2014 INTER-SESSIONAL MEETING OF THE BILLFISH SPECIES GROUP

(Veracruz, Mexico – June 2 to 6, 2014)

1. Opening, adoption of Agenda and meeting arrangements

The meeting was chaired and opened by Dr. Freddy Arocha (Venezuela), the Billfish Species Group Rapporteur. Dr. Mario G. Aguilar Sánchez, head of the Comisión Nacional de Acuacultura y Pesca (CONAPESCA) of Mexico welcomed the participants and expressed the interest of Mexico for their active participation on ICCAT and the importance of the SCRS scientific work. Dr. Josu Santiago, chairman of the SCRS, thanked Dr. Aguilar and Karina Ramirez, as well as the organizing committee from Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA), and CONAPESCA for hosting and organizing the meeting in Veracruz. Dr. Arocha then addressed the terms of reference for the meeting.

During the revision of the Agenda, the Chair called the Group attention to the agenda item on evaluation of management scenarios that included evaluation of benefits of time-area closure. It was noted that the ICCAT Rec. 11-07 that called for the analysis of the potential benefits and applicability of the use of time/area closures as a tool for marlin conservation was explicitly replaced by ICCAT Rec. 12-04, and taking into consideration that the most recent recommendation does not call for a time/area closure analysis, the Group decided to remove it from the agenda. The revised Agenda (**Appendix 1**) was then adopted with the considered changes. The List of Participants is attached as **Appendix 2**. The List of Documents presented at the meeting is attached as **Appendix 3**.

The following participants served as Rapporteurs for various sections of the report:

Rapporteurs	*Section*
M. Ortiz, F. Arocha	Items 1, and 7
M. Ortiz, K. Ramírez,	Item 2
J. Hoolihan, K. Ramírez, M. A. Huerta	Item 3
D. Die, L. Reynal	Item 4
E. Prince, M. Schirripa	Item 5
J. Santiago	Item 6

2. Review of basic information

The Secretariat presented a summary of the fisheries statistics available at ICCAT for billfish. A brief description of Task I, Task II and tagging data indicating the availability of data at the SharePoint or at the ICCAT web page. It was noted that no new data has been received since November 2013, and it is expected to receive 2013 billfish fisheries statistics by the end of July 2014. Four SCRS documents (SCRS/2014/043, SCRS/2014/062, SCRS/2014/069, and SCRS/2014/070) presented covered estimations and revisions of billfish catch statistics and size sampling data.

2.1 Task I nominal catch data

The Secretariat presented the most recent Task I nominal catch statistics available to the Working Group (**Table 1** and **Figures 1** to **19**). Task I data are available for billfish species including the unclassified billfish category. It was noted that in recent years reported catch of unclassified billfish is increasing from CPCs and fisheries that regularly were able to submit catch disaggregated by species. The Group recommended that the Chair will inform the Secretariat for it to take action by sending written communications to the CPCs statistical correspondents to resolve this issue as soon as possible.

The Secretariat presented the catalogs of catch statistics for blue marlin, white marlin, sailfish and spearfish, describing the design and objectives of these catalogs. These catalogs help to identify the major fleet/gear that account for most of the reported catches, and the associated catch and effort and size or catch-at-size data available from each fleet/gear. However, it was noted that the catalogs only report on presence/absence of data, and do not indicate the quality and/or representativeness of the data submitted.

Document SCRS/2014/043 presents a review of the Venezuelan catches for billfishes from the artisanal pelagic longline fleet. The Venezuelan artisanal off-shore (VAOS) pelagic longline fishery is a medium and long range fishery that operates within the Venezuelan EEZ and that of neighboring Caribbean island States and along the Guiana's shelf from Venezuela to French Guiana. The VAOS pelagic longline fishery usually operates with pelagic longlines and handlines, that uses live bait to commonly target pelagic species such as dolphinfish (*Coryphaena hippurus*), billfish, tunas, sharks, and coastal scombrids like king and Brazilian mackerel (*Scomberomorus cavalla*, S. *brasiliensis*), and wahoo (*Acantocybium solandri*). The VAOS pelagic longline fishery has been known to target billfish species since the late 1980s, and in this document statistical data from various sources (official statistics, publications, grey literature, expert opinion, and several ICCAT monitoring projects for data improvement) in Venezuela were used to reconstruct the species-specific billfish catch for the period of 1986-2013. Several sources of uncertainty were identified in the estimations that included potential double counting of catches or using of erroneous raising factors in some states. It was concluded that the combination of port and at-sea sampling programs provide the best available estimates for catches of billfishes and recommended the continuation and support of such programs.

It was noted also that recent increase in number of vessels as well as economic and social factors has increased the catch, retention and marketing of billfish species for local markets, with potential of trade neighboring in Island States; noting in particular the increased catches of billfish by the industrial longline fleet in recent years. Historically, a portion of the VAOS fleet switched target after the decline of the snapper-grouper stocks in the 1980's towards pelagic species including billfish, this change was favored by the use of live-bait in both the industrial and artisanal fishing vessels, and shallow sets with the longline gear in the latter. The Group recognized the importance of this new additional data to the billfish total removals reported to ICCAT Secretariat.

Document SCRS/2014/070 presented a review of the sampling and fisheries statistics that catch billfish in the Guadeloupe and Martinique area. La pêche du marlin bleu se fait aux Antilles françaises autour des Dispositifs de Concentration de Poissons (DCP). Cette pêche a démarré à la fin des années 1985 et la flottille qui la pratique a atteint son plein développement dans la seconde moitié des années 2000. Un système d'Informations Halieutiques (SIH), mis en place à partir de 2008, permet d'avoir une bonne estimation des prises et de l'effort autour des DCP. Les données d'estimation des prises de marlin bleu et de l'effort de pêche associé sont présentées ici, ainsi que les méthodes utilisées pour les évaluer. A partir de ces données et d'une enquête auprès de patrons pêcheurs, il a été possible de reconstituer, année par année la flotte pêche travaillant autour des DCP aux Antilles françaises et de reconstituer une série historique de débarquement du marlin bleu.

The Group recalled the importance of this information, as it represents updates of the Caribbean FAD fishery that targets billfish. It was noted that FAD fishery is now present in the majority of the Caribbean Islands, however it is difficult to estimate catch trends as most of these countries reports of billfish catch do not distinguish between catches from FAD or non-FAD operations.

The Group analyzed the Task 1 data, corresponding to the three spearfish species: Mediterranean spearfish (*Tetrapturus belone*), roundscale spearfish (*T. georgii*) and longbill spearfish (*T. pfluegeri*). The information of the data base corresponds of the period 1956-2013. Capture data are from: Belize, Brazil, China PR, China Taipei, European Union (Spain, Italy, France, Malta, Portugal), Japan, Republic of Korea, Mexico, Senegal, South Africa, Saint Vincent and the Grenadines, Trinidad and Tobago, the United States and Venezuela.

Regarding *T.belone*, it only corresponds to stock A+M, captured by different fishing gears: HP (harpoon), LL (longline), PS (purse seine), SP (sport), UN (unclassified). A total catch of 1,203t, this, 98% corresponds to EU-Italy (2002-2005, 2008-2011) and the rest to EU-Malta (1995-1997, 2007-2009), the EU – Spain (19997-2003, 2007, 2008, 2010-2012), EU - Portugal (2003) and EU-France (2007).

In relation to *T.georgii*, it corresponds to stock A+M, captured by LL and RR. A total catch of 8,4 t, corresponding 71% to Spain (2008, 2010, 2012), 24% South Africa (2009) and 5% to the United States (2010,2011).

In the case of *T.pfluegeri*, it corresponds to two stocks ATE-ATW, captured by LL, PS, GN, TP (traps) and UN. The total catch registered is 21.422 t, it corresponds 37% to Japan (1956-2012), 26% Mixed Flags (Spain and France) (1963-2000), 22% China Taipei (1962-2012), 9% Korea Republic (1964-1997), 2% to Spain (1992, 1993, 1995-2003, 2005, 2006, 2008-2012), with 1% to Saint Vincent and the Grenadines (2004, 2006-2012), EU-Portugal (2001, 2006-2012), Brazil (2000-2003, 2005-2007, 2011.2012), Trinidad and Tobago (1983-1991, 1994-2000, 2003, 2006, 2012) and Venezuela (1993, 1994, 1996-1999, 2001-2012), and the rest with less than 1% Belize (2010, 2011), the United States (1995-1997), Senegal (2010), China PR (1998), Mexico (2000) and South Africa (2012).

Catch distributions by species, flag and year are shown in **Figures 1** to **19**.

2.2 Task II catch-effort and size samples.

The Secretariat briefly described the data available of Task II catch-and-effort, size samples and Catch-at-size for billfish species. Size information has been recently used for evaluations of blue and white marlin within integrated statistical models (e.g., Stock Synthesis) and it was requested to the Secretariat to review size information for sailfish in preparation for the next evaluation. The Secretariat also informed the Group on the newly sampling areas definition for each species adopted by the SCRS in 2013. It was noted that the large number and different sampling areas will likely create confusion for most CPCs in terms of reporting Task I nominal catches. The Group was asked for possible options to consolidate and standardize the sampling areas for the billfish species. The Group agreed that stock structure and sampling areas do not necessarily have to be identical, but that sampling should allow considering alternative stock structure definitions. It was also noted that the definition of sampling areas should take into account biological and oceanographic features, such as the profile of the minimum oxygen zone that clearly delimited the habitat extent of billfish (Stramma, Prince, and Schmidtko et al., 2012).

Document SCRS/2014/069 presented a summary of the statistics of billfish catches from the longline Mexican fleet that targets yellowfin (*Thunnus albacares*) in the Gulf of Mexico from 1994 to 2012. Similarly, size frequency data was presented for blue marlin (*Makaira nigricans*) and white marlin (*Tetrapturus albidus*).

It was noted that this data was collected from an observer program with 100% coverage of the fleet. Authors informed that in 2014, a national normative (Normative 023/SAG) was updated, and requires restricting catch of billfish, sharks, swordfish and bluefin tuna to less than or equal of 20% of the total annual catch and the release of live billfish from commercial fisheries. In addition, for recreational fisheries Mexico updated in 2013 a regulation that limit the retention of 1 billfish per person per day. The Group asked for a geographical distribution of the catch and effort, the authors presented maps of catch effort for target species, indicating that corresponding maps and data will be submitted to ICCAT Secretariat before the annual meeting.

Document SCRS/2014/062 described the fishery and catch size distribution of billfish (sailfish, white marlin, blue marlin and swordfish) from the artisanal fishery of Cote d'Ivoire. Catches are landed mainly in the port of Abidjan, size data of 12931 fish caught between 2010 and 2013 was analyzed for changes and trends of mean size and size distribution. Over the four year period, mean size of white and blue marlin show a decreasing trend of mean size, while a stable mean size for sailfish and an increasing trend for swordfish. Seasonal presence of large blue marlins is likely associated with reproductive behavior. The artisanal fleet is composed of wooden canoes (piraguas) of 17 m average length with an outboard motor of 75 HP, carrying an average crew of 8 people. The main fishing gear is drift-gillnets of 80 - 200 m long and 8 to 26 m in depth, monofilament and mesh size between 35 -50 mm. Fishing operation is done at night, setting about 19:00 hours, and using anchors at both ends, keeping the gillnet attached to the canoe. Gillnet is set just below the surface or at surface using floaters and fishers also use lights at both end and near the canoe. The gear fishes usually for a maximum period of 24 hours. The fish caught are mainly immature specimens except swordfish.

The Group noted that the size composition of white marlin from the fishery in Cote d'Ivoire indicated the presence of large size fish and recommended to verify with author(s) if there is a possible misidentification of white and blue marlin. It was also noted the large proportion of relative small blue marlin (< 150 cm). It was requested that the size information made available to the Secretariat.

A preliminary analysis of the sailfish size data was done during the meeting and results are shown in **Figures 20** to **24**. Overall there are 32766 observations of size data representing over 370000 sailfish measurements. Data extends from 1970 to 2012, with samples from the East and West stock units, and from the major flag-fleets. By comparison sailfish east show slight larger sizes than sailfish west, even for samples from the same fleet-gear. The Group recommends reviewing the information for size above 300 cm (LJFL), as well some particular samples from 1980 and 1983 from the Central North Atlantic.

The data corresponding to longbill spearfish (SPF) of Task 2 Size were analyzed during the meeting (**Figures 25** to **29**). Regarding the size data by country, the group observed that the data series are incomplete. The CPCs that report size data are Brazil, China Taipei, Cuba, Spain, Italy, Japan, the United States and Venezuela. Recorded fishing gears are: GN (gillnet), LL (longline), LLHB (longline home-based), SPOR (sport), HARP (harpoon). The group observed that the size frequency type codes reported were: curved fork length (CFL), Operculum - keel (CLKL), Eye-fork length (EYFL), lower jaw-fork length (LJFL), and weight (WGT).

2.3 Other information. Conventional and electronic tagging information.

The Secretariat presented the available information from conventional tagging for blue marlin, white marlin and sailfish. It was noted the reduced tagging activity since 2000 for most of the billfish in the Atlantic Ocean. Overall recovery percentages for tagged fish are low for blue and white marlin just above 1%. The Group requested to update and revise the tagging information for sailfish to be considered for the upcoming evaluation.

3. Review of Biology

Document SCRS/2014/067 by Schmidt et al. reports the presence of billfish larvae in the southwestern Atlantic, over the continental shelf along southern Brazil. A total of 76 ichthyoplankton net surface trawls conducted over two fishing seasons during the period 2011-2014 revealed both sailfish and white marlin larvae. Specimens were identified to family level using morphological characters, and to species level using multiplex-PCR RFLP genetic analyses. During the first season, two sailfish and five white marlin larvae were netted. The sailfish were caught in January off the coast of Vitoria City (20°S, 39°W) in waters ranging from 53 to 100 m deep. The white marlin were caught in November off Rio de Janeiro (23°S, 42° W) in waters of 129 and 196 m deep. Capture of three additional istiophorid larvae were reported, although species identification was not apparent in the document. This was a preliminary study; however, it supports earlier works by Arfelli et al. (1986), Mourato et al. (2009), and Amorim et al. (2011) suggesting the coastal waters of Brazil are important spawning areas for sailfish and white marlin.

The Group noted the lack of tables and figures for this document, and suggested that at minimum it should include a figure that illustrates the sampling area. Species identification for 3 of the 10 billfish larvae captured was not apparent in the paper, and should be clarified.

Document SCRS/2014/068 provides estimates of age and growth for longbill spearfish *Tetrapturus pfluegeri* in the western Atlantic Ocean. The third anal spine was collected from 497 longbill spearfish during the period 2003-2011 between 22°N and 36°S by the artisanal gillnet and commercial longline fleets of Venezuela, and the commercial longline fleets of Brazil and Uruguay. In total, 416 of the spines were used for analyses. Growth bands showed annual periodicity, and very fast early growth in early years was evident (k = 0.52 years^{-1}, $L\infty$ = 175 cm LJFL, and t_0 = -1.26). Length ranged from 110 to 202 cm LJFL. The largest individuals were females. However, the mean length of males was significantly larger, possibly influenced by numerous large males in the 180 cm LJFL class. Estimated size at age, back-calculated to account for annuli obscured by spine vascularization, was significantly smaller than then estimates for size at age based on observed annuli only.

The Group discussed two concerns related to the use of fin spines for age and growth studies: 1) increased vascularization of the spine that may obscure, or obliterate, early growth annuli; and, 2) bilateral asymmetry in spine growth, which can inhibit accurate measurement. When using back-calculation, it was noted that there is a potential bias if growth functions are estimated without acknowledging the correlation that exists in age-length pairs coming from each individual fish. However, it was noted that in this study only back-calculate length for the observable rings. Transverse sections of early growth spines are roundish in shape, and become more ovoid with increased age. Most spines exhibit increased bilateral asymmetry with increased age. The common method of measuring spines is a straight-line measurement from the center point of the spine outward to the widest edge. Using this measurement to compare young spines that are roundish in shape with older, ovoid spines may introduce bias.

SCRS/2014/061 provided information on the reproductive biology of sailfish *Istiophorus albicans* found in the southeastern Caribbean Sea and adjacent Atlantic waters. A total of 729 sailfish (377 males, 352 females) landed at Playa Verde (central coast of Venezuela) were sampled during the period from February 2009 to September 2011. Samples originated from the artisanal gillnet (2009-2011) and industrial longline (2001-2011) fisheries, and ranged in size from 110 to 196 cm LJFL. The overall sex ratio was 0.93:1, although seasonal variability was evident. The average batch fecundity and relative fecundity of females were 449650 oocytes and 21.1 oocytes/g^{-1}, respectively. On average, spawning took place every 1.9 d over a 100 d period along the narrow shelf off the coasts of central Venezuela and the Guiana's. Spawning activity occurred nearly all year, but peaked during the periods of March-June and August-September. The estimated length at sexual maturity (L_{50}) was 160.12 cm LJFL.

The Group recognized that the sailfish L_{50} presented in this study represented a more robust estimate than the L_{50} estimated earlier by Arocha and Marcano (2006); and, is more comparable to the more recent preliminary L_{50} estimate presented by Mourato et al. (2009) for sailfish in the southwest Atlantic (**Figure 30**). It was noted that the Arocha and Marcano (2006) L_{50} estimate (currently used in the ICCAT manual) was most likely overestimated. During the Group meeting, consultations with Brazilian scientists working on sailfish reproduction indicated that the study by Mourato et al. (2009) was recently updated; and, efforts will be combined to produce a more robust L_{50} estimates for the western Atlantic sailfish stock when the Brazilian and Venezuelan data sets are jointly analyzed. Considering this fact, it was suggested that the L_{50} presented in SCRS/2014/061 be adopted as the new standard for the western Atlantic sailfish stock, as it represents the most rigorous study to date.

A review of biological parameters for spearfish species was developed and is shown in **Table 2**, for the purpose of facilitation in future assessments.

4. Fishery indicators

An analysis of the billfish CPUE for blue marlin, white marlin and sailfish from the fishery off La Guaira, Venezuela, was presented at the meeting (SCRS/2014/065). In it the authors attempt to produce relative abundance estimates for these three species from the sport fishing fleet, the artisanal fishing fleet and the combination of the two. Data available for the sport fishing fleet ranges from 1960 until 2001 whereas for the artisanal fleet it only includes the years 1991-2012. GLMMs were used to standardize log CPUE + 0.01 to account for the presence of some observations where the catch was zero, especially for the recreational fishery. CPUE was for both fleets calculated as the sum of monthly catches divided by the sum of monthly efforts. The trends in annual relative abundance estimates obtained are similar to those previously reported for the artisanal gillnet fleet but depart from those estimated for the recreational fishery, especially in the early period from 1960 until 1980, when the greatest decline in relative abundance had been reported before (**Figure 31**). Indices that combine the data for both fleets lead to tighter confidence limits for the period when the two series overlap (1991-2001).

The Group pointed out the usefulness of this analysis and the possibility that if used, these indices may influence the results of stock assessments because there are few indices available for the period prior to 1975. There was a diversity of views in the Group about whether is more appropriate to use the index which combines the data for the two fleets or the indices for each fleet. It was pointed out by the Group that this area is unusual in being a hotspot of abundance for billfish where two fleets coexist and catch the same size fish, thus facilitating the opportunity to standardize CPUE across fleets. This analysis addresses previous concerns regarding the lack of standardization of the rod and reel fishery.

A preliminary analysis of the CPUE of Brazilian longliners capturing billfish was also communicated to the Group in an informal manner. The analysis proposed uses a clustering method to determine the target of each longline set in the data, a method that was questioned in the past by this Group and the tropical tuna WG. The Group was made aware, however, that such method has been used in a recent peer review publication on blue shark (Carvalho et al 2014). Therefore the Group agreed to encourage the authors to complete the analysis and present an SCRS paper of the results to the next meeting of the Billfish WG. It is worth noting that another recent paper that used the Brazilian longline data has shown that sailfish CPUE variation in this fleet can be explained not just by the type of target species, and spatio-temporal considerations but also by oceanographic characteristics such as chlorophyl *a* concentration, depth of mix layer, sea surface temperature, wind velocity and bottom depth (Mourato et al 2014).

5. Other matters

5.1. Discussion of the OMZ

E. Prince made a presentation on the most recent work on the Atlantic OMZ (Oxygen Minimum Zone). This presentation links 50 years of ongoing ocean scale deoxygenation trends in the tropical Atlantic Ocean to changes in vertical habitat use of large pelagic predators, and the Atlantic fisheries that exploit them. Climate induced warming in this large ocean area (OMZs) has compressed the volumes of surface mixed layer habitat (Stramma, Prince, Schmitko et al., 2012), concentrating predators, preferred prey, and influencing Atlantic-wide fishing effort patterns into progressively shallower surface zones of the central Atlantic. This phenomenon increases the catchability of these predators due to increased densities in a much shallower habitat and may contribute to overly optimistic abundance estimates derived from surface fishing gears.

Overall, deoxygenation is estimated to have caused a 15% reduction in suitable habitat for tropical pelagic tunas and billfishes in the equatorial/tropical Atlantic during this time period (1955-2004). To demonstrate ocean scale changes in available habitat, the authors computed decadal matrices of OMZ size (volume and surface area), as well as the reciprocal decline in surface mixed layer from 1955 through 2004. Further, they tracked fishing effort and catch inside and outside of the Atlantic OMZ for 9 major ICCAT species to examine potential compression impacts. Based on patterns of LL hook deployments and catches, they found that at least 7 out of 9 regularly assessed ICCAT species were impacted by the OMZ.

In order to improve assessment process for tropical pelagic fisheries, the Group feels that is important to incorporate hypoxia-based habitat compression impacts into the assessment process. One potential approach might be accomplished during the CPUE standardization process, by scaling catchability coefficients (by species and gear) using the progressive decadal decline in available surface mixed layer habitat (in volume).
The point was brought up that changes in the OMZ match the Atlantic Multidecadal Oscillation (AMO) for the 1965 - 1995 decade cold phase suggesting the correlation between changes in the AMO and size of the OMZ. It was suggested that this assertion may not be valid for all the decades.

A second point was brought up that the Group encourages the estimation of the change in the size of OMZ over time periods finer than a decade in order to facilitate the incorporation into CPUE standardization. Furthermore, the Group should encourage to identify indicators that are universal to multiple species and not just a few specific ones. The Group felt that a better use of the OMZ data would be to modulate fleet catchability directly within the assessment model.

5.2. Discussion of the Strategic Plan

The SCRS Chair presented the most recent version of the SCRS Strategic Plan discussed the previous week during the meeting of the Dialogue between Scientist and Managers (Barcelona, June 2014). The group discussed the upcoming assessment schedule and how it pertains to this Group. The questions still remains with regard to the scheduling of the next sailfish assessment. Given the very full meeting agenda in 2015, the possibility of postponing a sailfish assessment meeting was discussed. However, given the high probability of overexploitation on sailfish, the Group favored conducting an assessment in 2015 rather than later.

The Group discussed the level of CPCs participation at this meeting. As an indicator, plots were presented that showed total billfish landings by country in terms of the participation at the meeting (**Figure 32**). It was apparent that there was an under representation of CPCs that land the largest tonnage of billfish present at this meeting. The Group felt that this was a hindrance to the development of strong stock assessment on these species.

5.3. Anchored FADs

To sustain the successful continuous fishing around anchored FADs, it is important to reduce the capture of juveniles or species that need a decrease in fishing effort, temporarily or definitively (SCRS 2014/071). Through previous statistics data coming from commercial fishing trips and new experimental fishing trips, the authors compared different gears and selectivity techniques. Comparisons were made on species composition and size of the catch around anchored FADs. The authors also compared different types of bait used, the best hours to fish for better yield and to target adults. Finally, the influence of the anchored FAD distance from shore was evaluated. The authors observed that fishers' strategies have a critical influence on anchored FADs setting and targeted species. The further from shore a FAD is anchored, the better the yield obtained. The fishers who target dolphinfish deploy several FADs while the others exploit generally one FAD per trip. The main results from experimental fishing trips show that the jigging technique around anchored FADs catches blackfin tuna adults. Most of the blackfin and yellowfin tuna captures happened late in the morning and we observed a drop off after 12:00 pm. Flying fish bait (live or dead) seems to be more efficient, except for the blue marlin. An analysis of anchored FADs governance is necessary before advising some techniques.

With the exception of catches reported by EU France for Guadaloupe and Martinique that have identified catches done on anchored FADs (SCRS 2014/070), no other country identifies catches made on anchored FADs. There is evidence that anchored FADs are used or have been tried in many other countries of the Caribbean including Cuba, Dominican Republic, Haiti, Dominica, St. Lucia, Grenada and Belize (FAO 2002). The Group summarized the reported task I data from these countries on the assumption that such catches had been reported to ICCAT as either handline or unclassified gear. Only catches for BUM and SAI where considered because these two species of billfish are the two most billfish commonly caught in anchored FADs. In addition, only catches since 1990 where selected, because that is the conservative estimate of when anchored FADs started being used outside Martinique and Guadaloupe.

Dominica was the only country of those considered that reported catches of BUM and SAI on handline and only for the period 2000 and 2008, although catches for 2003 are reported as "unknown gear". According to reports provided by Dominica through the MAGDALESA project (CRFM 2013) catches on anchored FADs are of the same level to the catches reported to ICCAT as handline catches. A number of other countries reported catches of BUM and SAI from unknown gears including, Aruba, Curacao, Dominican Republic, Cuba, Grenada, St. Vincent and the Grenadines and St. Lucia (**Figure 33**). It is possible that some of these catches correspond to anchored FADs. It is obvious, however, that reports are very irregular for all countries and effort should be made to improve these, including reporting the gear used.

5.4. Presentation on considering time varying catchability in the Japanese longline fleet and the implications to the 2011 Blue Marlin Stock Assessment

A presentation was given investigating the use of species ratio from the Japanese longline fishery as an index of catchability for blue marlin. The premise of this work was that, since yellowfin tuna and blue marlin shared habitats close to the surface, and bigeye tuna were more prone to be found deeper, that the ratio of yellowfin to bigeye tuna in the longline landings might be an indicator of depth fished and thus able to be used as an index of catchability for blue marlin. From this, two hypotheses were created. The null hypothesis was that the drop in the Japanese longline CPUE is entirely due to a decrease in blue marlin biomass (current hypothesis). The alternative was that the drop in the Japanese longline CPUE is due partly to a decrease in blue marlin biomass and partly due to a change in catchability. The 2011 blue marlin assessment model was run both with and without this species ratio effect on the Japanese CPUE. The model with the species ratio information was able to fit the Japanese longline CPUE much better, although with slightly more uncertainty in the estimated quantities. However, the group agreed that this work should continue as it has ramifications for the yellowfin tuna, bigeye tuna, blue marlin, and potentially white marlin assessments.

6. Recommendations

1. The Group recommends that the 1986-2013 revised billfish catch estimates of the Venezuelan artisanal off-shore pelagic longline fishery (SCRS/14/043) be incorporated into the ICCAT Task I data base, according to the existing rules.

2. 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/14/043. 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.

3. After the analysis of the data catalogues of BUM, WHM, SAI and SPF provided by the Secretariat, the Group considers critical to fill the gaps observed in the existing database. Therefore the Group recommends that the CPCs put in place initiatives of BIL data recovery/data mining to this purpose. To this end the chair of the BIL WG will prepare a circular (with the data catalogues attached) to be sent to the CPCs that capture billfishes in the Convention area.

4. The Group observed that there has been an increase of the proportion of unclassified BIL landings reported since 2011. The Group recommends that the CPCs make greater efforts to identify by species the unclassified captures of billfishes.

5. Noting the misidentification problems between istiophorid species identified by the Group (i.e., in the Gulf of Guinea), the Group recommends that the Secretariat reinforce the distribution of the species identification guide for Atlantic istiophorids to all fleets to minimize future misidentification problems of istiophorid species.

6. 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 on 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 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.

7. Although it is preferable to have scientists present at the Billfish WG 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 WG again stresses the need that scientists prepare SCRS documents for the meeting.

8. 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°.

9. In line with the Recommendation of the 2014 Working Group of Stock Assessment Methods, the Group recommends to make available fine scale catch and effort data (e.g. set by set).

10. The Group recommended that the work on making attempts to account for the change in the Japanese catchability be continued. While the ratio of yellowfin tuna to bigeye tuna in the longline catch does offer one means to address this, another is to use the depth of the sets from this fleet. Results from this work could have implications for the billfishes, yellowfin tuna, as well as the bigeye tuna assessments. A more detailed and thorough examination of the data and possible alternative hypotheses is recommended.

11. 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.)

7. Adoption of the report and closure

The report was adopted during the meeting. The Chair of the BIL Group and the Chair of the SCRS joined to express appreciation for all the arrangements and facilities provided by the SAGARPA and CONAPESCA and its scientists for the more than satisfactory development of the meeting. The hospitality provided was extraordinary and the Species Group deeply acknowledged the exceptional attention given to the participants by the Mexican scientists.

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Table 2 SPEARFISH biological data review: ROUNDSCALE SPEARFISH, MEDITERRANEAN SPEARFISH & LONGBILL SPEARFISH.

PARAMETER	ROUNDSCALE SPEARFISH (SPG)	MEDITERRANEAN SPEARFISH (MSP) *Tetrapturus belone*	LONGBILL SPEARFISH (SPF) *Tetrapturus pfluegeri*.
DISTRIBUTION	Genetic sampling has helped to elucidate the distribution of roundscale spearfish by revealing that they range in the western Atlantic from at least latitudes 37°41' N to 28°52' S, and longitudes 56°00' W to 27°58' W (Bernard et al., 2013).	Mediterranean spearfish is limited in distribution to the Mediterranean Sea. Inside the Mediterranean Sea, adults are most common around Italy (south of Corsica), the Adriatic Sea, and the western Mediterranean. There are no reports from the Aegean Sea or the Black Sea, only juveniles are found in the eastern Mediterranean (off Israel and Lebanon).	Longbill spearfish are widely distributed in subtropical, tropical, and occasionally in Atlantic temperate waters of the Atlantic Ocean, ranging from 40 ºN to 35 ºS. In the western central Atlantic, important concentrations are present in the Venezuelan basin, and off Suriname, dispersed fish are located in the Gulf of Mexico, and off the southeastern coast of the USA. Other areas of concentration of longbill spearfish include the pelagic waters of the mid-Atlantic ridge in both hemispheres (Ueyanagi et al., 1970).
L_{50}	There is no information regarding the size or weight at which sexual maturity is reached. However, in an ongoing research study that examined around 50 females roundscale spearfish from the western central Atlantic, indicated that females of 155 cm LJFL and beyond displayed high gonad index values and ripe gonads with hydrated oocytes (Arocha unpublished data).	N/A	There is no information regarding the size or weight at which sexual maturity is reached. However, Arocha et al. (2007) reported that for longbill spearfish from the western central Atlantic, higher gonad index values (> 1.0) were observed in females >150 cm LJFL.
% SEX RATIO	In an ongoing research study conducted on western central Atlantic spearfishes (5°N - 25°N), sex ratio at size of roundscale spearfish (n=263) seem to indicate a seasonal pattern between trimesters, but due to low sample size, patterns were not clearly differentiated (Arocha unpublished data). However, preliminary results indicated that the proportion of females was around 35-80% for sizes between 165 and 185 cm LJFL in the second and fourth trimesters. During the third trimester, the proportion of females drops monotonically from 50% to near 0%, for sizes 160 cm to >190 cm LJFL. Indicating that in the aforementioned trimester, sex ratio favours males for size classes >170 cm LJFL.	As the rest of the billfishes, Mediterranean spearfish do not show apparent sexual dimorphism in colour pattern or external morphological characters.	In a study on the distribution and reproductive biology of the longbill spearfish in the western central Atlantic (5°N - 25°N), sex ratio at size of longbill spearfish (n=117) displayed a seasonal pattern between trimesters (Arocha et al., 2007). In the first trimester, the proportion of females remained above 50% for almost all sizes. During the second and fourth trimesters, the proportion of females decreased monotonically from 30% to near 0% (in the 2nd trimester) from sizes between 160 and 170 cm LJFL to sizes >190 cm LJFL, and from around 90% to 0% (in the 4th trimester). In the third trimester, the proportion of females for sizes >160 cm LJFL increased from under 20% to 100% in the larger fish. Notably, the proportion of females decreased as their size increased.
GROWTH/AGE	Round scale spearfish age determination and growth studies have not been undertaken. No growth model is available for the species. However, the largest size recorded from the Venezuelan longline tuna fishery was 200 cm LJFL.	Young (immature) Mediterranean spearfish first appears in the catches when they are around 70 cm LJFL. From this time on, it is easier to track their migratory movements both by observing the fisheries and by tagging experiments.	The available length-weight relationships for longbill spearfish are scarce due to the low availability of the species from commercial catches for weight measurements. The only source found, was from recreational billfish surveys conducted by the USA in the Atlantic Ocean (Witzell, 1989). Due to the small sample size (n=34), no sex specific relationships were developed. The fish collected and used for the estimation of the length-weight relationship had an average weight of 14.7 kg and

<table>
<tr><td></td><td></td><td></td><td>average length was 151.8 cm LJFL.
<table><tr><th>Ecuación</th><th>Referencia</th><th>N</th><th>Sexo</th><th>Rango LJFL (cm)</th></tr><tr><td>RWT = 2.7 x 10[illegible] LJFL[illegible]</td><td>Witzell (1989)</td><td>34</td><td>Combinado</td><td>85-195</td></tr></table>
The age and growth of the longbill spearfish, Tetrapturus pfluegeri, was estimated using transversal cuts from the third spine of the anal fin. Also, the structure and periodicity of annuli formation were validated for this species. The samples used were collected in a large zone of the Western Atlantic between 25ºN and 40ºS, obtained on the artisanal gillnet and commercial longline fleets of Venezuela and commercial longline fleets from Brazil and Uruguay. This is the first growth estimates for the longbill spearfish and the results showed that the third spine of the anal fin in this species is suitable for age and growth studies. An annual periodicity in the formation of growth bands was observed and, like most of billfish species, was characterized by having very fast growth in the early years of life (k = 0.52 years-1, L∞ =175 cm and t0 = -1.26). No differences in growth rates between sexes were observed and the parameters estimated for the longbill spearfish were within the range of parameters reported for species within the same family in the Atlantic Ocean like white marlin and sailfish (Pons, M. et al., SCRS/2014/068).</td></tr>
<tr><td>NATURAL MORTALITY</td><td>No reliable estimates of natural mortality rates are available. Tagging data are insufficient for that effort. Estimating M from growth parameters is limited because they have not been estimated. Natural mortality based on the estimated longevity would rand range from 0.15 to 0.30. However, based upon body size, behaviour, and physiology, estimates of adult fish would likely be fairly low (ANON. 1994, 1998).</td><td>No reliable estimates of natural mortality rates are available. Tagging data are insufficient for that effort. Estimating M from growth parameters is limited because they have not been estimated. Natural mortality based on the estimated longevity would rand range from 0.15 to 0.30. However, based upon body size, behaviour, and physiology, estimates of adult fish would likely be fairly low (Anon. 1994, 1998).</td><td>No reliable estimates of natural mortality rates are available. Tagging data are insufficient for that effort. Estimating M from growth parameters is limited because they have not been estimated. Natural mortality based on the estimated longevity would rand range from 0.15 to 0.30. However, based upon body size, behaviour, and physiology, estimates of adult fish would likely be fairly low (Anon., 1994; Anon., 1998).</td></tr>
<tr><td>SIZE FREQUENCY</td><td>The are no available length-weight relationships for roundscale spearfish. There are no estimates of catch-at-age. Recent information on size data is provided in this report in Section 2.2.</td><td>There are no estimates of catch-at-age for Mediterranean spearfish. Available catch-at-size information come from the Italian fisheries. Di Natale et al. (2003, 2005) indicate that for 1994 through 2003, size mode varied between years, from the smallest mode observed in 2001 between 98-99 cm LJFL to the largest one observed in 1998 for fish between 170 and 179 cm LJFL. The minimun size fish caught was 78 cm LJFL, and the maximum size was 193 cm LJFL. Recent information on size data is provided in this report in Section 2.2.</td><td>There are no estimates of catch-at-age for longbill spearfish. Catch-at-size is only available from the longline fishery off the western central Atlantic for the period of 1991-2000 (Arocha, 2006). The size distribution was based on 715 specimens, mean size observed was 166.7 cm LJFL, the median size of captured fish was 169 cm LJFL.
Recent information on size data is provided in this report in Section 2.2.</td></tr>
<tr><td>POPULATIONS /STOCK STRUCTURE</td><td>Landings of roundscale spearfish have been traditionally combined by ICCAT with those of Atlantic sailfish, Mediterranean spearfish,</td><td>Landings of Mediterranean spearfish have been traditionally combined by ICCAT with those of Atlantic sailfish and the longbill spearfish, T.</td><td>Landings of longbill spearfish have been traditionally combined by ICCAT with those of Atlantic sailfish and the Mediterranean spearfish, T. belone. Therefore, the species</td></tr>
</table>

	and the longbill spearfish. Therefore, the species group sailfish+spearfish have been considered by ICCAT as a separate east and west stock for management purposes. However, in the sailfish assessment of 2001 (Anon. 2002) a procedure was developed to separate sailfish catch from that of spearfish, but without differentiating between the spearfish species caught by the fleets.	pfluegeri. Therefore, the species group sailfish+spearfish have been considered by ICCAT as a separate east and west stock for management purposes. However, in the sailfish assessment of 2001 (Anon. 2002) a procedure was developed to separate sailfish catch from that of spearfish, but without differentiating between the spearfish species caught by the fleets.	group sailfish+spearfish have been considered by ICCAT as a separate east and west stock for management purposes. However, in the sailfish assessment of 2001 (Anon., 2002) a procedure was developed to separate sailfish catch from that of spearfish, but without differentiating between the spearfish species caught by the fleets.

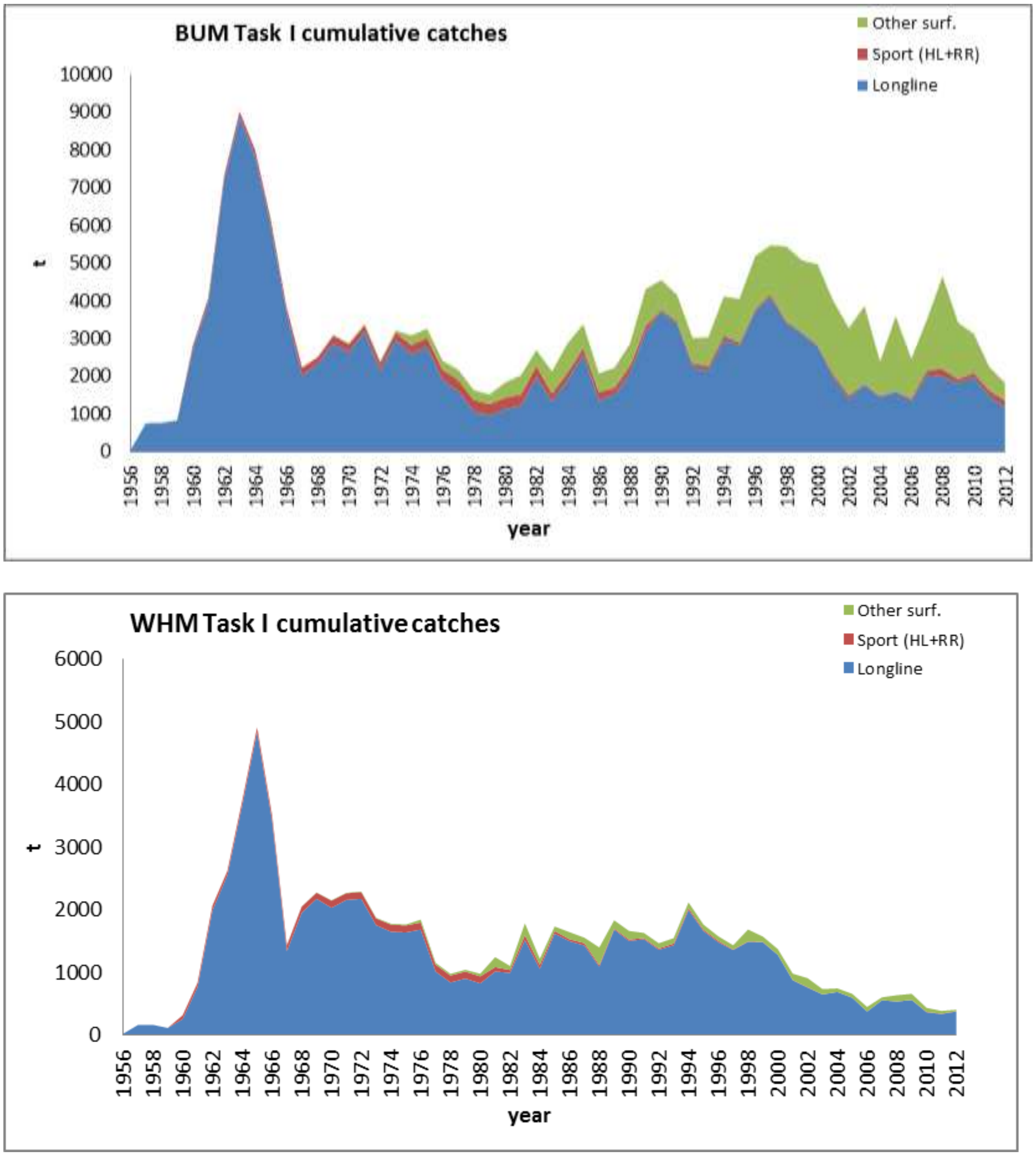


Figure 1. Total catch of blue marlin (top) and white marlin (bottom) reported in Task I NC for the period 1956-2012**.**

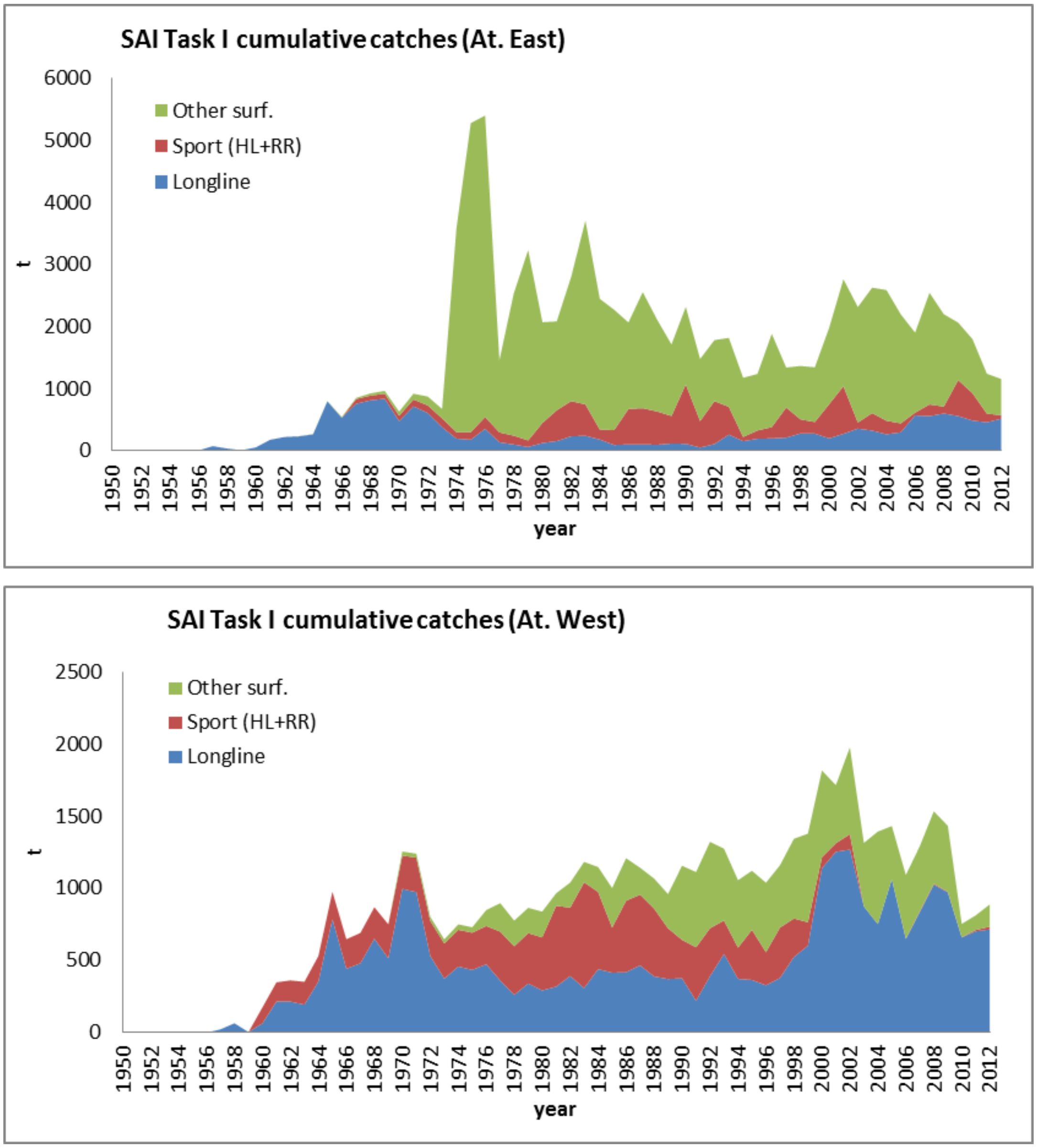


Figure 2. Total catch of sailfish by stock Atlantic east (top) and Atlantic west (bottom) reported in Task I NC for the period 1956-2012

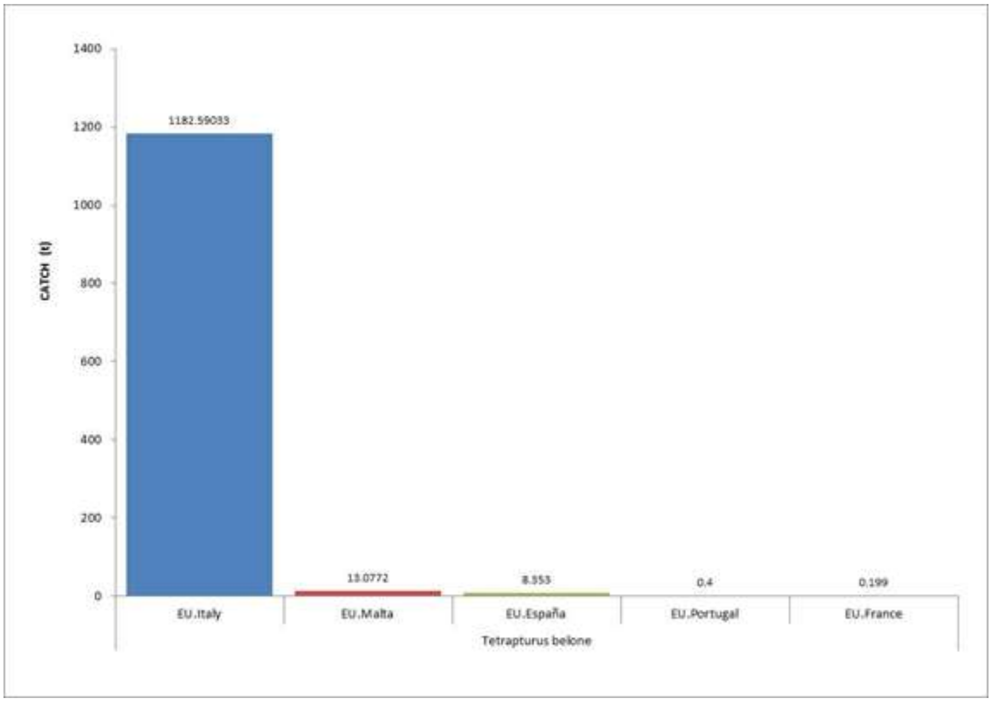


Figure 3. Task 1 catches (t) of Mediterranean spearfish (*Tetrapturus belone*) by flag.

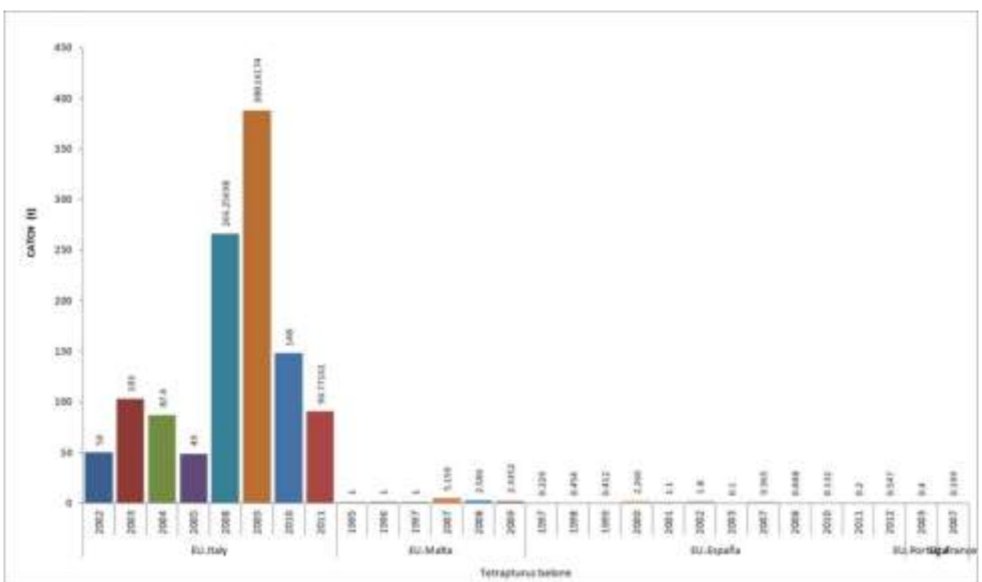


Figure 4. Task 1 catches (t) of Mediterranean spearfish (*Tetrapturus belone*) by flag and year.

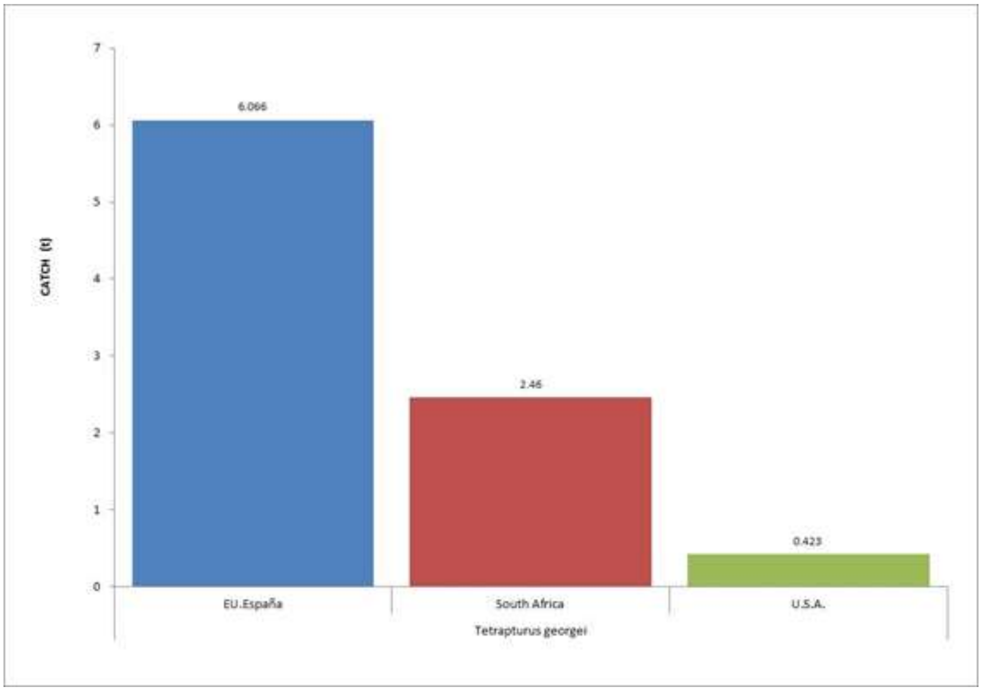


Figure 5. Task 1 catches (t) of Roundscale spearfish (*Tetrapturus georgii*) by flag.

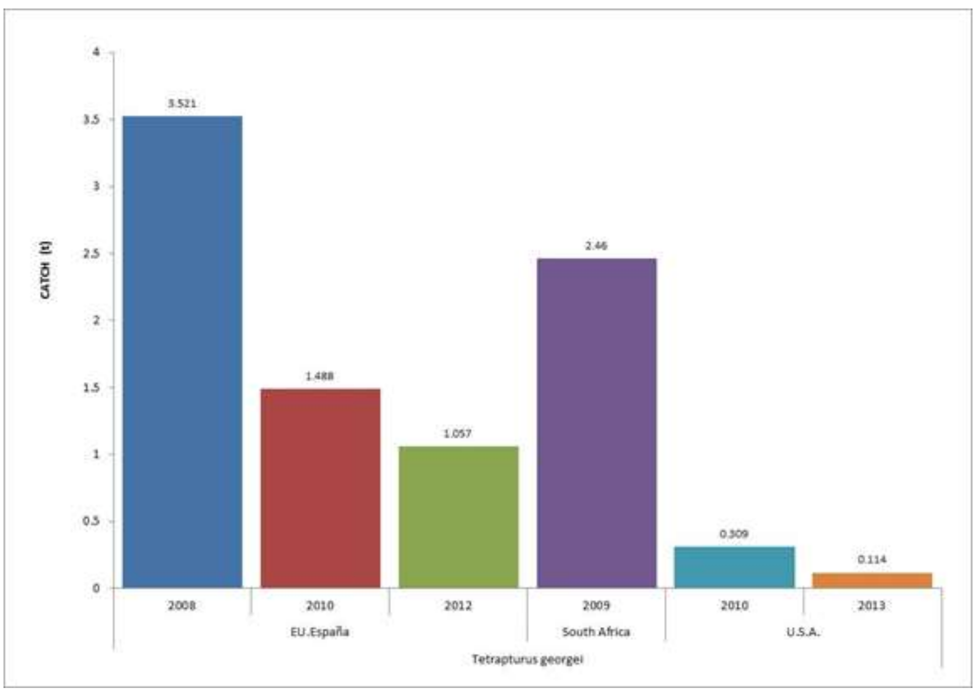


Figure 6. Task 1 catches (t) of Roundscale spearfish (*Tetrapturus georgii*) by flag and year.

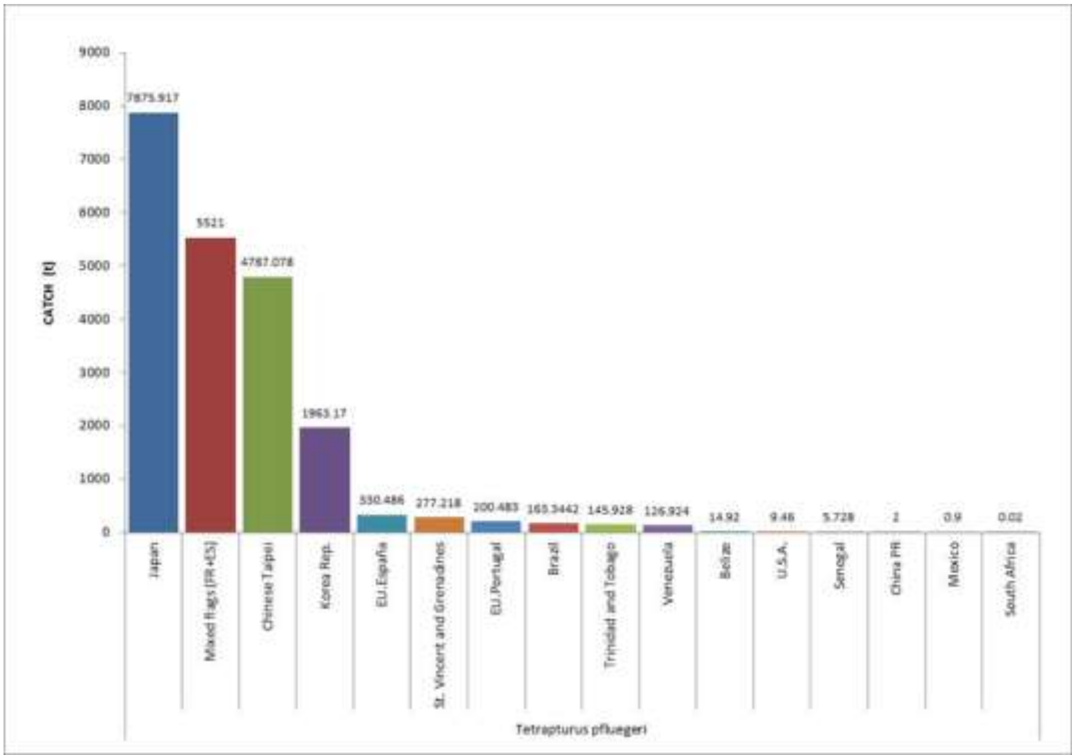


Figure 7. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by flag.

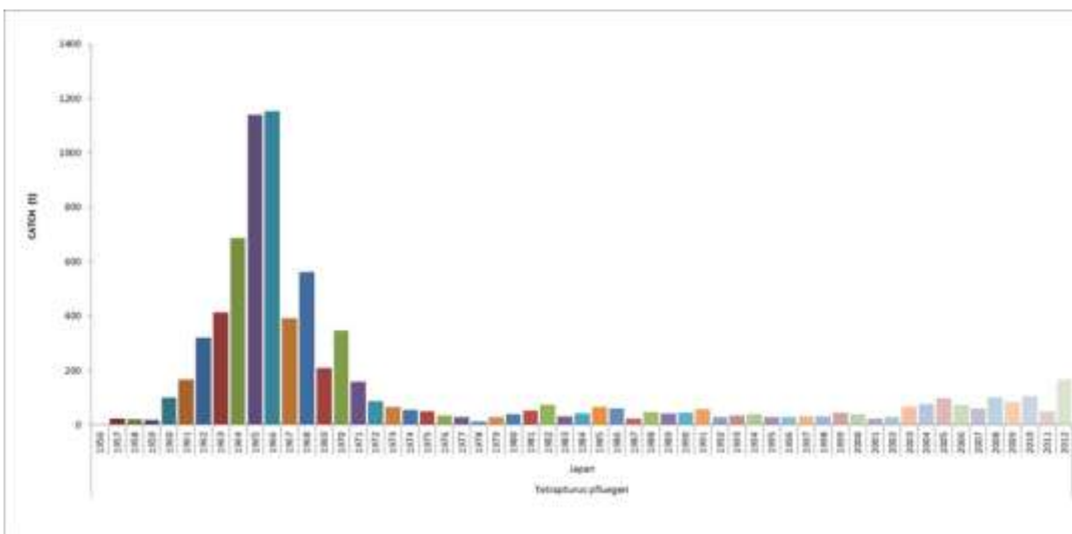


Figure 8. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Japan per year.

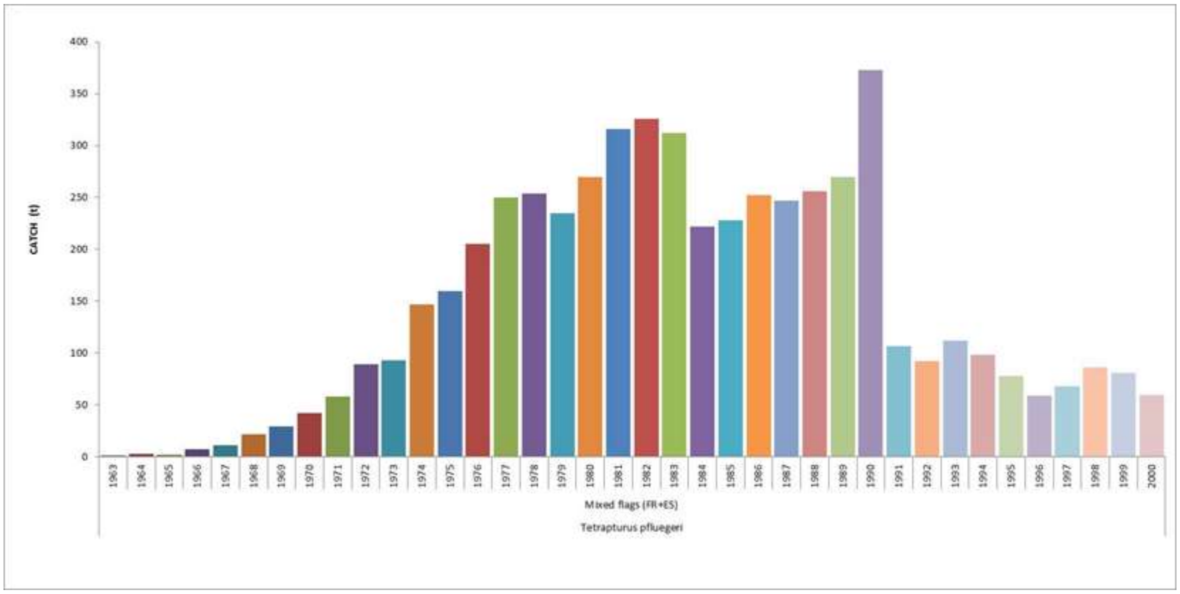


Figure 9. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Mixed flag (FR+ES) per year.

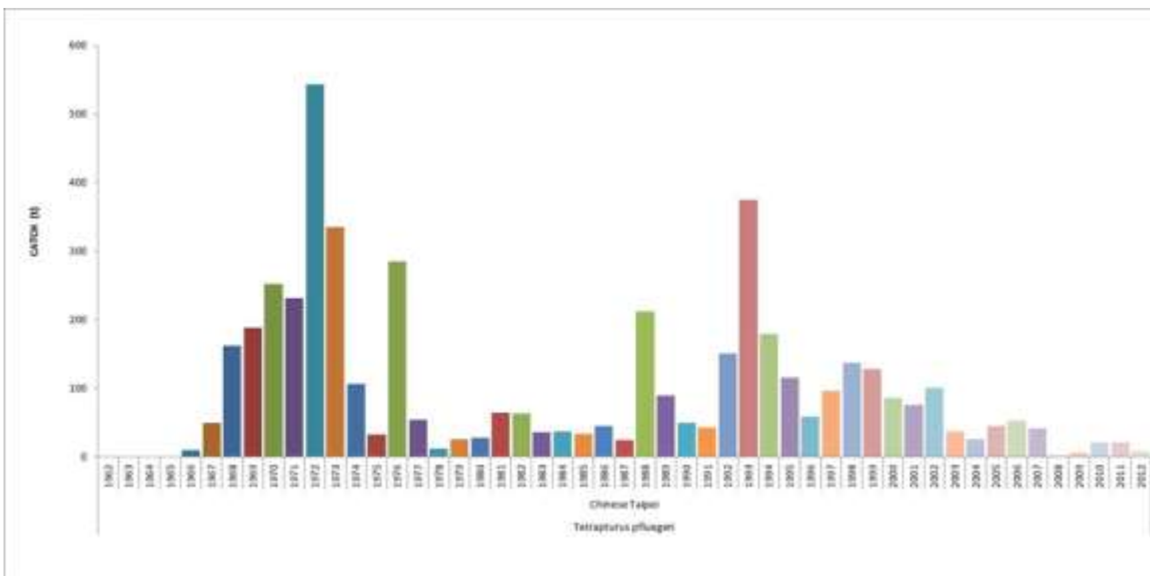


Figure 10. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Chinese Taipei per year.

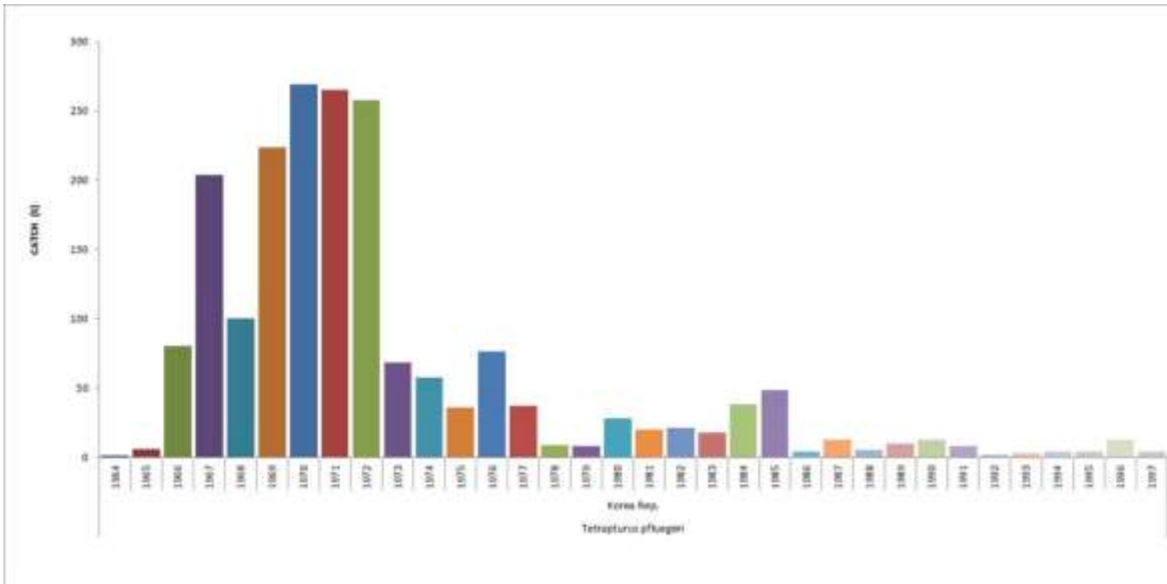


Figure 11. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Korea Rep. by year.

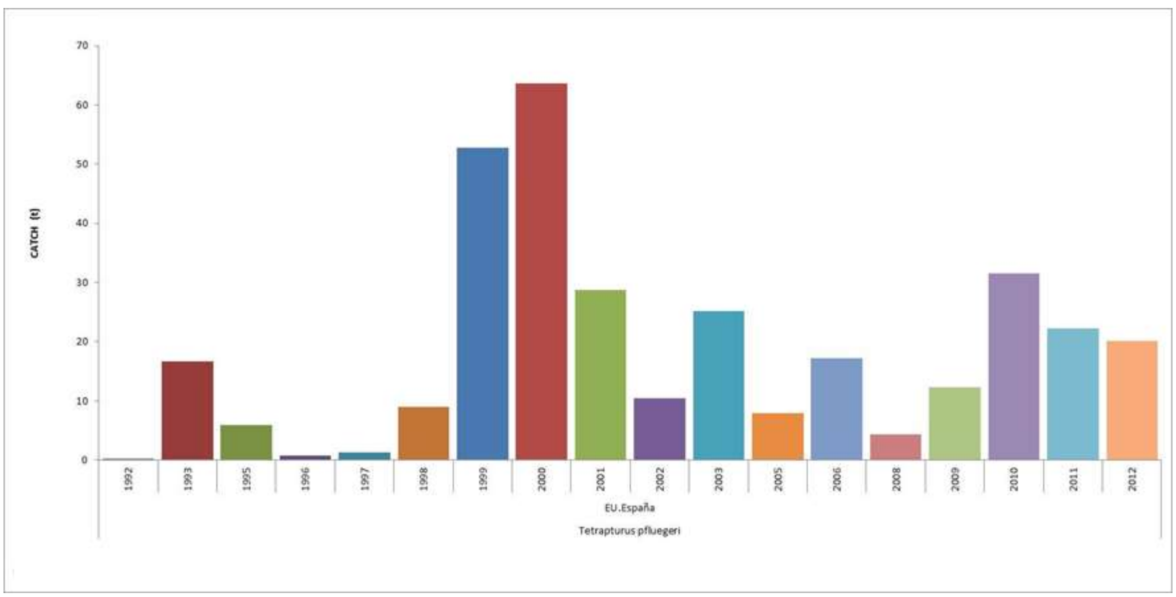


Figure 12. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by EU-Spain by year.

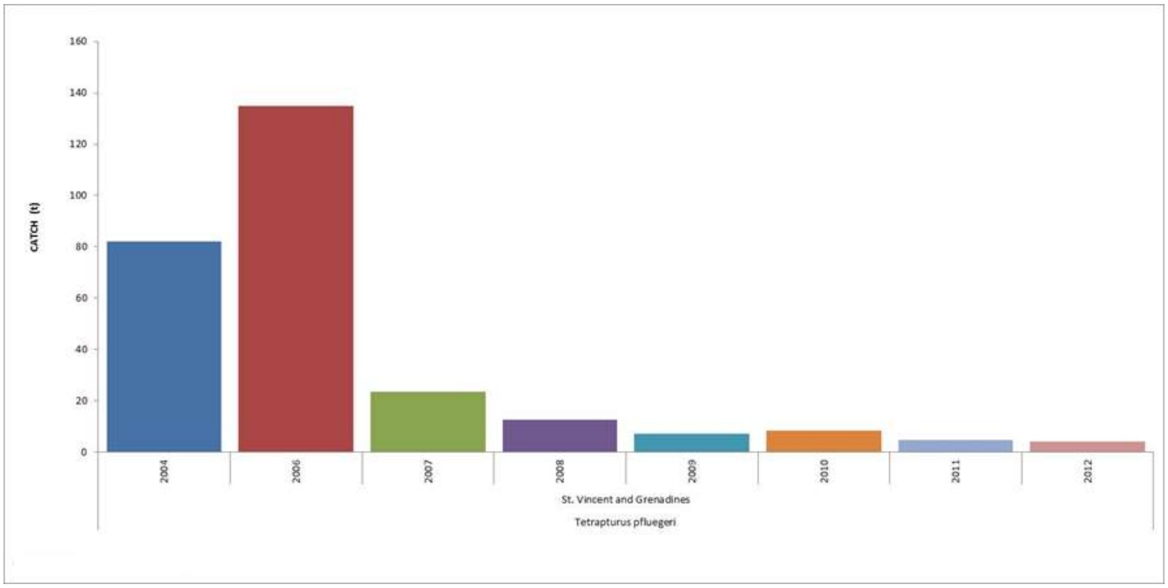


Figure 13. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by St. Vincent and Grenadines by year.

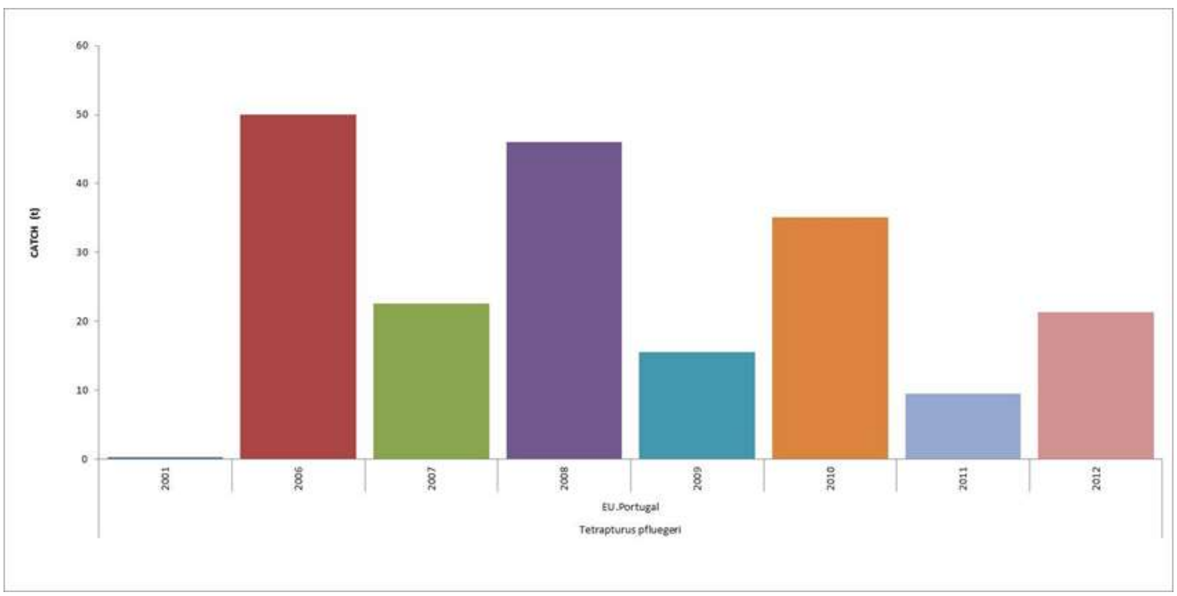


Figure 14. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by EU-Portugal by year.

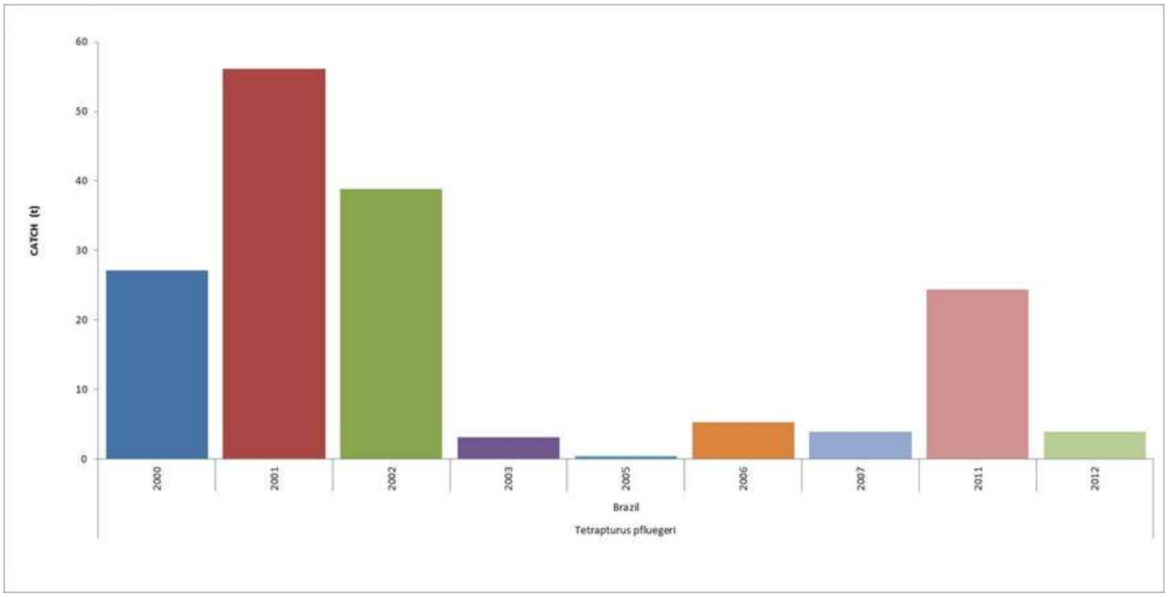


Figure 15. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Brazil per year.

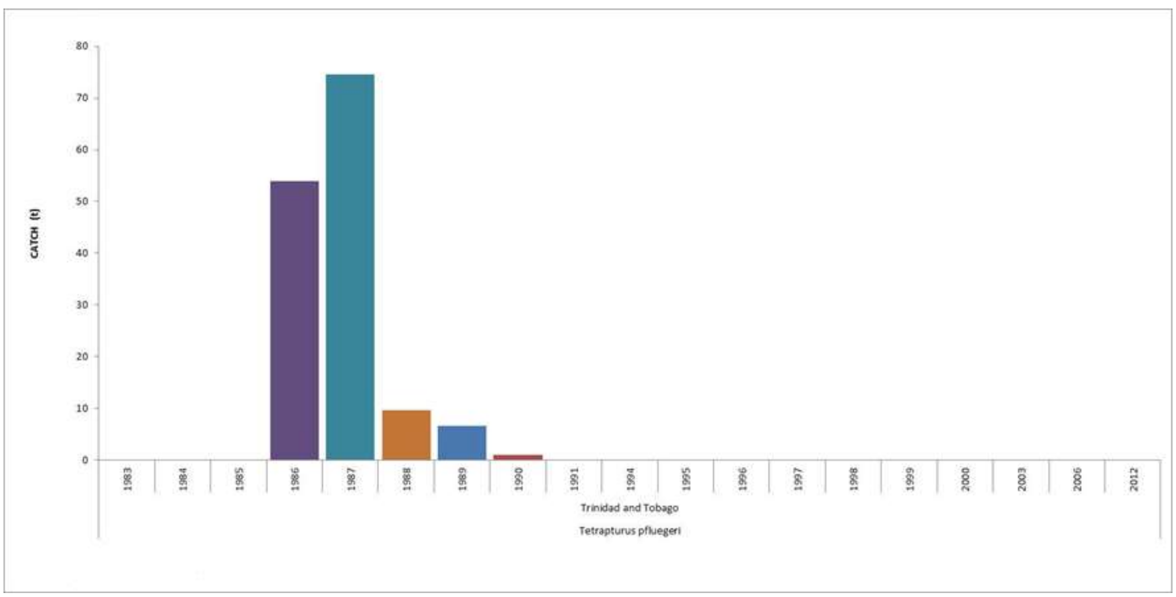


Figure 16. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Trinidad and Tobago by year.

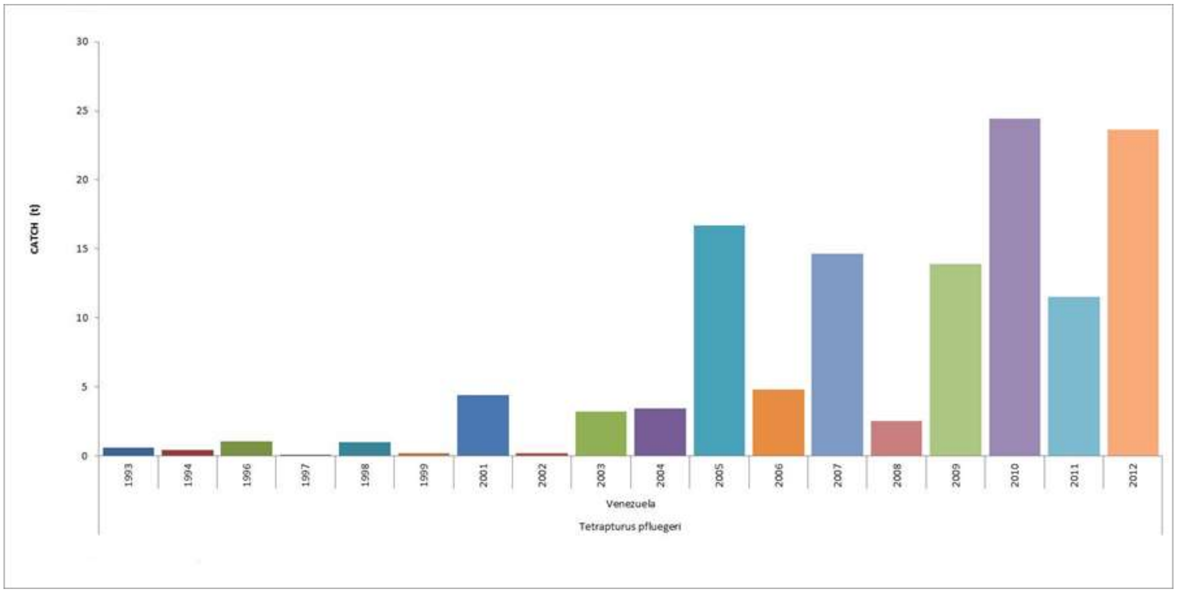


Figure 17. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Venezuela per year.

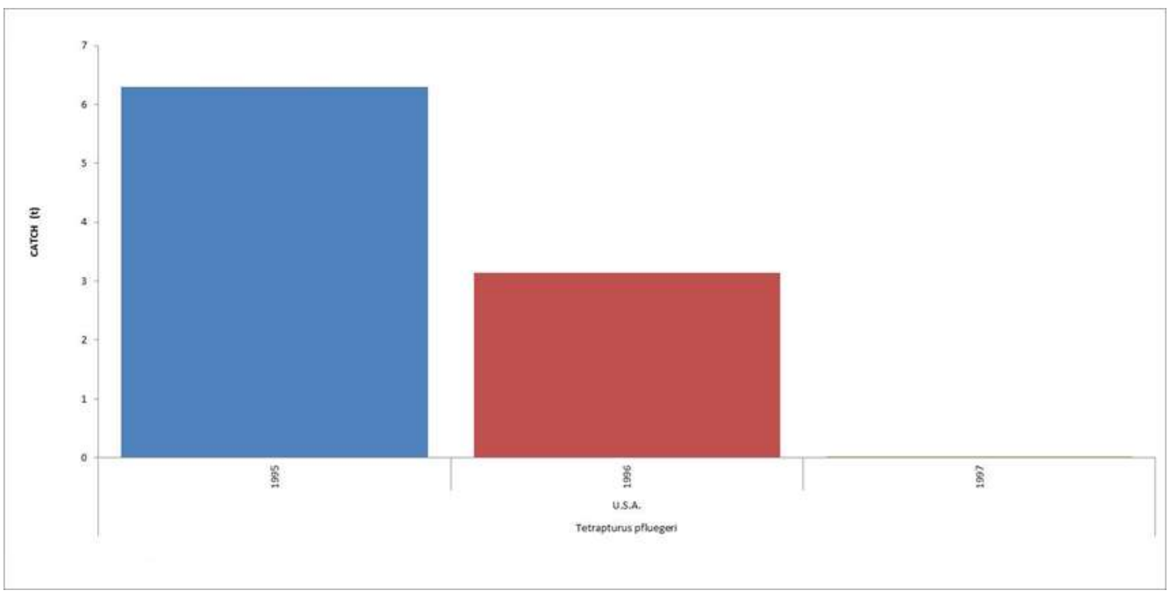


Figure 18. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by United States of America per year.

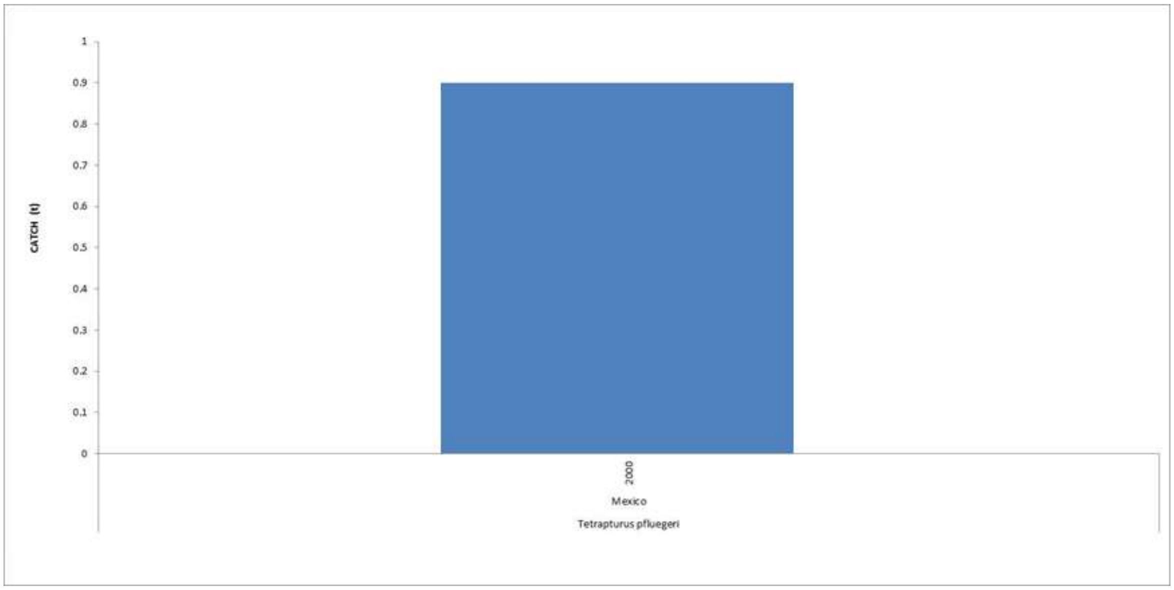
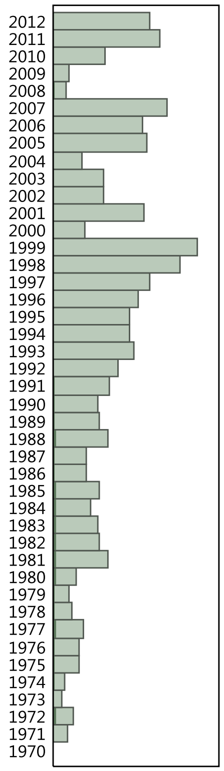


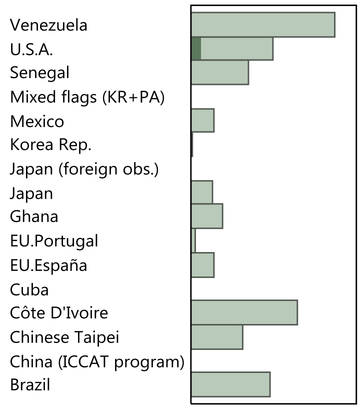
Figure 19. Task 1 catches (t) of longbill spearfish (*Tetrapturus pfluegeri*) by Mexico per year.

SAI Sz data ICCAT distributions

YearC



FlagName

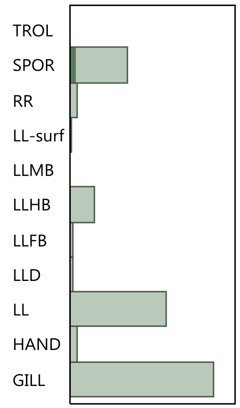


Frequencies

Level	Count	Prob
Brazil	4121	0.12577
China (ICCAT progra	16	0.00049
Chinese Taipei	2718	0.08295
Côte D'Ivoire	5519	0.16844
Cuba	11	0.00034
EU.España	1191	0.03635
EU.Portugal	255	0.00778
Ghana	1668	0.05091
Japan	1146	0.03498
Japan (foreign obs.)	22	0.00067
Korea Rep.	71	0.00217
Mexico	1178	0.03595
Mixed flags (KR+PA)	9	0.00027
Senegal	3035	0.09263
U.S.A.	4305	0.13139
Venezuela	7501	0.22893
Total	32766	1.00000

N Missing 0
16 Levels

GearCode

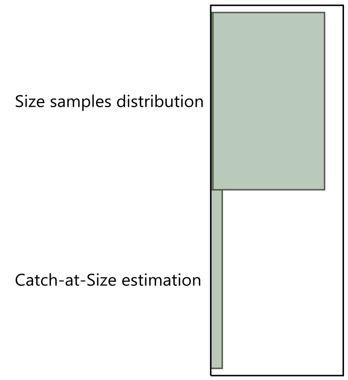


Frequencies

Level	Count	Prob
GILL	13685	0.41766
HAN	705	0.02152
LL	9109	0.27800
LLD	227	0.00693
LLFB	278	0.00848
LLHB	2383	0.07273
LLMB	20	0.00061
LL-su	89	0.00272
RR	738	0.02252
SPOR	5501	0.16789
TROL	31	0.00095
Total	32766	1.00000

N Missing 0
11 Levels

SizeInfo

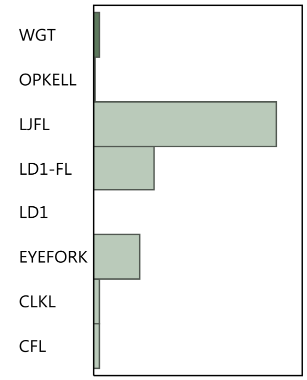


Frequencies

Level	Count	Prob
Catch-at-Size estimatio	2848	0.08692
Size samples distributio	29918	0.91308
Total	32766	1.00000

N Missing 0
2 Levels

FreqTypeCode



Frequencies

Level	Count	Prob
CFL	558	0.01703
CLKL	661	0.02017
EYEFOR	4905	0.14970
LD1	17	0.00052
LD1-FL	6393	0.19511
LJFL	19505	0.59528
OPKELL	164	0.00501
WGT	563	0.01718
Total	32766	1.00000

N Missing 0
8 Levels

Figure 20. General distribution of Task 2 Sz data for Sailfish. Number of observations per year, flag, gear, type of size information and measure units reported.

SAI Size *vs* Year boxplot distribution by Stock ID

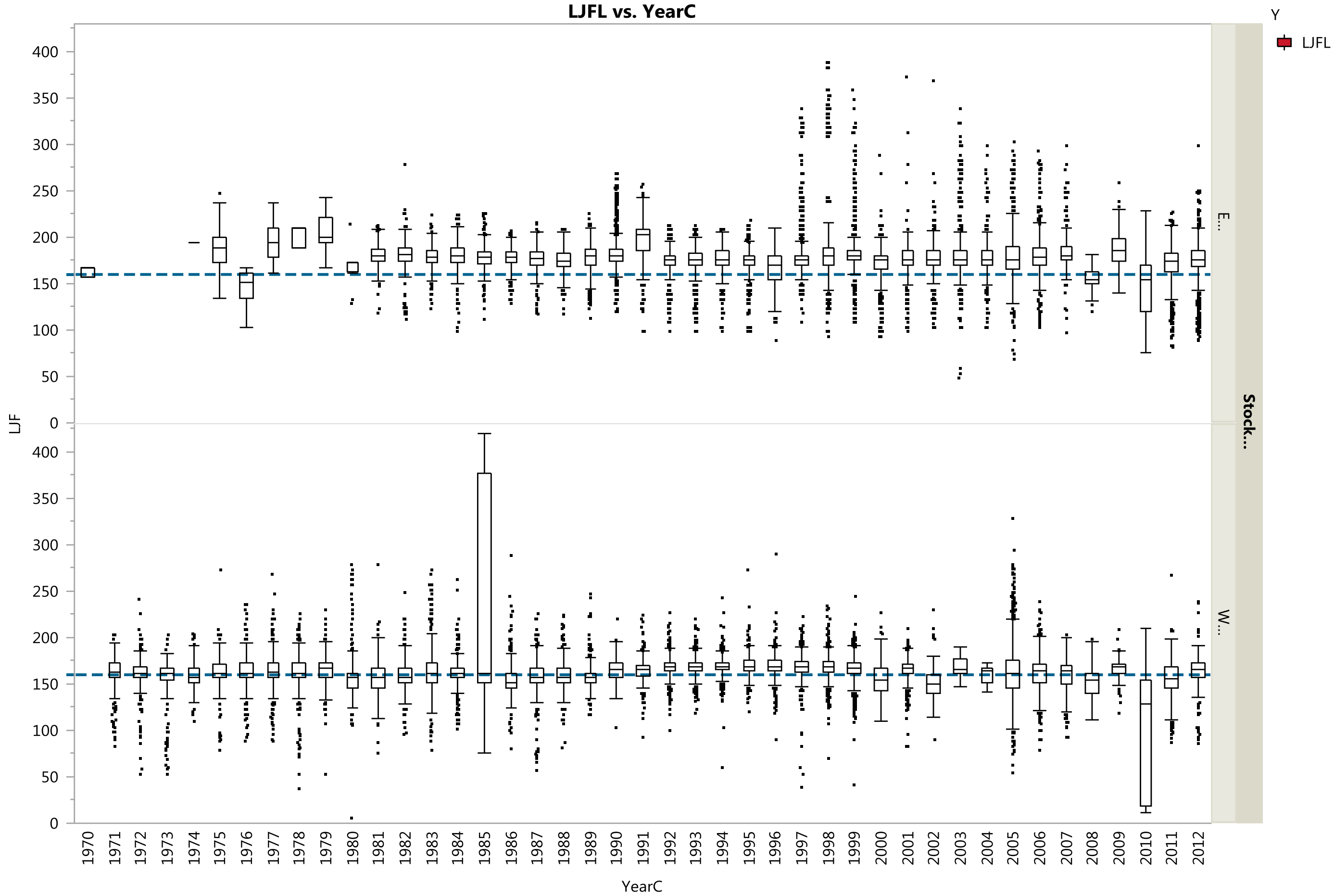


Figure21. SAI boxplot size distribution by year for the East and West stocks. The broken line represents the overall mean size (160 cm LJFL)

SAI size distribution for Flag by stock ID

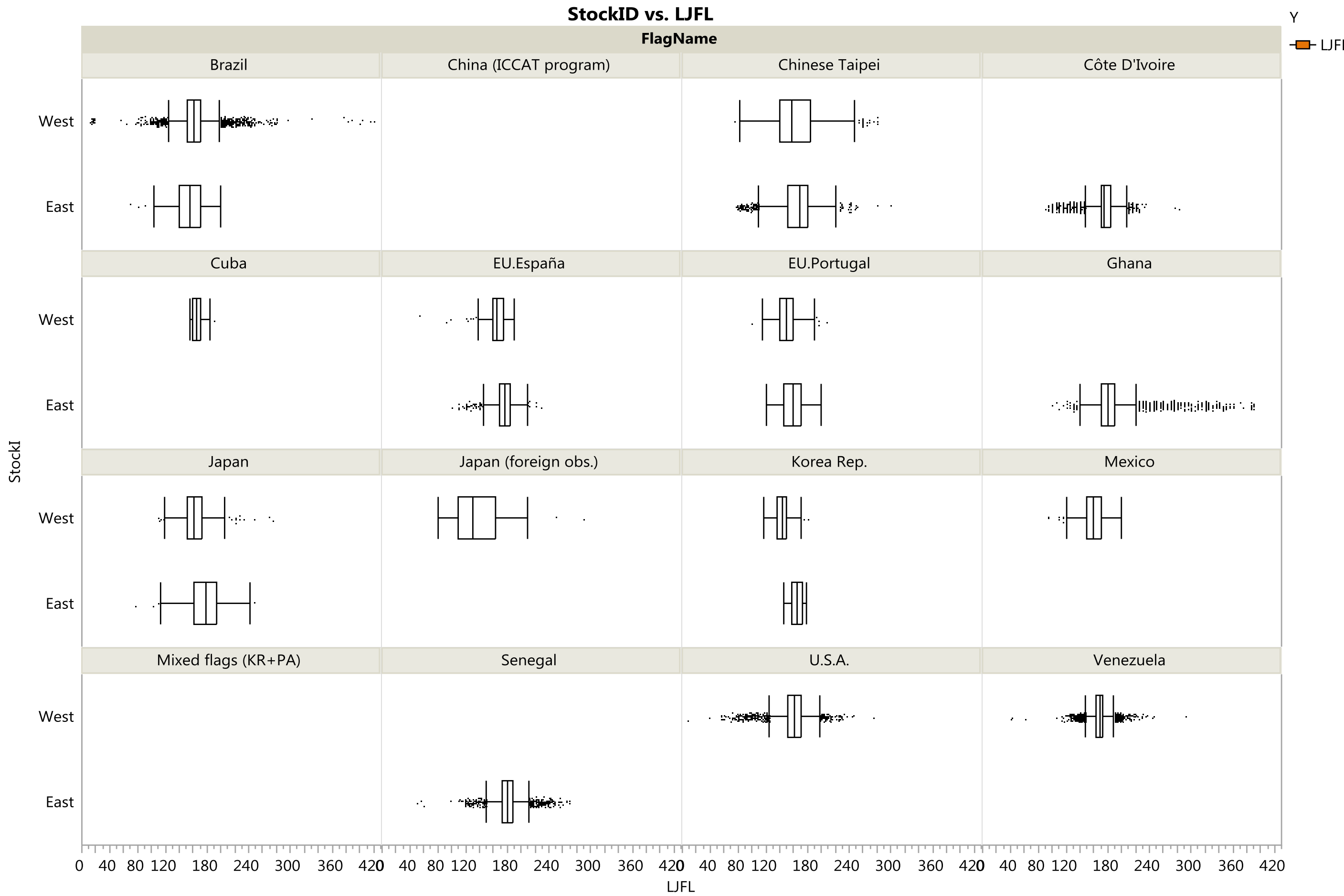


Figure 22. SAI comparison of size distribution by flag-fleet and stock.

SAI size density distribution by month for each stock ID

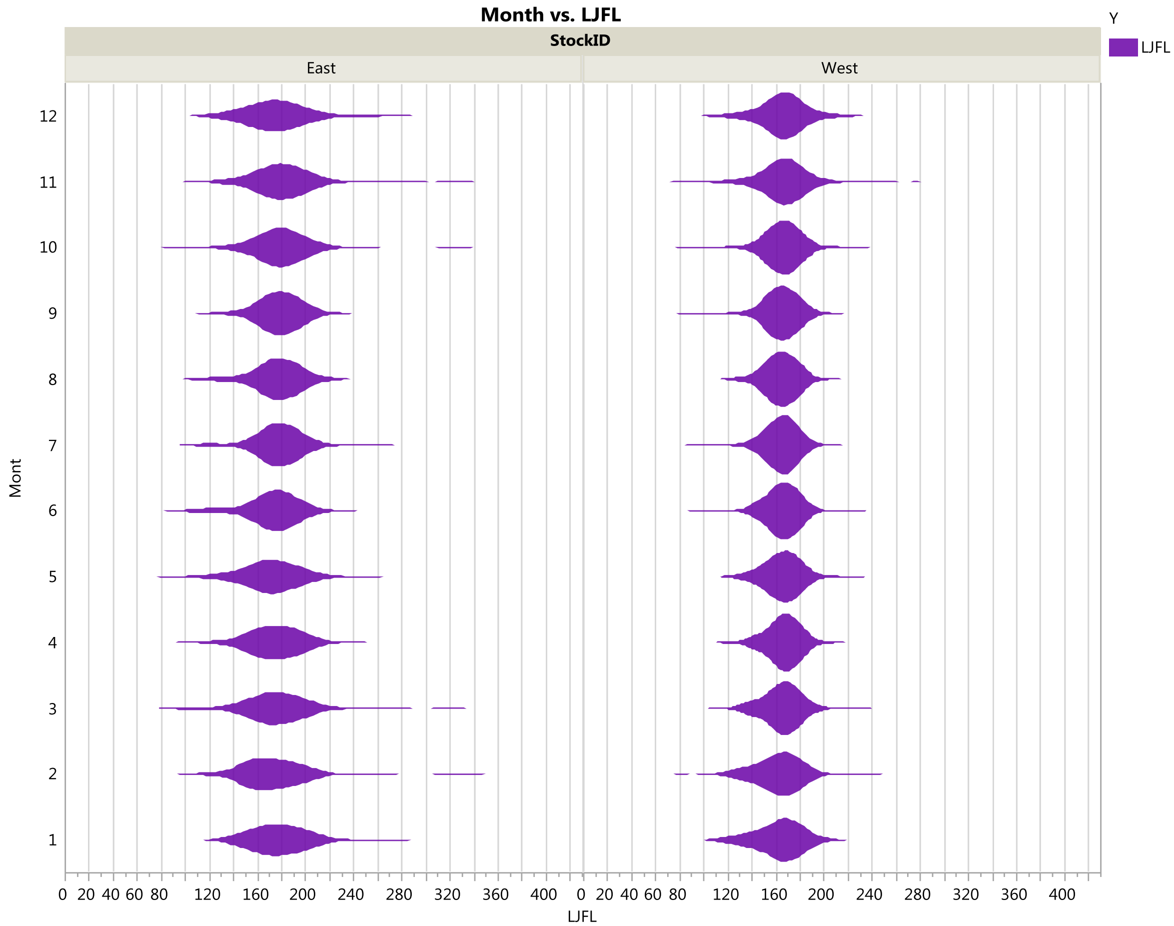


Figure 23. SAI size frequency density distributions of LJFL by month and stock ID.

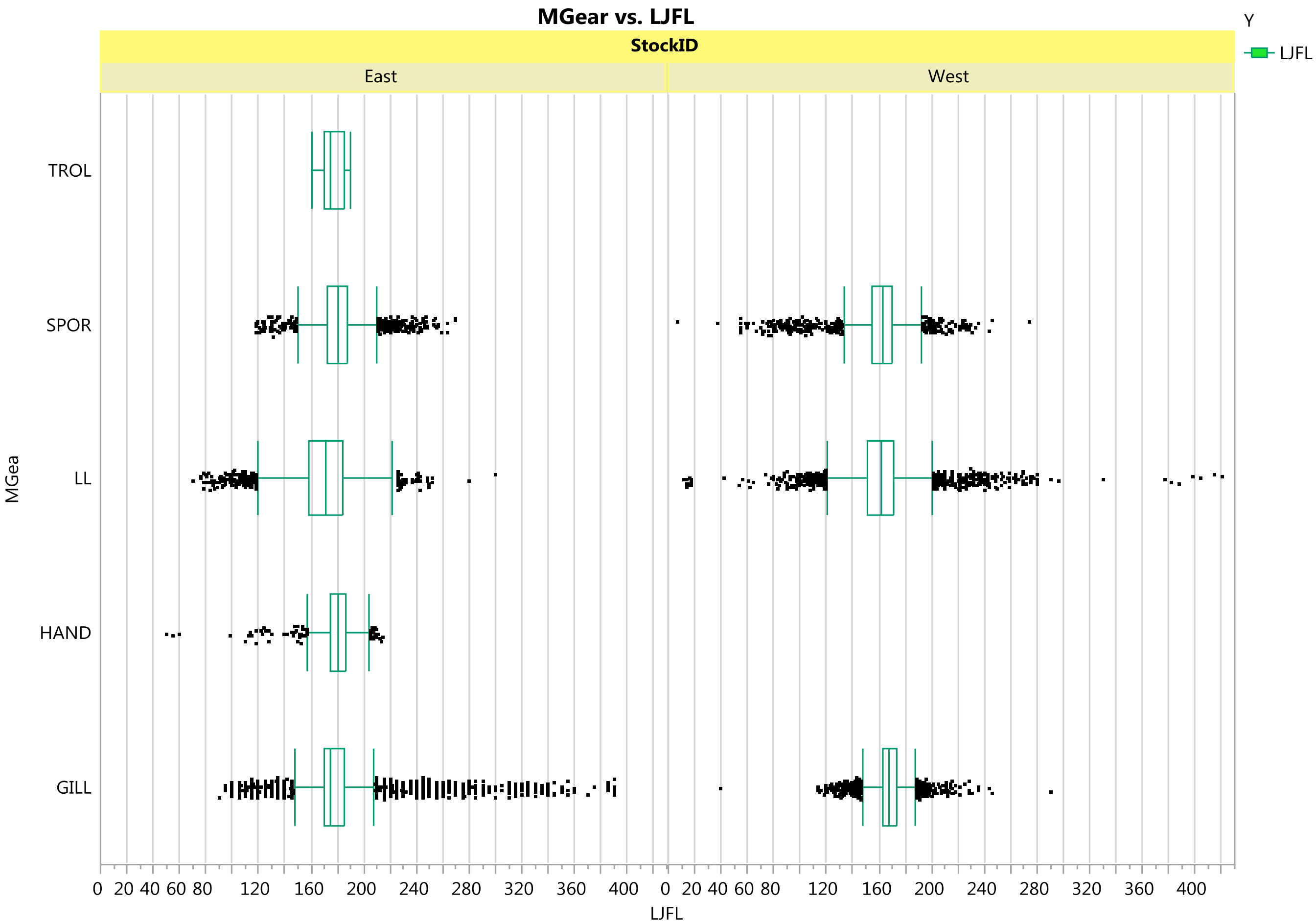
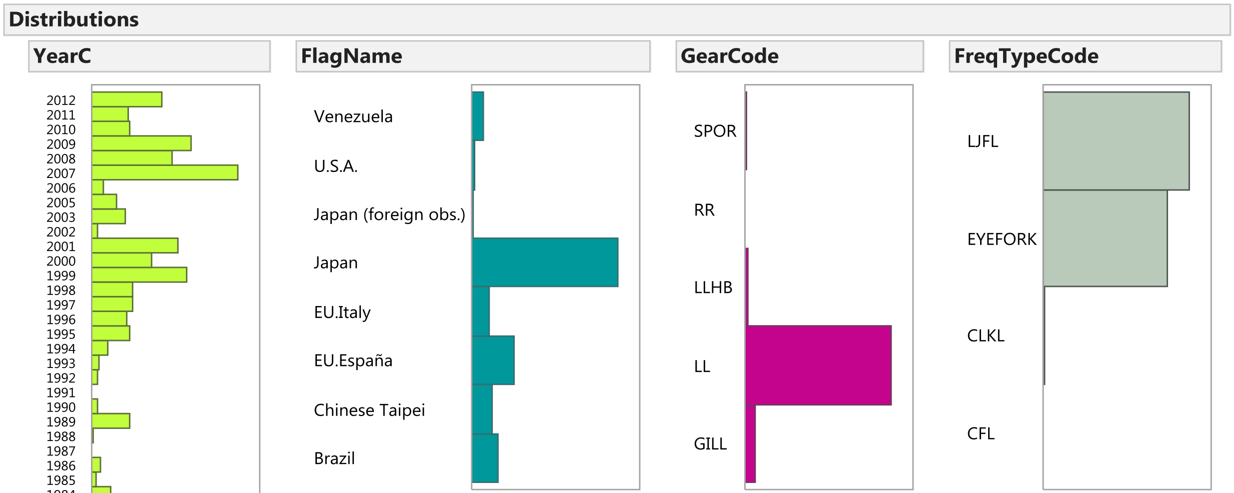


Figure 24 SAI size distributions by main gear and stock for sailfish.



Frequencies (FlagName)

Level	Count	Prob
Brazil	450	0.09969
Chinese Taipei	339	0.07510
EU.España	704	0.15596
EU.Italy	286	0.06336
Japan	2452	0.54320
Japan (foreign obs	31	0.00687
U.S.A.	47	0.01041
Venezuela	205	0.04541
Total	4514	1.00000

N Missing 310
8 Levels

Frequencies (GearCode)

Level	Count	Prob
GILL	286	0.06336
LL	4087	0.90541
LLHB	94	0.02082
RR	3	0.00066
SPO	44	0.00975
Total	4514	1.00000

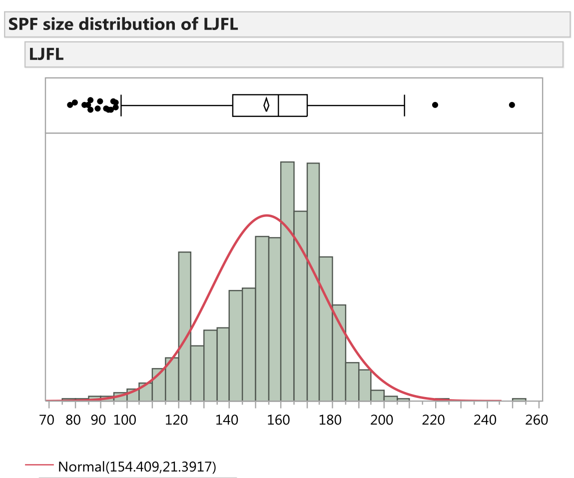
N Missing 310
5 Levels

Frequencies (FreqTypeCode)

Level	Count	Prob
CFL	3	0.00066
CLKL	35	0.00775
EYEFOR	2063	0.45702
LJFL	2413	0.53456
Total	4514	1.00000

N Missing 310
4 Levels

Figure 25. Available task 2 ICCAT longbill spearfish (SPF *Tetrapturus pfluegeri*) size samples by year, flag, gear and type of measure reported.



Summary Statistics

Mean	154.40853
Std Dev	21.391662
Std Err Mean	0.4352072
Upper 95% Mea	155.26194
Lower 95% Mea	153.55511
N	2416

Figure 26. Frequency size distribution LJFL of longbill spearfish ICCAT Task 2 SZ data.

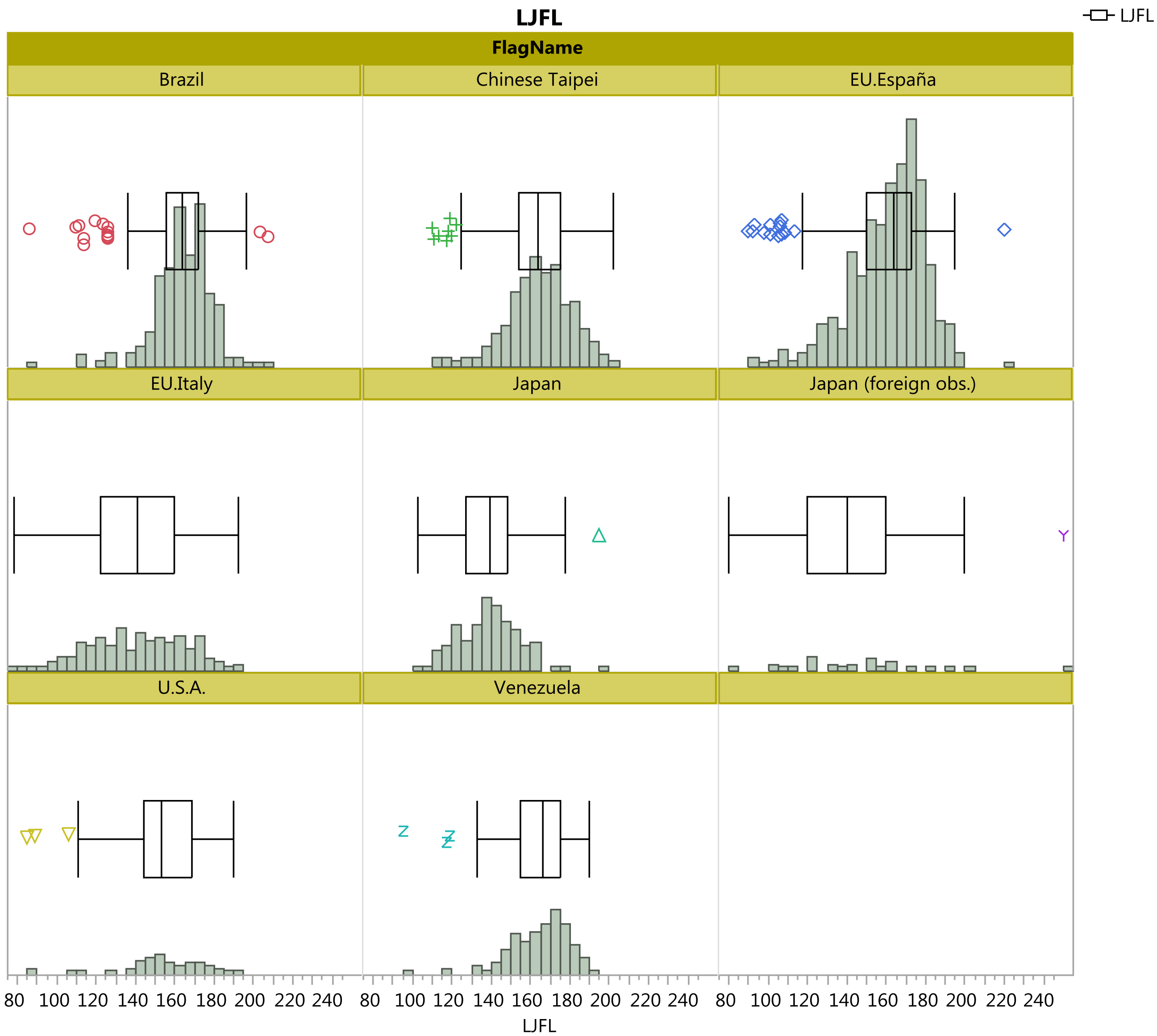


Figure 27. SPF Size distributions by flag

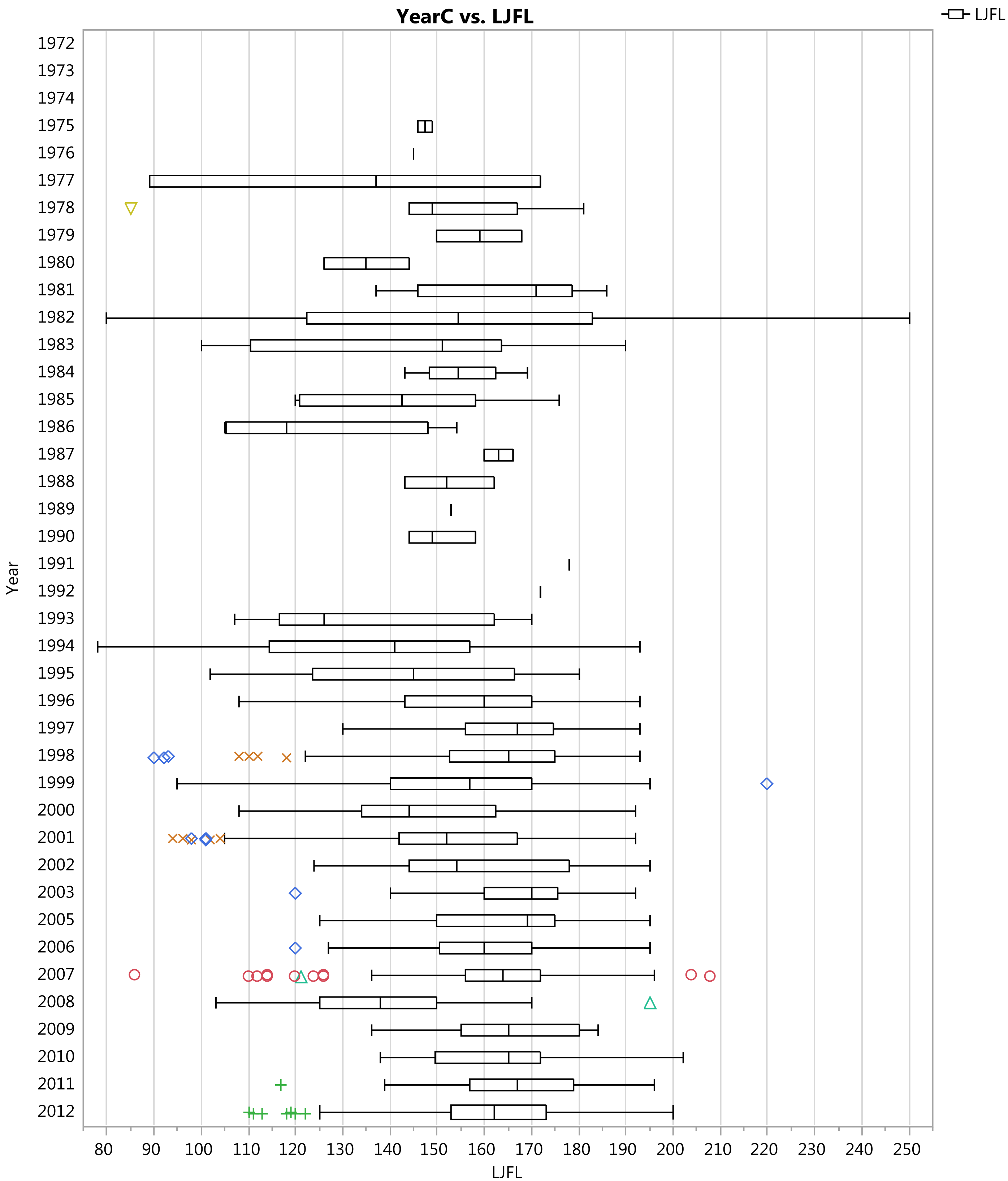


Figure 28. Boxplot of size SPF by year.

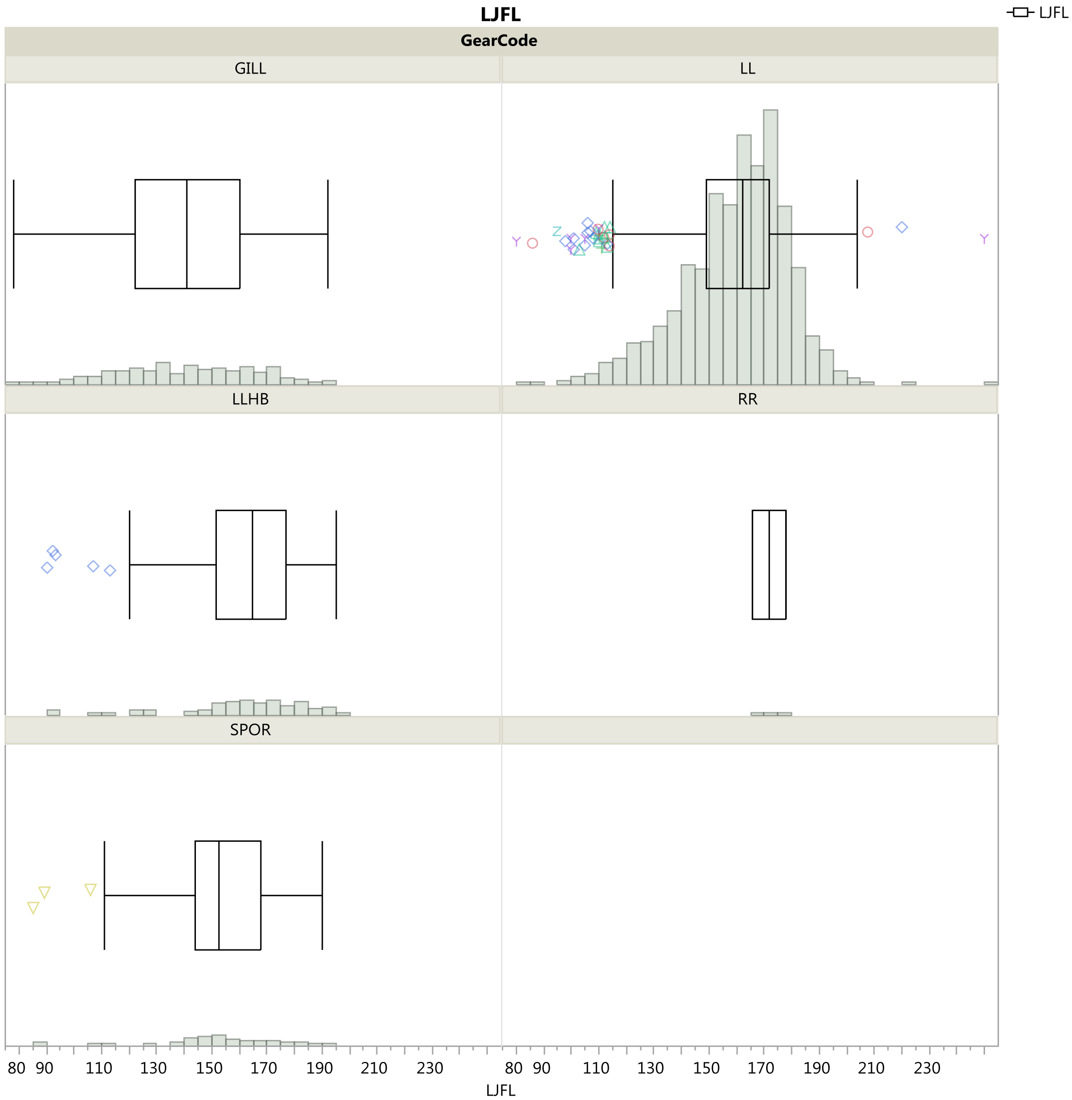


Figure 29. Frequnecy size distributions SPF by main fishing gear.

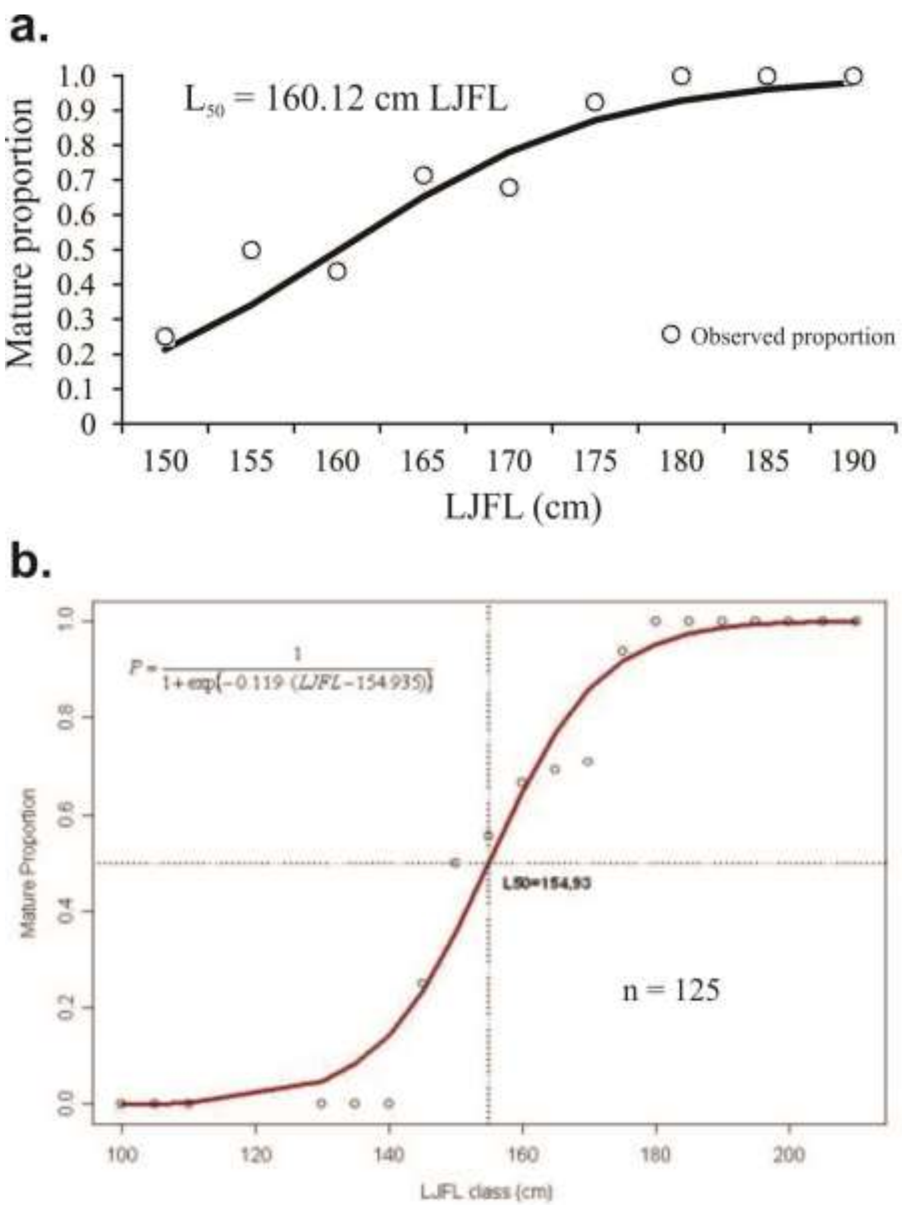


Figure 30. Proportion of mature female sailfish in the western Atlantic at 5 cm length intervals. Curve (a) illustrates the optimal logistic maturation ogive fitted by maximum likelihood for the samples from the Venezuelan fleets in the Caribbean Sea and off Guiana's shelf (from SCRS/2014/061), and the optimal logistic maturation ogive (b) fitted by minimum least squares for the samples from the Brazilian longline fleet in two areas from the southwest Atlantic (from SCRS/2008/080).

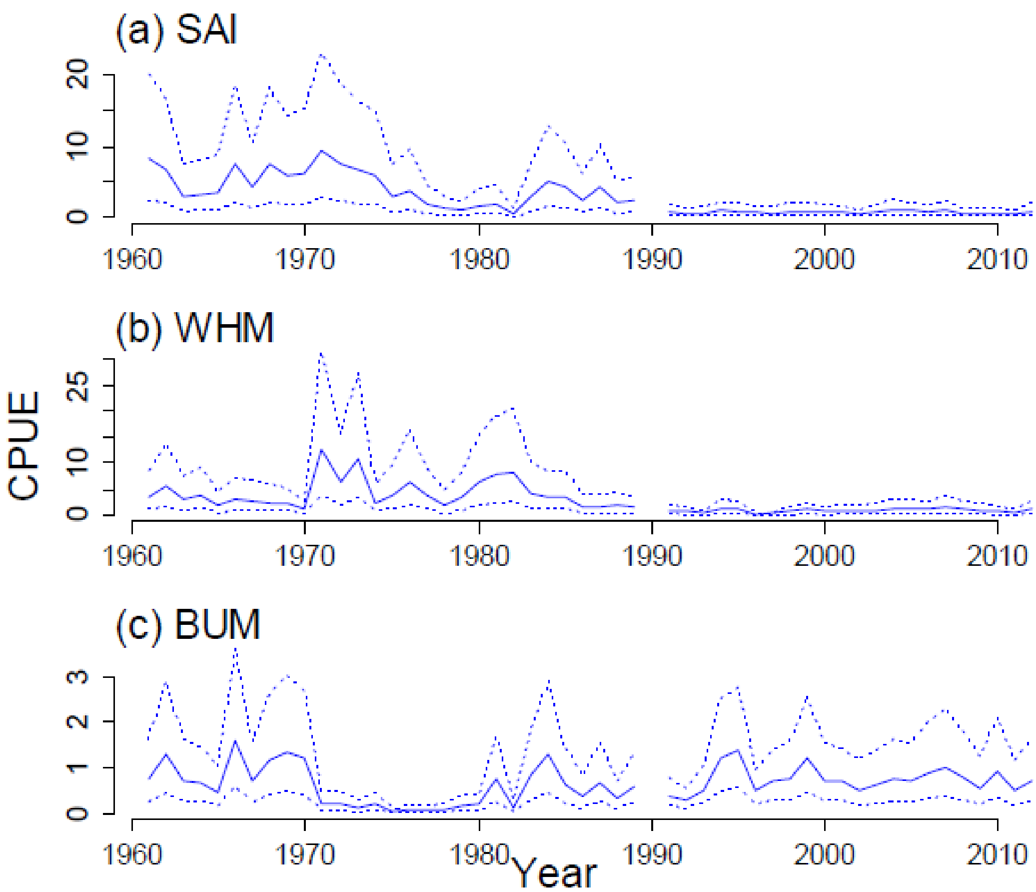


Figure 31 Relative abundance estimates for sailfish, white marlin and blue marlin for the area of La Guaira, Venezuela. Estimates were obtained from a GLM model fitted to a combined data set from a recreational and artisanal gillnet fleets. Reproduced from SCRS 2014/065. Data for the recreational fleet is available for 1961-2001 and for the artisanal fleet for 1991-2012.

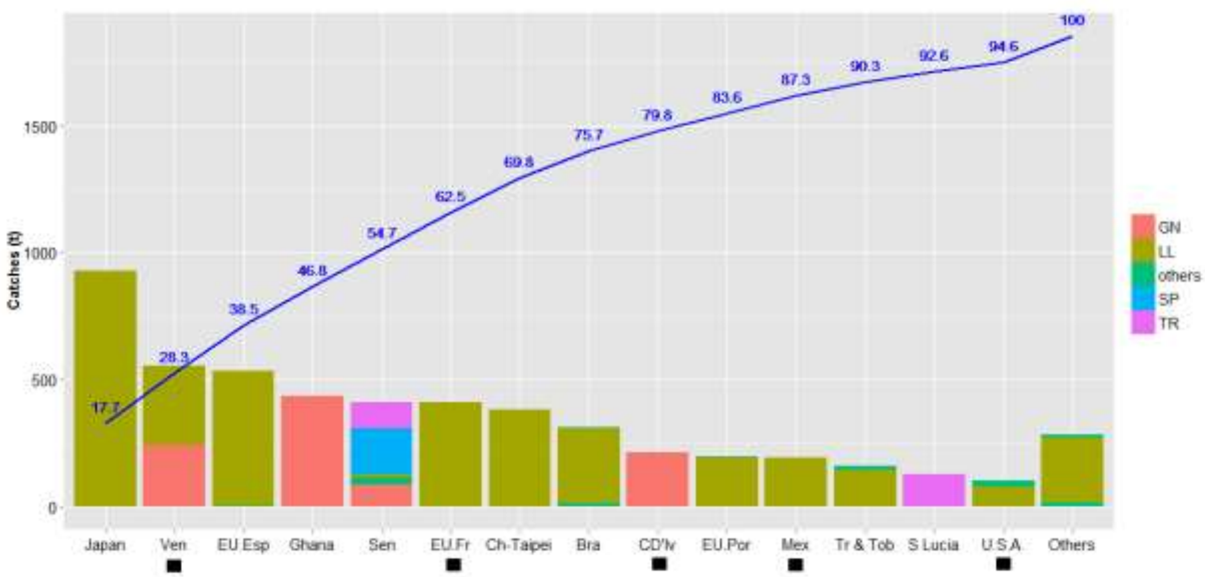
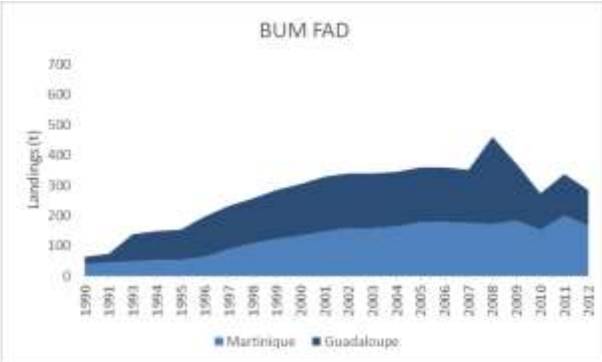


Figure 32 Billfish catches by flag and gear type (2012). Black filled squares in the x-axis indicate those flags that sent scientists to the 2014 Billfishes species group intersessional meeting.

(a)



(b)

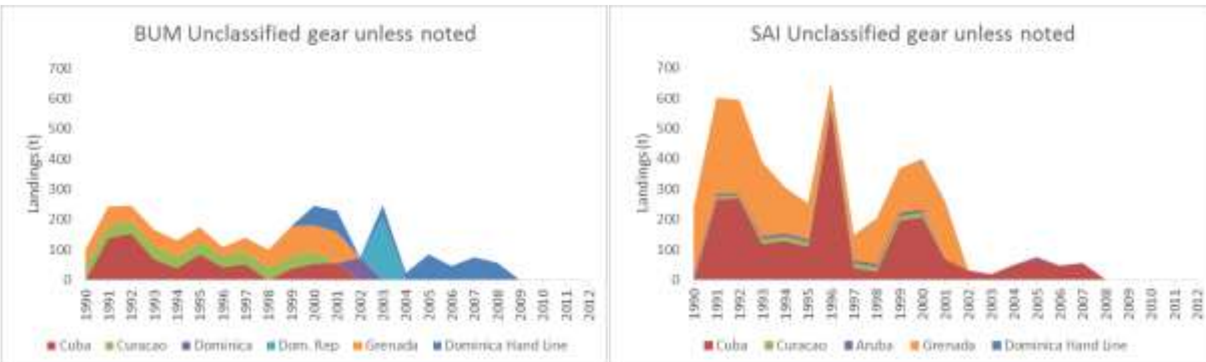


Figure 33 Catches of Blue marlin (a) made on anchored FADs by EU France vessels from Martinique and Guadaloupe (source: SCRS 2014/070) and (b) reported task I catches of BUM and SAI reported to ICCAT as handline or unknown gear by Caribbean countries that are known to use anchored FADs.

Appendix 1

AGENDA

1. Opening, adoption of Agenda and meeting arrangements
2. Review of basic information
   2.1. Task I (catches)
   2.2. Task II (catch-effort and size samples)
   2.3. Other information (tagging)
3. Review of biological data
4. Review of fishery indicators
5. Other matters
6. Recommendations
7. Adoption of the report and closure

Appendix 2

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Appendix 3

LIST OF DOCUMENTS

SCRS/2014/043	Billfish catch in the Venezuelan artsisanal off-shore pelagic longline fleet: past and present (1986-2013) Arocha, F., Larez A., Pazos A., Gutierrez X., Marcano L. and Silva 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 N'Guessan Constance, Amande Monin Justin, Konan Kouadio Justin, Soro Yaya
SCRS/2014/065	Standardized CPUE from the Rod and Reel and Small Scale gillnet fisheries of La Guaira, Venezuela. Babcock, E., F. Arocha.
SCRS/2014/067	Preliminary occurrence of istiophoridae larvae (perciformes, xiphioidei) in southern Brazil. Schmidt R.F. , Rodrigues T., 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., F. Arocha, A. Domingo, D. J. Die, A. Brazeiro, F. Hazin.
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.