2.1.2 Encouraging participation in the meetings by industry, NGOs and other stakeholders.

2.1.3 Taking advantage of the GEF/ABNJ funding offered to ICCAT in support of MSE conduct and in support of conducting dialogue with Commissioners and stakeholders.

Measurable target

- An SCRS-COM stakeholders meeting in the format of the SCRS Working Groups (50% percent of cost to be covered by GEF/ABNJ project).

GOAL 3 IMPROVE THE DIALOGUE WITHIN THE SCRS

OBJECTIVES

3.1 Increase interaction between SCRS officers

Strategies

3.1.1 Encouraging participation of SCRS officers in regular and intersessional meetings of the Sub-Committees (Statistics and Ecosystems) and Stock Assessments Methods Working Group.

Measurable targets

- 100% SCRS officers participate in the SCSTAT meetings.
- 100% of SCRS officers participate in the annual coordination meeting.

3.2 Develop better dialog between the working group chair and potential participants

Strategies

3.2.1 Submitting work documents to the Secretariat in advance of the meetings.

3.2.2 Based on the group's response, the Chair will ensure that the appropriate time will be given to the relevant documents within the framework of the meeting agenda.

3.2.3 The documents will be made available before the meeting to registered participants.

3.2.4 Promoting work with all intersessional participants.

3.2.5 Committing the participants in the work to performing the intersessional tasks**.**

Measurable targets

- Broader participation in the working group reports.
- Develop a protocol for the submission of documents prior to meetings.
- 100% of the work plans established (containing deadlines, allocated responsibilities, framed within the strategic plan, subject to financial and technical conditions).

GOAL 4 IMPROVE THE DIALOG WITH THE SCIENTIFIC COMMUNITY

OBJECTIVES

4.1 Strengthen linkages and collaboration with other Tuna Regional Fishery Management Organizations (tRFMOs)

Strategies

4.1.1 Increasing the scientific exchange between the SCRS with other RFMOs.

4.1.2 Prioritising the participation of scientists from other tRFMOs as guest experts or as peer reviewers.

4.1.3 Promoting inter-tRFMO meetings on areas of common interest (species, assessment methods, data acquisition, etc.), taking advantage of other fora in which best practices are being discussed. Such as ISSF stock assessment workshops.

4.1.4 Supporting the processes arising from Kobe of the Bycatch and MSE groups.

Measurable targets

- Broader participation in the working group reports.
- External experts or scientists from other tRFMOs will participate in five SCRS meetings up to 2020.
- An inter t-RFMOs meeting on an area of common interest before 2020.

4.2 Strengthen linkages and collaboration with ICES

Strategies

4.2.1 Extending the cooperation to all the shared shark species in all areas of mutual interest (e.g. assessment methods).

4.2.2 Encouraging the participation of the Chairs of the ICES and ICCAT shark groups in the assessment meetings of both organisations.

4.2.3 Communicating to the scientists of ICCAT CPCs the ICES agendas for the purposes of encouraging their participation.

Measurable target

- Number of meetings with joint participation of ICES-ICCAT.

4.3 Collaborate with a peer-reviewed journal to enhance communication of SCRS science products to the scientific community

Strategies

4.3.1 Seek out a scientific journal that encourages peer-reviewed articles on a variety of topics.

4.3.2 Considering a dedicated tRFMO peer-reviewed journal.

Measurable target

- Partner with at least one peer-reviewed annual publication.

4.4 Promoting the dialogue and communication between CPCs in order to carry out scientific research on ICCAT fishery resources in a coordinate and efficient way

Strategies

4.4.1 Use the funding programs to develop capacity, research and cooperation between the CPCs, preferably intra-regionally.

4.4.2 Use the opportunities afforded by the special fund (SCBF) in accordance with Rec. 13-19.

Measurable targets

- Full utilisation of the Scientific Capacity Building Fund (SCBF) throughout the period of the plan.
- 10 collaborative papers on a regional scale to be submitted to the SCRS groups.

GOAL 5 **IMPROVE THE DIALOG WITH THE SOCIETY**

OBJECTIVES

5.1 Broad dissemination of the results of the SCRS work to the society as a whole

Strategies

5.1.1 Defining dissemination procedures.

Measurable target

- A mechanism in place by 2020.

GOAL 6 IMPROVE THE MECHANISMS OF COMMUNICATION OF THE SCRS

OBJECTIVES

6.1 Work on the Ontology of the durability of tuna fisheries in the epipelagic ecosystem

Strategies

6.1.1 Utilising ontological methods of process analysis to share basic concepts and a clear representation of the SCRS missions among the various groups (scientific, administrative, NGO, fishers' organizations), and for decision-making, specifically employing an MSE approach.

6.1.2 It is proposed to set up an ad hoc working group, related to the WGSAM, contracting an expert in ontological engineering (i.e. in graphic or textual representations) to analyse and represent the ontologies of the main SCRS missions (diagnosis and uncertainty, selection process of regulatory measure, an ecosystem approach to fisheries).

6.1.3 Graphical representation (conceptual map, mind map, etc.) of the process of information flows or interconnections, from data collection through to the final objective, could provide clarification. This would then facilitate dialogue and integration of groups from various disciplines (fisheries, ecology, socio-economics) regarding the concepts used, knowledge, responsibility and point of intervention of each of them, as well as time management of the different SCRS tasks from an MSE approach, etc.

Measurable target

- No measurable target has been identified.

PARTICIPATION AND CAPACITY BUILDING

GOAL 1 PRESERVE AND PROMOTE THE INDEPENDENCE AND EXCELLENCE OF THE SCRS AND ITS WORKING GROUPS

OBJECTIVES

1.1 Avoid conflict of interests and ensure the independence of the scientific process

Strategies

1.1.1 Adopting, publishing and implementing SCRS rules, including a code of conduct for scientists and for observers.

Measurable target

- Code of conduct of the SCRS by 2016.

GOAL2 IMPROVE SCIENCE CAPABILITIES OF THE SCRS OBJECTIVES

OBJECTIVES

2.1 Increase the capacity of the CPCs in meeting data-related obligations

Strategies

2.1.1 Developing programs to assist CPCs in meeting data-related obligations;

2.1.2 Continuing training on basic data collection and concept of representative sampling, preferably on site when feasible;

2.1.3 Increasing financial support to the CPCs monitoring and data collection;

2.1.4 Developing a strategy of observer's system improvement by training, monitoring and evaluation system.

Measurable target

- 20% reduction in Secretariat's annual report on statistics list of specific data elements that are lacking for each stock over a 5-year span.

2.2 Increase the ability of the SCRS in the application of methods used in providing management advice on tuna stock management

Strategies

2.2.1 Evaluating the use of funds currently available and evaluate the efficacy of the training activities conducted by the Secretariat and the SCRS in the recent years.

2.2.2 Defining standardised curriculum contents required to increase the abilities of the SCRS according to the needs required.

2.2.3 Working with CPCs to develop and promote undergraduate and graduate level curricula in quantitative fishery science.

2.2.4 Organising regular training courses, workshops, webinars and on-line courses.

2.2.5 Developing audiovisual, multimedia, electronic training material adapted to the curriculum contents defined.

2.2.6 Evaluate the value of the training programs conducted.

2.2.7 Bringing experts to meetings when there are clear and identified needs for the improvement in the knowledge/ability amongst participants in order to meet Commission objectives.

2.2.8 Attending meetings in other fora where contact can be made with experts in areas where the SCRS has deficiencies.

2.2.9 Developing and enhancing synergies and coordination of capacity-building initiatives.

Measurable target

- 5 courses are conducted and the training materials are openly available on the website.

GOAL 3 ENHANCE AND IMPROVE PARTICIPATION IN THE SCRS, AND IN PARTICULAR ENHANCING THE ACTIVE INVOLVEMENT OF DEVELOPING ECONOMIES IN THE SCRS ACTIVITIES

OBJECTIVES

3.1 Ensure the participation of scientists from those CPCs that harvest significant portions of the stock

Strategies

3.1.1 Advocating a mandatory participation for CPCs that catch >10% of the total catch of a given stock.

3.1.2 Note the participation of scientists by CPC in the elaboration of the scientific advice.

Measurable target

- 100% participation of the CPCs that harvest significant portions of the stock.

3.2 Increase scientific leadership for SCRS by scientists from G77 economies

Strategies

3.2.1 Emphasizing the need for cross-cultural leadership in the SCRS with Commissioners.

3.2.2 Recruiting aspiring individuals from amongst G77 scientists attending SCRS meetings.

3.2.3 Seeking possible special 'capacity building' funding support for time & travel for G77 scientists to serve in leadership positions.

3.2.4 Establishing mentoring programs specifically targeted at aspiring G77 scientists using vice-Reporter positions where appropriate.

Measurable target

- At least 30% of the SCRS officers belong to G77 countries.

3.3 Increase scientific participation in SCRS by scientists from G77 economies

Strategies

3.3.1 Supplementing travel/participation funding of G77 CPC scientists at intersessional and plenary.

3.3.2 Sponsoring long-term training at one or more national laboratories.

3.3.3 Initiating collaborative research projects with G77 scientists leading to SCRS/white journal papers.

Measurable targets

- 33% increase in scientific participation at the SCRS by scientists from G77 economies.
- Supplementing travel/participation funding: 10 participations funded per year.
- Long-term training of at least 6 scientists from G77 economies.
- Initiate 3 collaborative projects with the involvement of scientists from G77 economies.

RESEARCH PRIORITIES

GOAL 1 **QUANTIFY THE MAJOR UNCERTAINTIES AFFECTING STOCK ASSESSMENT AND MANAGEMENT ADVICE**

OBJECTIVES

1.1 Identify the major uncertainties affecting management advice and the type of research needed to address them

Strategies

1.1.1 Compile metadatasets about biological and fishery data that will allow characterisation of quality of data as well as identification of knowledge gaps.

1.1.2 Conduct meta-analyses and reviews on the knowledge about biological parameters, fishery data, data processing and assumptions during the assessment process.

1.1.3 Conduct surveys within the SCRS with specific questionnaires to characterise the expert opinion on the main uncertainties.

Measurable targets

- Metadatabase for fishery, biologial and mark recapture data.
- At least one cooperative SCRS or peer reviewed research paper for each main specie identifying the main sources of uncertainty and ranges for different (e.g. biological) parameters.

1.2 Quantification of the relative importance of the different uncertainties and prioritisation of future research

Strategies

1.2.1 Developing simulation frameworks (MSE-style approach) for all main species or group of species, that allow the testing of the cost/benefits of different research activities (e.g., How much of the biology do we need?).

1.2.2 Developing (and/or updating) research plans for each specie or group of species, accordingly.

1.2.3 Prioritising according to socio-economic importance and stock status.

Measurable targets

- Simulation approach developed for each main species.
- At least one collaborative SCRS or peer reviewed research paper describing the relative merits of different research actions, for each main species.

GOAL 2 **ACQUIRE THE NECESSARY BIOLOGICAL KNOWLEDGE IN TUNA AND TUNA-LIKE SPECIES, AS WELL AS IN CRITICAL BY-CATCH SPECIES COMMENSURATE TO THE NEEDS FOR THE ASSESSMENT OF THE DIFFERENT STOCKS UNDER THE CONVENTION**

OBJECTIVES

2.1 Get accurate biological knowledge on stock structure, migrations and life history (growth, maturity, fecundity, maternal effects, etc.)

Strategies

2.1.1 Identifying biological knowledge gaps within the species working groups.

2.1.2 Promoting joint collaborative analyses of sparse biological datasets.

2.1.3 Designing and execute biological research programs.

2.1.4 Evaluating spatio-temporal patterns in fisheries data.

2.1.5 Summarising the outcome of the research programs by characterising the estimated biological parameters and their variability.

Measurable target

- Development of peer reviewed papers describing new biological findings.

GOAL 3 **IMPROVE THE STANDARDISATION OF THE FISHERY DEPENDENT INFORMATION**

OBJECTIVES

3.1 Develop measures of fishing capacity and standardized fishing effort for different fleets

Strategies

3.1.1 Agreeing, within the WGSAM, methodologies to quantify fishing capacity and standardised fishing effort.

3.1.2 Expanding EFFDIS estimates for PS, GN and other fleet/gears.

Measurable targets

- Develop SCRS documents and WGSAM reports on the methodologies to quantify fishing capacity and standardised fishing effort.
- EFFDIS database expanded to PS, GN and other gears, available at the website.

3.2 Further improve standardization of CPUEs for their use as reliable indices of abundance

Strategies

3.2.1 Developing standardised categories for different gear configurations/fishing strategies.

3.2.2 Continuing investigating alternative methods to standardise CPUEs and their relative merits/efficiency under different circumstances (changes in catchability due to changes in gear configuration, environmental influences, etc.).

3.2.3 Developing collaborative efforts to perform standardisations across national fleets.

3.2.4 Developing the quantitative basis for the potential use of floating objects to monitor relative abundance.

Measurable targets

- SCRS or peer reviewed paper on best practices to standardize CPUEs of different nature.
- Peer reviewed paper on the use of floating objects to monitor relative abundance.

GOAL 4 APPLY APPROACHES WHICH PROVIDE INFORMATION ON POPULATION DYNAMICS INDEPENDENT OF DATA FROM THE COMMERCIAL FISHERY

OBJECTIVES

4.1 Increase availability of fishery independent information to improve stock assessment and monitor the effect of management regulations

Strategies

4.1.1 Dedicated workshop on fisheries independent information for ICCAT (state of the art, as well as future development).

4.1.2 Fisheries independent indices of abundance (e.g. based on acoustics, aerial observations, egg-larvae surveys, scientific fishing, or other), should be sourced and projects to improve this information should be supported.

4.1.3 Implementing and/or continuing large-scale tuna tagging programs in support of developing fishery management advice (abundance, migration, mortality, etc.).

Measurable targets

- Development of report about dedicated workshop with specific recommendations on how to move forward.
- Increased number of peer reviewed and SCRS papers with the outcomes of fisheries independent research surveys.
- Develop and document experimental designs for mark-recapture surveys of key ICCAT species.

GOAL 5 BALANCE THE ADEQUACY BETWEEN MODELS USED AND QUALITY OF DATA AND KNOWLEDGE

OBJECTIVES

5.1 Develop guidelines and robust methodologies that can cope with a range of different situations, including data poor ones

Strategies

5.1.1 Dedicated workshop or contract to develop general guidelines, based on first principles, on best practices for the range of data qualities observed in ICCAT stocks.

5.1.2 Development of simulation frameworks to test the effects of alternative modelling approaches for different data qualities.

5.1.3 Collaborate with other institutions that work with the same goals.

Measurable target

- Identification and/or development of SCRS or peer reviewed papers on best practices and robust methodologies.

GOAL 6 EVALUATE MANAGEMENT MEASURES AND STRATEGIES IN ACHIEVING THE OBJECTIVES OF THE COMMISSION

OBJECTIVES

6.1 Quantify the effects of adopted as well as potential alternative management measures

Strategies

6.1.1 Develop MSE and other simulation frameworks for ICCAT tuna stocks that allow to test alternative management measures/strategies.

6.1.2 Apply such frameworks to quantify the effects of already adopted management measures.

6.1.3 Apply such frameworks to test candidate management strategies in consultation with the Commission.

Measurable target

- Development of SCRS and peer review papers with the effects of existing and alternative management measures/strategies.

GOAL 7 COVER RESEARCH NEEDS SO AS TO BE ABLE TO INCLUDE ECOSYSTEM CONSIDERATIONS IN THE PROVISION OF SCIENTIFIC ADVICE

OBJECTIVES

7.1 Identify and fill knowledge gaps so as to be able to provide scientific advice including ecosystem considerations (e.g. assessment of bycatch species, mitigation strategies, environmental effects on population dynamics, fishing impacts on the ecosystem, socio economic aspects, etc.)

Strategies

7.1.1 Assessing the adequacy of existing ecosystem indicators in other forums and / or development of new indicators.

7.1.2 Subcommittee on Ecosystems and Bycatch to list the specific research needs and develop prioritised research plans.

7.1.3 Subcommittee on Ecosystems and Bycatch to organise specific workshops (e.g. on tropical tuna issues including moratorium effects, mitigation aspects, multispecies stock assessments, FAD effects and management plans, etc.).

7.1.4 Enhancing participation of researchers from different disciplines (oceanography, climate, socioeconomics, etc.) in the SCRS process (especially on the Subcommittee on Ecosystem and Bycatch) by invitation and appointment of specific tasks.

Measurable targets

- Development of WG reports with specific Research Plans.

- Increasing number of people by research discipline participating in the SCRS.

STOCK ASSESSMENTS AND ADVICE

GOAL 1 **PROVIDE OBJECTIVE, RELIABLE AND ROBUST SCIENTIFIC ADVICE TO THE COMMISSION IN SUPPORT OF THE CONVENTION OBJECTIVES (VISION)**

OBJECTIVES

1.1 Integration of the different forms of uncertainties (e.g. natural variability and or lack of knowledge) in status diagnoses and projections

Strategies

1.1.1 Develop effective methods to integrate the sources of uncertainties into the stock assessment process and results.

1.1.2 Better utilisation of data preparatory meetings to quantify, prioritise, and integrate uncertainties identified in the previous assessment process.

1.1.3 Providing simple criteria could be used by the different working groups to start scoring the quality of the information used in different stock assessments.

1.1.4 Developing criteria to evaluate the importance of the different data elements depending on the life history and/or assessment model used.

1.1.5 Developing a meta-database with information on the quantity and quality of available fisheries, biological information, and mark-recapture data.

1.1.6 Utilising tables/plots as presented at the 2014 WGSAM, in an effort to be consistent with the resolution 13-15.

Measurable targets

- Development of a more standardised Terms of Reference for the Data Prep Meetings (and Assessment meetings?) that include a more complete analysis of the advice and uncertainty from the previous assessment.
- Further evaluate the quality of the fisheries data and related to the knowledge of the species.

1.2 Provide scientific advice using methods of analysis that are appropriate for the amount of information available for a given stock

Strategies

1.2.1 Applying MSEs to determine most parsimonious and robust assessment approaches and control rules to use given current and likely future information levels/data quality.

1.2.2 ICCAT continuing to build staffing levels to support the data needs of more sophisticated stock assessment models.

1.2.3 The SCRS should continue to participate in the ICES SISAM initiative in order to further promote collaborative work in developing assessment methodologies.

1.2.4 Establishing a dialogue with the Commission on the future role of the Secretariat and CPCs in the conducting of future assessments.

1.2.5 Conducting the meetings of the WGSAM next to already established meetings of the same topic in an effort to cultivate outside interactions.

1.2.6 Encouraging CPCs to provide sufficient access to CPUE set-by-set data according to the needs and priorities identified by the different species groups and the subcommittees; use of the existing “cloud” opportunities.

1.2.7 Developing protocols for utilising robust population indicators annually for species which are not necessarily being assessed.

Measurable target

- Conduct a meeting between the Commissions and CPC to discuss the future roles of the CPCs and the Secretariat in future assessments.

1.3 Consolidate the stock assessment catalogue to ensure the best use of models that should be fully documented

Strategies

1.3.1 Update the current stock assessment catalogue to remove outdated software and update the software versions that are currently being used.

1.3.2 Ensure that all software used in the most recent assessments are matched up with the versions in the catalogue.

1.3.3 Ensure that software is well documented and have an accompanying user's manual and code.

Measurable targets

- Reactivate the Working Group of the Stock Assessment Catalogue and review the protocols of inclusion and updating the software used for stock assessments while maintain a historic repository of version control.

1.4 Improve Stock Assessments by incorporating improved information on fishery and life history characteristics

Strategies

1.4.1 Encourages CPCs to provide limited access to CPUE set-by-set data according to the needs and priorities identified by the different species groups and the subcommittees; use of the existing "cloud" opportunities.

1.4.2 Quantification of exactly how much more information constitutes "improved".

1.4.3 Addressing uncertainties in stock assessment by incorporating improved information on life history characteristics: fecundity, age composition of catch, growth, stock structure, and spatial distribution patterns of the stocks of concern.

1.4.4 Expand the aforementioned meta-database to other tRFMOs for comparisons across ocean basins.

Measurable targets

- A written plan of how the data will be collected, stored, shared, and utilised and for exactly what purposes by 2015.
- Use an MSE approach to quantity the sample sizes needed to improve the information.

1.5 Strengthen peer review process

Strategies

1.5.1 Ensuring financial support for the SCRS's plans to implement a peer review system.

1.5.2 Inviting outside experts (e.g., from other RFMOs or from academia) to participate in the SCRS activities, particularly for stock assessments.

1.5.3 Publishing the SCRS scientific findings in the scientific peer-reviewed literature.

Measurable target

- Conduct a peer review of at least one assessment each year.

GOAL 2 EVALUATE PRECAUTIONARY MANAGEMENT REFERENCE POINTS AND ROBUST HARVEST CONTROL RULES THROUGH MANAGEMENT STRATEGY EVALUATIONS

OBJECTIVES

2.1 SCRS should continue to evaluate precautionary management reference points and robust harvest control rules through management strategy evaluations

Strategies

2.1.1 Determining and characterising major sources of scientific uncertainty in the assessment of ICCAT's stocks and fisheries.

2.1.2 Developing operating models to examine the impacts of these sources of uncertainty on management advice.

2.1.3 Conducting management strategy evaluations to determine most robust harvest control rules given scientific uncertainty.

2.1.4 Testing precautionary harvest controls rules (e.g. targets and limits) using MSE and make recommendations for use of these measures for ICCAT stocks.

Measurable targets

- Establish a 5 year schedule for the establishment of species specific HCRs which will include a default HCR in the absence of species specific information.
- Produce a review of MSE efforts so far in light of successes, lack of successes and the resources limiting future MSE progress and to collate feedback from managers and stakeholders on the process thus far.

2.2 Provide advice on the setting of precautionary approach and harvest control rules to avoid overfishing and decline of stocks as well as rebuild overfished and depleted stocks.

Strategies

2.2.1 Carrying out directed studies and workshops to discuss and develop harvest control rules with reference points that achieve stated Commission objectives.

2.2.2 Engaging other scientific bodies and RFMOs in the development of HCRs and LRPs.

Measurable targets

- Establish a 5 year schedule for the establishment of species specific HCRs which will include a default HCR in the absence of species specific information.
- Advocate the establishment of a standardised precautionary approach limit to be used as a default in the absence of more specific limits.
- Conduct at least one workshop on the use of MSE to evaluate harvest control rules to be held jointly with other RFMOs.

GOAL 3 ADVANCE ECOSYSTEM BASED FISHERY MANAGEMENT ADVICE

OBJECTIVES

3.1 Focus on the fishery and its role in the ecosystem, including the commercial and non-commercial species as well as the habitat.

Strategies

3.1.1 Through a dialogue with the Commission, determining and making clear the Commission EBFM Goals and Objectives.

3.1.2 Identifying the major ecosystem correlates and drivers of the various ICCAT stocks under consideration.

3.1.3 Creating testable hypotheses relating these ecosystem drivers to various life history parameters (recruitment, growth, migratory patterns, etc.) for incorporation into stock assessments either directly or indirectly.

3.1.4 Creation of a research effort to quantify and monitor in time and space (to the extent possible) the forage base for the various ecosystem functional groups under ICCAT consideration.

Measurable targets

- Create a proposal of possible EBFM goals and objectives to the Commission referring to those currently used by other RFMOs that are further along in this process.
- Support a post-doc or similar position to establish as ecosystem (multi-species, multi-functional group) operating model that can be used to test the afore mentioned hypotheses.

3.2 Enhance the Ecosystem Approach to Fisheries Management (EAFM)

Strategies

3.2.1 Organising workshops to review, evaluate, and develop EAFM plans relevant to the tuna fisheries in the ICCAT Convention area.

3.2.2 Supporting dialogue on Integrated Ecosystem Assessment approaches within and between the RMFOs.

3.2.3 Taking advantage of the GEF/ABNJ funding that ICCAT will receive for this purpose.

3.2.4 Defining data collection needed for the implementation of EBFM through application of Integrated ecosystem models to identify key ecosystem components which need to be monitored in order to more broadly apply EBFM.

Measurable targets

- Host a workshop and invite outside expertise to collaborate with the Sub-Committee of Ecosystems to determine an effective approach to the creation of an ESR.
- In line with other RMFO, compilation of an Ecosystem Status Report that describes the current state and trends in selected ecosystem indicators for communicating this information to participating scientists and managers.

3.3 Develop short term, medium and long-term objective to enhance ecosystem based approaches

Strategies

3.3.1 Determining a list of relevant ecosystem indicators that could be included in ICCAT stock assessments.

3.3.2 Formally and explicitly include these indicators into current stock assessments to the extent they are appropriate and constitute an improvement to the assessment.

3.3.3 Developing management advice that incorporates and considers these critical indicators.

3.3.4 Applying Integrated Ecosystem Based Approaches to the ICCAT Convention Area.

3.3.5 Conducting a meta-analysis of year/area effects on ICCAT species abundance.

Measurable target

- Conduct a metaanalysis of year/area effects on ICCAT species abundance with the goal of determining historic and recent changes in the spatial distribution of these species, possible regime shifts in productivity, and other relevant characterisations.

GOAL 4 BROADEN THE SCIENTIFIC ADVICE TO INCLUDE ECONOMIC AND SOCIAL ASPECTS OF VARIOUS MANAGEMENT MEASURES

OBJECTIVES

4.1 Development and testing of bio-economic modeling approaches and Identification of data needs

Strategies

4.1.1 Clearly understand the Commissions goals and objectives for embarking on bio-socio-economic modelling.

4.1.2 Identifying which modeling platforms are most appropriate to meet these stated objectives.

4.1.3 Identifying the desired outputs of the models so that the appropriate data can be secured.

4.1.4 Including in the national sampling programs the collection of socio-economic information from the large pelagic fisheries by Developing protocols for the collection of socio-economic data for large pelagic fisheries and upgrading ICCAT databases to include other than biological data.

Measurable target

- Protocol to collect bio-socio-economic information.

4.2 Development and test bio-economic modeling approaches

Strategies

4.2.1 Identifying experts in the field that will assist ICCAT in this exercise.

4.2.2 Identifying the resources available for this modeling effort.

4.2.3 Identifying the costs and benefits of bio-economic modeling and measures of success.

4.2.4 Beginning a dialogue with other tRMFOs on successful approaches.

Measurable target

- Creation of a plan to apply bio-socio-economic modelling approaches.

2015-2020 TENTATIVE SCHEDULE OF MEETINGS

	2015	2016	2017	2018	2019	2020
ALB		ALB (N,S,M) Data Prep ALB (N,S,M) SA session				ALB (N,S,M) Data Prep ALB (N,S,M) SA session
BFT	BFT (E,W) Data Prep	BFT (E,W) Data Prep BFT (E,W) SA session		BFT (E,W) Data Prep BFT (E,W) SA session		
YFT-SKJ-BET	BET Data Prep BET SA session	YFT Data Prep YFT SA session	Management of FAD fishing in the EAF context			BET Data Prep BET SA session
SWO			SWO (N,S,M) Data Prep SWO (N,S,M) SA session			
BIL		SAI SA	BUM Data Prep BUM SA session	WHM Data Prep WHM SA session		
SHK	BSH SA session		POR SA (ICCAT-ICES)	Other SHK SA session	SMA SA session	
SMT	SMT Data Prep		SMT Data Prep		SMT Data Prep	SMT SA session
		Workshop on Ecosystem Based Fishery Management				
					Workshop on fishery independent abundance indicators	
Methods	WGSAM					
Ecosystems	SCECO					
Courses	COURSES					
SCRS-COM	WG DIALOGUE SCRS - COM					

This schedule has been prepared for planning purposes and will be adapted according to the different requirements and the progress of the SCRS SSP, especially with the incorporation of MSE approaches in the work of the SCRS.

SCRS SCIENCE STRATEGIC PLAN 2015-2020 ESTIMATED BUDGET	
Thematic area	**Budget 2015-2020**
a. Data Collection	30,000
b. Dialogue and Communication	25,000
c. Participation and Capacity Building	295,000
d. Research Priorities	115,000
e. Stock Assessments and Advice	227,000
Total	**692,000**

Appendix 11

SPEECH BY MR. DRISS MESKI, ICCAT EXECUTIVE SECRETARY

Mr. Chairman,
Scientific Delegates,
Ladies and Gentlemen,

Firstly, I would like to welcome you to this meeting of the Scientific Committee and I hope that you will have some free time to enjoy the beautiful city of Madrid.

As usual, just days ahead of the annual meeting of the Commission, the SCRS meeting is held invariably in pressurized circumstances which are generally linked to the many expectations of the ICCAT Contracting Parties.

As you know, the Contracting Parties await impatiently the deliberations of this Committee. I know that scientific work is a lengthy process and how difficult it is to achieve accurate short-term results. Yet, the recommendations of the Scientific Committee continue to be the basis of the decisions reached by the Commission.

As in previous years, 2014 has been very busy, for you and for the Secretariat. More than 18 scientific meetings have been held over the course of this year, which are obviously in addition to those organised outside of ICCAT.

This means that your work is increasingly demanded to provide answers to the numerous questions raised by our Commission.

This year already seems to be a starting point for other challenges. The premises of a strategic plan for the coming years, regarding the management of the fisheries operating in the ICCAT Convention area, seem to be taking shape. Other methods and approaches which are necessary to diagnose the state of the stocks managed by ICCAT, as well as other programmes, are being developed.

Needless to say that all this will necessarily be accompanied by intense activity by the scientific community that ensures the monitoring of tuna and tuna-like species. Therefore, it is necessary to stress the great importance that ICCAT attaches to research and improvement of scientific knowledge; this is specifically reflected in the encouraging results of implementation of a series of large-scale research programmes – which are often too expensive – managed from the Secretariat. The GBYP is an example of this.

I can tell you that the Secretariat is always delighted to accompany you in your work and the laudable efforts that you unhesitatingly undertake. The Secretariat will do all that it can, as far as existing procedures allow, to respond to your requests.

I am convinced that the work of this meeting will meet the expectations of our Contracting Parties, which will furthermore allow our Organisation to remain at the leading edge of tuna resource management.

I wish you every success with your work.

Thank you.