2011 SHARKS DATA PREPARATORY MEETING TO APPLY ECOLOGICAL RISK ASSESSMENT

(Madrid, Spain - June 20 to 24, 2011)

1. Opening, adoption of Agenda and meeting arrangements

Dr. Pilar Pallarés, on behalf of the ICCAT Executive Secretary, opened the meeting and welcomed participants.

The meeting was chaired by Dr. Andrés Domingo, the Shark Species Group Rapporteur. Dr. Domingo welcomed Working Group participants and addressed the terms of reference for the meeting.

After opening the meeting, the Agenda was reviewed and adopted without changes (**Appendix 1**). The List of Participants is included 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:

Section	*Rapporteurs*
1, 8	P. Pallarés
2	M. Ortiz, C. Palma
3	E. Cortés
4	M. Neves dos Santos, K. Yokawa
5	G. Díaz, J.M. Ortiz de Urbina
6, 7	A. Domingo

2. Review of basic information

2.1 Task I fleet and catches

The Secretariat presented a summary of the information on sharks submitted by the CPCs. **Table 1** shows for Task I fleet characterization the current distributions of the number of longline vessels reported by CPCs. Note that data for 2010 are preliminary as most of the CPCs are expected to submit this information later in the year (July 31). It was noted that the high number of vessels reported by Grenada in 2005 (855 vessels), corresponded to small longliners of less than 50 GRT and that there is no information reported by this CPC for other years.

The pelagic longline fleet is considered the most important component for interactions with most species of pelagic sharks and some skates and rays.

Figure 1 shows the annual trend of the number of longline vessels reported by CPCs. In the last five years of the time series, the number of vessels varied between 500 and 2500. **Table 2** and **Figure 2** show the frequency distribution of longline vessels by GRT category. It is important to note that not all vessel records have both the length (LOA) and GRT information. There has been an increase in the number of longliners particularly of small size (< 50 GRT) and it is unclear if this increase is due to better reporting, fleet increase, or a combination of both.

Table 3 shows the overall total catch of sharks and other elasmobranches reported in Task I. Note that the 1992-1995 increase is due mainly in response to the creation of the sharks species group and the request for catches of sharks and related species. In recent years the total catch has oscillated between 70 and 90 thousand tons (t). Data for 2010 are considered preliminary. **Table 3** highlights the CPCs that reported catches of sharks in recent year and that have not yet done so in 2010. **Table 4** presents the annual trend of catch blue shark, porbeagle and shortfin mako since 1990. **Table 5** presents the reported catches for the all species considered by the Group for the ERA analysis (**Figures 3** and **4**). These included blue shark (*Prionace glauca*), shortfin mako (*Isurus oxyrinchus*), longfin mako (*Isurus paucus*), porbeagle (*Lamna nasus*), white shark (*Carcharodon carcharias*), smooth hammerhead (*Sphyrna zygaena*), scalloped hammerhead (*Sphyrna lewini*), thresher (*Alopias vulpinus*), bigeye thresher (*Alopias superciliosus*), oceanic whitetip shark (*Carcharhinus longimanus*), silky shark (*Carcharhinus falciformis*), night shark (*Carcharhinus signatus*), dusky shark (*Carcharhinus obscurus*), sandbar shark (*Carcharhinus plumbeus*), and tiger shark (*Galeocerdo cuvier*). For the crocodile shark (*Pseudocarcharias*

kamoharai), pelagic stingray (*Pteroplatytrygon violacea*), and the giant manta (*Manta birostris*) there are not reported catches in ICCAT databases.

It was noted that in the Pacific and Indian Oceans there are significant catches of tropical sharks associated with tuna fisheries other than longline including the purse seine fleet (Watson et al. 2009). It was recommended by the Group to request CPCs with purse seine fleets to review and evaluate catches of sharks by these fleets in the Atlantic and Mediterranean Sea, since it seems to be some by-catch on sharks associated to these fleets (Arrizabalaga et al 2011).

2.2 Task II catch-effort and size samples

The Secretariat summarized and presented the available information on catch and effort information submitted through the Task II. **Table 6** provides a view of the information submitted by CPCs on sharks catch and effort for the Species Group to be included in the ERA analysis. The table describes the year and flags that have provided data either in numbers or weight units. With regards to size information, **Table 7** shows the available size frequency information provided by species and year. The degree of detail by geographic specification, measurement type and units is quite variable. In some cases, information was provided by weight categories, but most commonly in length units. However, there is no standard measurement for most species (**Table 8**). The Group recommended that standard measurement units be defined and that further research studies be conducted to estimate conversion factors of size measurements, weight and size-weight measures. This information should be communicated to the Secretariat. **Table 8** presents the current size/weight information in the ICCAT database by flag and by type of information provided. The Group also recommended that size information be reported by sex because many shark species have sex-specific growth patterns and this information can be relatively easily collected by observers programs.

The Secretariat also presented a preliminary update of the estimated longline effort in the Convention area. This estimate (EFFDIS) has been used in the past to infer the overlap between longline fishing effort and the spatial distribution of some particular species (e.g., seabirds). The methodology and assumptions used to estimate the longline effort (developed and adopted as preliminary by the SCRS in the past) were explained to the Group (Palma C. and Gallego J.L., 2010). However, current analysis separating the Atlantic and Mediterranean Sea suggested that the input information for the Mediterranean is very limited. **Table 9** and **Figures 5** and **6** show a summary of the estimated EFFDIS. The plots of **Figure 6** show the average of five years for the annual total estimated number of hooks in a 5ºx5º grid cell, color shades are proportional to the values.

In the case of the shark ERA analyses, the EFFDIS will also be used to assess the overlap between longline effort and the shark species. However, the Group expressed several concerns with the methodology and substitutions required for the EFFDIS estimation including:

- The use of average mean weight to convert catch in number to catch in weight, particularly for those CPCs that already submit detailed information and have a high coverage of Task II C/E data (i.e. Japan, US, and other fleets).
- Using estimates of CPUE to replace data of effort submitted by CPCs in recent years.
- The contrast in the quality and availability of data among CPCs that seems to become more apparent in recent years.
- Lack of consideration of variations in fishing operations, such as depth of setting, changes in targeting, seasonal and spatial trends that are not taken into account when estimating mean annual weight.

The Group recognized the importance of the EFFDIS information, but considering the prior concerns and the data gaps that still exist in the ICCAT database (for some important fleets and historically), it recommends that:

a) The Secretariat to finalize the update of the EFFDIS.

b) A review by the Stock Assessment Methods Working Group of the protocols and methods used to estimate EFFDIS.

c) Encourage CPCs to submit direct estimates of their fishing effort distribution in the 5x5 square degree or better geographic resolution for current and historical data, when possible, and inform the Secretariat to exclude them from the estimation procedure.

d) Review and evaluate the data quality for the estimation of EFFDIS in the Mediterranean Sea.

2.3 Tagging

The Secretariat presented a summary of the current conventional tagging information available in the ICCAT database. Most of reported tag releases are for blue shark, over 20 thousand releases and about 900 recaptures (**Table 10**). Over 50% of the recaptures are within a year at large; however, there are reports of blue shark recovered after 15 years at large. **Figure 7** shows the distribution of releases and recaptures as a density plot in 5x5 degree squares. The main areas of the releases are from the regions off Ireland, the US, and southern Brazil and Uruguay, while most of the recoveries are from the north central Atlantic region. For shortfin mako (**Table 11** and **Figure 9**), there are over 900 releases with 137 recaptures, most of them within 2 years at large; but there were tagged shortfin mako that remained at large for up to 5 years. Almost all releases and recaptures were concentrated in the northeast coast of the US. In the case of porbeagle, there are 246 tag releases and 166 recaptures (**Table 12 and Figure 8**). In this case, it is likely that reports of releases are incomplete as in early years CPCs only reported releases of recaptured fish. Tagged porbeagles were recovered up to 10 years at large, but most of them were recovered within 2-3 years. **Table 13** shows the tag releases by year of other sharks included in the list of ERA evaluation. **Table 14** presents the recoveries of other sharks by species and years at large.

The Group noted that with conventional tags there is no information on the type of conventional tag used, at least for tags not provided by the Secretariat. Therefore, the Group requested that national scientists provide information on the type of tag and particularly the tag-anchor type and construction to carry out analyses of tag shedding in sharks. The Group also recommended that CPCs submit to the Secretariat all tag release information from tagging programs aimed at pelagic sharks and also to include the summary from electronic tag research projects. It was noted that the Secretariat recently received release-recapture information for 2009 and 2010 that will be incorporated in the database soon.

3. Review of information for the Ecological Risk Assessment (ERA)

The following documents were presented in this section: SCRS/2011/086, SCRS/2011/094, SCRS/2011/095, SCRS/2011/096, SCRS/2011/092, SCRS/2011/099, SCRS/2011/100, SCRS/2011/101, SCRS/2011/102, SCRS/2011/085, SCRS/2011/091, SCRS/2011/093, and SCRS/2011/103.

Document SCRS/2011/086 presented distribution and maturity information on the bigeye thresher shark from the Atlantic Ocean. Significant differences were found in the size distribution of the species and the sex ratios between the North and South Atlantic. Sizes at first maturity (L50) were estimated at 206.09 cm FL for females and 159.74 cm FL for males.

Suggestions were made to investigate sex ratios by quarter of the year and by maturity stage (juveniles vs. adults). Other questions involved available information regarding nursery grounds of bigeye thresher shark in the Atlantic Ocean. The issue of future data/sample collection for species that are now prohibited to be retained on board was raised since the collection of samples from those species is currently very limited. To that end, it is recommended that scientific observers be allowed to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs).

SCRS/2011/094 presented information on the diet of tiger shark in subtropical waters of the southwest Atlantic Ocean. This species is an opportunistic predator-scavenger which feeds on a wide variety of prey, including fish, mollusks, crustaceans, marine mammals and reptiles. Information on prey items, based on in-situ analysis of stomach contents of 11 tiger sharks incidentally caught by a Uruguayan pelagic longliner targeting swordfish was presented. Of the 11 analyzed stomachs, 1 was everted, 3 were empty, 6 presented a low degree of repletion, and 1 was full. The results of this work provide new information on dietary items of tiger sharks in the South Atlantic Ocean, and confirm the opportunistic nature and low degree of specialization of this top predator.

SCRS/2011/095 reported on the presence of birds in blue shark stomachs in three areas of the Southwest Atlantic Ocean: the continental slope off Uruguay, international waters off southern Brazil, and the Rio Grande Rise. A total of 621 stomachs were examined, and the relative frequency of occurrence (%FO) of birds was calculated for the stomachs with food. A total of 21 birds (%FO=6.31%) consumed by sharks were recorded, including seabirds (Spheniscidae, Diomedeidae, Procellaridae) and land birds (Thraupidae, Charadriidae). In the Uruguayan continental slope bird %FO was 12.5% (n = 17 birds), while in international waters off southern Brazil %FO was 4.17% (n = 4 birds), and no birds were recorded in stomach contents of samples collected in the Rio Grande Rise. Studies conducted in multiple regions of the world have shown that seabirds are not important

dietary items for blue sharks. However, our results show that seabirds are more frequent prey in the Uruguayan slope than in other regions of the Atlantic Ocean. This may be related to differences in the distribution and abundance of the prey species (albatrosses, petrels and penguins). The occurrence of land birds in the diet is not unusual in the region and could be related to birds being carried away from land by strong winds, thus becoming prone to predation by blue sharks. In response to a question about the presence of other species of sharks in stomachs of blue sharks, it was noted that no sharks have been recorded as prey.

A presentation on reproduction and life history aspects of the pelagic stingray in Brazilian waters was made based on data that are being included in a paper to be submitted for publication. The pelagic stingray is the only dasyatid species that is fully pelagic in behavior. Specimens were collected between October 2005 and March 2010 by observers on Brazilian commercial longline fishing vessels operating off the Brazilian coast. A total of 480 specimens, 188 females (39.2%) and 292 males (60.8%), were examined to document reproductive biology. Disc widths (DW) ranged from 28.0-66.0 cm (mean ± S.E. = 50.0 ± 0.4 cm DW) for females and from 34.0 - 59.6 cm (mean = 45.5 ± 0.1cm DW) for males. Females were classified as juvenile (n=42; 22.7%); maturing (n= 67; 36.2%); pre-ovulatory (n = 28; 15.1%); pregnant stage 1 (n=17; 9.2%); pregnant stage 2 (n = 13; 7.0%); pregnant stage 3 (n = 2; 1.1%); postpartum (n = 6; 3.2%); and resting (n = 10; 5.4%). The DWs of females in the three pregnant stages (n = 32; 17.3%) ranged between 48.0-60.0 cm. Size at first sexual maturity was estimated at about 44.8 cm DW for females and at 37.0 cm DW for males, since all sampled specimens equal or larger than these sizes were fully mature. Ovarian fecundity, considering only follicles larger than >0.5cm in diameter, ranged from 1to 17 (mean = 5.4 ± 0.3; n = 72) follicles/female. Uterine fecundity of embryos in pregnancy stage 2 and 3 females ranged from 1to 5 (mean = 3.5 ± 0.3; n = 15) pups/female.

Preliminary data on age and growth, sex and size composition of the pelagic stingray in the Southwest Atlantic Ocean were also presented.

SCRS/2011/096 reported on the population structure of porbeagle in the southwest Atlantic Ocean. Information on catch, effort, CPUE, sex and length composition, reproductive aspects, and length conversions obtained by the Uruguayan National Program of Observers (DINARA) onboard the tuna fleet during 1998-2010 was presented. A total of 1595 individuals were recorded, with a CPUE of 0.43 sharks/1000 hooks. A strong correlation was observed between higher values of CPUE and lower values of sea surface temperature (SST). The sex ratio for the whole period was 1.95:1 males to females and seasonal variation was observed. A total of 1291 individuals were measured (FL), mean length for males was 147 ± 40.5 cm (range: 66-226 cm, n = 825) and for females, 129 ± 40.8 cm (range: 67-221 cm, n = 443). A pregnant female was observed, with 4 embryos (2 males and 2 females) with a FL of 67 cm. Based on embryo size and minimum length of free-ranging individuals, it was determined that the size at parturition is close to 66-67 cm FL. Based on the individuals measured, linear regressions for FL vs. PCL (precaudal length), FL vs. UCL (upper caudal lobe), PCL vs. UCL, and FL vs. TL were presented.

SCRS/2011/092 presented data on movements and habitat use of the blue shark in the southwest Atlantic Ocean obtained through satellite telemetry. The blue shark has a circumglobal distribution, occurring in tropical and temperate epipelagic environments. It is characterized by complex movement patterns related to its feeding and reproduction. Although it is one of the most ubiquitously caught species in pelagic longline fisheries, there is a lack of information that generates a high degree of uncertainty for stock assessment. Between March and April 2010, five blue sharks caught by a Uruguayan fishing boat were fitted with satellite transmitters by a scientific observer of DINARA's National Program of Observers. Results of this work complement those obtained by observer programs and conventional tagging programs. Results are also important to assess the susceptibility of blue shark to the different fisheries that operate in the South Atlantic Ocean.

SCRS/2011/099 presented data on habitat use and movement patterns of oceanic whitetip, bigeye thresher, and dusky sharks based on archival satellite tags. This study was part of a larger program to determine the habitat use and movement patterns of pelagic and semi-pelagic sharks in the U.Ss South Atlantic Ocean and Gulf of Mexico. Since 2007, three species of sharks have been tagged with data obtained on three species. An oceanic whitetip shark tagged in the western Gulf of Mexico moved a straight-line distance of 238 km during one track. During the track, the shark rarely dove below 150 m and instead, stayed above the thermocline. The deepest depth attained was recorded from one dive to 256 m. The most frequently occupied depth during the entire track was 25.5-50 m (49.8% total time) and temperature was 24.05-26 °C (44.7% total time). One bigeye thresher shark moved 51 km from the initial tagging location and exhibited a diurnal vertical diving behavior. The most common depths and temperatures occupied were between 25.5-50 m (27.3% total time) and 20.05-22 °C (52.5% total time). The bigeye thresher dove up to 528 m and deeper dives occurred more often during the day with time spent above the thermocline during night. Tags have been deployed on dusky sharks; one tag is pending pop-off,

four tags transmitted unusable data, and three provided data that could be analyzed. Based on geolocation data, sharks generally traveled an average of 691 km in total. Overall, mean proportions of time at depth revealed dusky sharks spent the majority of their time in waters 0-40 m deep but did dive to depths of 400 m. Dusky sharks occupied temperatures of 20.5-24 °C over 50% of the time. Tagged sharks had varied movement patterns. One shark that was tagged off Key Largo, Florida (USA) in January moved north along the east coast of the United States, then meandered around the Charleston Bump before continuing north to the North Carolina/Virginia border in June. A second shark also tagged off Key Largo, Florida in March travelled south towards Cuba before the tag sent data two weeks later. The third shark, tagged off North Carolina in March, moved little from where it was initially tagged. While data for some species is limited, these results will be useful in providing habitat use data as inputs to Ecological Risk Assessments.

SCRS/2011/100 presented data on habitat use and movement patterns of a scalloped hammerhead shark in the northern Gulf of Mexico based on high-rate pop-off archival satellite data. High-resolution data were collected on the diel movement patterns and environmental preferences of a presumably mature female scalloped hammerhead tagged in the northern Gulf of Mexico on 19 June 2008. The tag remained on the shark for 27 days. The shark exhibited a consistent and predictable diel vertical movement pattern. During the day, 86% of the shark's time was spent between 20-100 meters. During night hours the majority of the shark's time (70%) was spent in surface waters; however, the shark repeatedly made deep dives to depths associated with the seafloor. The frequency of night dives increased throughout the duration of tag deployment and could have been influenced by the lunar cycle. Though this information is limited to a single individual, this type of diel vertical behavior demonstrates the vulnerability of this species to both surface and bottom longline fishing gears.

SCRS/2011/101 presented data on habitat, seasonal movements and environmental data of dusky shark in the northern Gulf of Mexico based on pop-off archival satellite tags. During the summers of 2008-2009, pop-up satellite archival tags (PSAT) were attached to 10 dusky sharks (eight adult, two sub-adult) in the GOM to examine their seasonal movement patterns, habitat use and environmental preferences. All tags transmitted data, with deployment durations ranging from 7 to 124 days, resulting in a total of 426 total days of movement and habitat preference data. Dusky sharks travelled distances in excess of 200 km from the initial tagging location, primarily utilizing GOM waters along the continental shelf edge from the Desoto Canyon to the Texas/Mexican border; however, one individual moved into coastal waters of the Bay of Campeche in the southern Gulf of Mexico. The sharks spent 87 % of their time between 20-125 m and 83% of their time between 23-30^{o}C. Dusky shark seasonal depth preference varied but was directly correlated with the sharks remaining within a temperature range of 24-28^{o}C.

SCRS/2011/102 presented data on habitat use patterns and environmental data of juvenile silky sharks in the northern Gulf of Mexico based on pop-off archival satellite tags. Prior to the current study, few data existed on habitat utilization of this species. During summer 2008-2009, pop-up satellite archival tags (PSAT) were attached to seven immature silky sharks in the northern GOM to reveal their seasonal movement patterns, habitat use and environmental preferences during summer and fall. All tags transmitted archived data, with deployment durations ranging from 24 to 54 days. A total of 203 total days of movement and habitat preference data were acquired. Most sharks remained within 150 km of the initial tagging location and preferred warm surface waters, spending 95% of their time in the top 50 meters of the water column and 75% of their time in waters warmer than 27^{o}C. This study represents the first use of PSAT technology to address critical gaps in behavior and habitat use information for silky sharks in the GOM.

SCRS/2011/085 presented information on the at-haulback fishing mortality of elasmobranchs that are caught as by-catch in pelagic longline fisheries. Results indicated that at-haulback fishing mortality is species specific. Size of the specimen was a significant factor for the at-haulback mortality of the blue shark and the shortfin mako. The odds of been dead at time of haulback decrease with larger size. For the crocodile shark size was not a significant factor for mortality at-haulback.

Suggestions were made to include the effects of gangion type/length and hook type (J vs. circle) when estimating the odds of mortality for the Portuguese and other fleets.

SCRS/2011/091 reviewed the information of other sharks caught by Japanese longliners in the Atlantic. By the end of the 1990s, the Japanese longline logbook system started to collect catch information of the oceanic whitetip and the thresher sharks. In this study, the logbook information of these species was quickly reviewed from the view point of their usefulness for stock assessments. In addition, the information of sharks collected by Japanese longline observers was also reviewed.

SCRS/2011/093 reviewed the catch distribution of tiger sharks from the Uruguayan pelagic longline fleet in the South Atlantic Ocean. The tiger shark has a wide distribution in the western Atlantic, from Massachusetts (USA) to Uruguay. Data on tiger shark distribution, based on catch data obtained by the National Program of Observers Onboard the Tuna Fleet (DINARA), from the Uruguayan pelagic longline fleet, were presented. The study period included data from June 2001 to September 2006, during which 2,459,236 hooks distributed in 1152 sets were observed. The occurrence of 18 tiger shark individuals was recorded, 11 of which were measured (Min=93cm, Max=245cm, Mean=177.9cm, SD=36.8cm). Tiger sharks occurred on 7 sets, representing 0.61% of the observed sets. The results of these analyses indicate that the tiger shark is a species with low occurrence in the Uruguayan fisheries, being the least frequent shark caught by this fleet. The unusual aggregation of tiger sharks in a set deployed over a seamount of the Vitoria-Trindade seamount chain, suggests the potential importance of this area for the species. An important proportion of fishing effort (416 sets, 484,801 hooks) was deployed and observed south of the southernmost point of occurrence of tiger sharks, which together with the scarce reports of this species in Uruguay and southern Brazil (all recorded on coastal bottom-set gillnets during summer), suggest that the presence of this species is very infrequent south of 32ºS.

SCRS/2011/103 reviewed of information on sharks caught by the Brazilian tuna longline fleet. Catch and effort data of 14,860 longline sets from the Brazilian chartered tuna longline fleet, from 2004 to 2010, were analyzed. Data were obtained from the logbooks filled out by on-board observers from the National Observer Program on vessels operating off north-eastern Brazil. Elasmobranchs were caught over the majority of the longline fishing range. However, there were areas where some species were not caught, regardless of fishing effort. Blue sharks and makos showed the highest CPUE values across the study area. Sharks captured by the Brazilian longline fleet are mainly individuals ranging from 120 to 239 cm in total length (TL). Catches of the oceanic whitetip shark all over the coast were represented primarily by small individuals, with 78% being juveniles. Blue sharks caught by the Brazilian longline fleet range from 71to 398 cm TL and were mainly adults (> 226 cm TL). The nominal CPUE of blue sharks and makos has shown a moderate increasing trend during the study period.

A presentation was then made to provide background on the Ecological Risk Assessment (ERA) approach. ERA, also known as productivity and susceptibility analysis (PSA), has become a common tool to provide information for data-limited stocks of sharks and other marine taxa. This approach is not a substitute for stock assessment, but can be used to help determine appropriate management action and research recommendations. This type of analysis typically assesses the risk based on two factors: biological productivity and susceptibility to a particular type of fishery. The previous analysis conducted by the Shark Working Group on 11 pelagic shark and 1 ray species taken in Atlantic pelagic longline fisheries was a level-3 (quantitative) ERA. Susceptibility to pelagic longline fishing was computed for several fleets and all fleets combined (Cortés et al, 2010). Biological productivity data were based on biological parameters obtained from published studies. The Group noted that the Subcommittee on Ecosystems also conducted in 2009 an ERA on a number of by-catch species in ICCAT fisheries (Anon, 2010).

One comment was that although ERA does not provide a measure of the status of a species, inclusion in the ERA of species for which stock assessments are available (e.g. blue shark and shortfin mako in this case), could be used as a check of the validity of the ERA approach to identify species at risk of overexploitation and, as a corollary, to determine the level of risk of overexploitation for other species by comparing their relative positions on the risk plots. There was also concern expressed that the simplicity of the approach could be misinterpreted by managers and that the advantages and shortcomings of ERAs be explicitly stated.

It was also noted that work on a risk assessment was underway for bluefin tuna under the GBYP. The goal in this case is to provide a preliminary quantification of the main sources of uncertainty in consultation with stakeholders. This will allow appropriate scenarios to be specified for use within the Management Strategy Evaluation (MSE) analysis. MSE will then be used to help develop a new robust stock assessment and management advice framework.

A comment was also made about including susceptibility of pelagic sharks to the impacts of purse seine gear into the ERA but it was noted that currently there are very limited data on catches of sharks from the purse seine fleets operating in the Atlantic and Mediterranean Sea.

A list of improvements in the proposed 2012 ERA with respect to the previous analysis conducted in 2008 was presented, including:

1) The new analysis will include 6 additional species (*Galeocerdo cuvier*, *Manta birostris*, *Carcharodon carcharias*, *Carcharhinus obscurus*, *C. signatus*, *C. plumbeus*).

2) The previous analysis reflected an average historical vulnerability because the effort data used included the entire 1950-2005 dataset. The new analysis can be done at a finer level, and be stratified, for example, by decade.
3) New information on the geographical (horizontal plane) distribution will be used, particularly for the southern hemisphere.
4) New and updated information on the vertical overlap between gear and species will be used. Because of scarcity of data on species habitat use in the previous analysis, all values were fixed to 1. It is hoped that new information on time spent at depth for a number of species will allow computation of more realistic overlap values.
5) Productivity for some species will be updated with new biological information and productivity for northern and southern stocks if appropriate.
6) Post-capture mortality estimates will also be updated based on newer information from observer programs.
7) It is hoped that information from more fleets, particularly Japan, Spain and Chinese Taipei, is made available for the new analysis.

The Group specified a list of potential collaborators to collate the information required to run the ERA. Coordination of the different groups will be made by A. Domingo and E. Cortés. Topics and collaborators are:

- Horizontal distribution: ICCAT Secretariat, G. Burgess, Y. Semba, M. Neves, J. Ortiz de Urbina (Coordinator: A. Domingo).
- Vertical distribution of fishing gear: H. Holtzhausen, Y. Semba, J. Ortiz de Urbina (Coordinator: E. Cortés).
- Vertical distribution of species: E. Cortés.
- Post-capture mortality: M. Neves, J. Ortiz de Urbina (Coordinator: A. Domingo).
- Selectivity/length frequencies: ICCAT Secretariat (Coordinator: E. Cortés).

The first version of this data collection task is intended to be completed by the Shark Species Working Group meeting in September 2011.

Data inputs required for the ERA are listed in **Appendix 4**.

4. Review of the relative abundance indices and other fisheries indicators for shortfin mako shark

Document SCRS/2011/090 reported updated standardized CPUE for mako sharks caught by Japanese pelagic longliners, between 1994 and 2009, in North and South Atlantic. In the North Atlantic, the CPUE showed a slightly decreasing trend until 2000 (except for 1995, where the highest value was observed), it increased in 2001, remaining stable and equal to the median of the whole period through 2009. In the South Atlantic, the series remained relatively constant since 1996, after relatively higher values recorded in 1994 and 1995.

It was suggested that the newly developed method used for the area stratification aiming CPUE analysis, should be submitted to the ICCAT Secretariat. A suggestion was made to apply a variogram, as it offers better information for the area stratification process. As important information to evaluate the result of CPUE standardization is lacking, these should be prepared according ICCAT guidelines. Finally, it was suggested updating the index with 2010 data, prior to the stock assessment of shortfin mako, scheduled for 2012.

4.1 Others documents

Document SCRS/2011/088 provided updated standardized CPUE for porbeagle (*Lamna nasus*) caught by Japanese longliners in the South Atlantic. Standardized CPUE was estimated using Generalized Linear Models (GLM) with application of a GLM-tree model for area classification. Although distinctive conclusion about historical trend of CPUE was difficult because of data scarcity until 2005, a continuous decreasing trend of CPUE was not detected which would not support the deterioration of stock status. Analysis using combined data from the South Atlantic and South Indian Oceans was proposed to reflect the distribution of the species.

It was suggested that the increase in the catch rates was, at least, due to the increase of the number of vessels reporting shark catches. Another hypothesis was raised, linked to changes on the fishing grounds. The Group acknowledged that a genetic study conducted by Japanese scientists that was presented to the CCSBT suggested that porbeagle in the southern hemisphere (Atlantic and Indian Ocean) would be better considered as a single stock. A suggestion was made to present this study to the Group for its evaluation.

Document SCRS/2011/089 provided updated standardized CPUE for blue shark (*Prionace glauca*) caught by Japanese longline fishery in the Atlantic Ocean. Trends for the standardized CPUEs were provided, based on long-term (1971 to 2009) and short-term (1994 to 2009) data series. The short-term analysis was conducted based on a new area stratification model (GLM-tree). A comparison between the CPUE trends estimated by Matsunaga (2008) and these two analyses was presented, but no major differences were noted. The results of the two CPUE data series indicated a stable trend in both the North and South Atlantic.

A recommendation was made to apply the GLM-tree model for area stratification to the target species, and that the CPUE series to be analyzed on the light of that.

Document SCRS/2011/103 provided a review on catch and effort statistics, size composition and biological parameters for pelagic sharks caught in the South Atlantic. Most information was recorded by observers onboard Brazilian chartered tuna longline vessels, between 2004 and 2010, the exception being that regarding biological parameters. Although most elasmobranchs were caught over a large geographical area, some species were only caught in particular areas regardless of fishing effort. Blue and mako sharks had the highest CPUE values across the study area. The catches of oceanic whitetip were mostly composed of juveniles. The nominal CPUE for blue and mako sharks has shown a moderate increasing trend during the studied period. The blue sharks caught were mainly adults, while in the case of shortfin mako the catches were dominated by juveniles.

5. Methods and data required for the shortfin mako assessment

The Group discussed the different modeling approaches used during the 2008 shortfin mako and blue shark stock assessments. The models used were: (1) a Bayesian surplus production model, (2) a catch-free model, and (3) an age-structured production model. Of the number of CPUE series that were presented during that assessment meeting, the Group used the series for the US LL, Japan LL, and Spain LL fisheries for the northern stock and the series for Uruguay LL, Brazil LL, Japan LL, and Spain LL fisheries for the southern stock. Combined CPUE series using a GLM approach were also estimated for each stock using two weighting schemes: (a) area covered by each fishery, and (b) catch.

For next year's assessment, the Group agreed to use the same modeling approaches. However, there was concern if enough analysts will attend the meeting to perform all the required modeling for both stocks of shortfin mako. The Group agreed to identify and to reach out to national scientists that could assist to run the models. In addition, the Group recommended the Secretariat to provide financial support to some of these scientists to facilitate their attendance to the 2012 shortfin mako assessment meeting.

The Group also discussed the possibility of using sex-specific information for some of the models. Concerns were raised regarding the limited available information on sex and size of the catches, particularly for the earlier time periods. It was indicated that the limited data might result in having to make a large number of assumptions to achieve model convergence. Furthermore, the significance of model results under such circumstances was questioned. It was noted that shark stock assessments are conducted using a variety of production models due to the limited available information (e.g., catch by sex and size, growth rates, maturity) for many shark species. There was a general agreement on the need to explore the use of more complex models and length-based models can be used as an exploratory tool to do so However, there was a recognition of the need to find a balance between the use of more complex models, the number of necessary assumptions to be made, and the use of historical data currently used in the production models.

The Group also identified the data needed to conduct the 2012 stock assessment and produced a brief work plan:

1) Catches

For the catch series, the Group discussed the need of performing the following tasks prior to the assessment: (a) a comparison of shark catches in the ICCAT databases compared to the Eurostat data, (b) estimation of catch series using tuna:shark ratios, and (c) estimation of catch series using shark fin trade information. It was agreed

that these tasks will be reviewed and performed by the Secretariat. The Group also requested CPCs to conduct a review of their historical catches of sharks.

2) Effort

The Group requested that the time series of estimated longline effort (EFFDIS) be updated by the Secretariat prior to the assessment and the methodology used be reviewed by the Methods Working Group. The Group also recommended that for those fleets where the Task II catch and effort reported correspond to 100% of the effort (e.g., Japan, US) no correction factors be applied.

3) Gear/fleet specific selectivities

The need to estimate gear/fleet selectivities to use in those models that do not estimate them internally was also discussed. Although these selectivities were already estimated during the last assessment, it was indicated that there is a need to revise the methodology and biological data used. This task will be performed by U.S. national scientists.

4) Biological data

The Group recognized the need to conduct a review of the shortfin mako biological data used in the last assessment and to update them if necessary. National scientists from Uruguay will conduct the review.

5) Catch rates

The Group requested that, besides updating the catch rate series used in the previous assessment (see above), CPUE series be also developed for the Portugal LL, Namibia LL, South Africa LL, and Venezuela LL fisheries. The Group reminded national scientists that the documents with the CPUE series should also include model diagnostics and other detailed information so that the series can be better evaluated prior to be used for stock assessment purposes. The Group indicated that the CPUE series should be submitted prior to the meeting so they can be compiled and compared. In addition, early submission of the CPUE series would allow the estimation of combined CPUE series for each shortfin mako stock. National scientists from the US agreed to compile the submitted series and estimate the combined CPUEs.

Because most of the described tasks are expected to be performed and completed prior to the beginning of the 2012 assessment meeting, the Group recognized the need to find a way to easily exchange data and information. The Secretariat proposed the use of the software DropBox and provided a short demonstration of its use.

The Group considered a tentative date for the meeting in July 2012 and decided to use data on catches and CPUE until 2010.

6. Other matters

The Group suggested the possibility of adding information on more shark species in Chapter 2 of the *ICCAT Manual* in the by-catch species section to incorporate the 6 species that have been included in recent Recommendations (*Alopias vulpinus, A. superciliosus, Carcharhinus longimanus, Sphyrna lewini, S. zygaena, S. mokarran).*

The Group requested that the Secretariat provide information on those species that have been reported by CPCs but whose correct identification or reporting appears uncertain in order to assess the convenience/need of trying to correct or discard those reported captures.

7. Recommendations

- Urge scientists to participate in the 2012 assessment of shortfin mako and comply with the deadlines for the submission of data and documents (see item 5).
- The standardised CPUE series should be submitted in accordance with the recommendation of the 2009 ICCAT Working Group on Stock Assessment Methods.
- The Group recommended that the CPCs provide data to analyze conventional tag shedding rates.

- The information on tagging should specify the sex of sharks tagged by scientific personnel.
- Allow scientific observers to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs) from species whose retention is prohibited by current regulations that are dead at haulback.
- Conduct studies to measure post-release survival.
- Given that the identification of different south and north Atlantic stocks is unclear, more studies (genetic studies, as well as studies on life cycles and tagging) are required to obtain more information.
- An improvement on the understanding of the migratory and vertical movements of sharks in the major areas of their distribution is needed for a better understanding of the potential interaction between fish stocks and fishing activities.
- The use of only fishery-dependent catch rate data in stock assessments is problematic, as these data are not necessarily informative. Independent surveys are required in the major distribution areas of these species.
- The Group recommended that the CPCs explore methods to estimate catches of sharks in purse seine fisheries.
- The Group recommended that CPCs report shark Task II size data by sex since this information can be easily collected by observers in most cases.
- The Group suggested incorporating the description of the six species of sharks that has been included in recent Recommendations (ALV, BTH, OCS, SPL, SPZ, SPK) in Chapter 2 of the *ICCAT Manual* in the by-catch species section.

8. Adoption of the report and closure

The report was adopted during the meeting.

The Chairman thanked the participants and the Secretariat for their hard work.

The meeting was adjourned.

References

Anon. 2010, Report of the 2009 Inter-sessional Meeting of the Sub-Committee on Ecosystems (Recife, Brazil, June 8 to 12, 2009). Collect. Vol. Sci. Pap. ICCAT, 65(6): 2209-2261.

Arrizabalaga, H., de Bryun, P., Diaz, G.A., Murua, H., Chavance, P., Delgado de Molina, A., Gaertner, D., Ariz, J., Ruiz. J. and Kell, L.T. 2011, Productivity and susceptibility analysis for species caught in Atlantic tuna fisheries. Aquat. Living Resour. Vol. 24, no. 1, pp 1-12.

Cortés, E., Arocha, F., Beerkircher, L., Carvalho, F., Domingo, A., Heupel, M., Holtzhausen, H., Neves, M., Ribera, M. and Simpfendorfer, C. 2010, Ecological Risk Assessment of pelagic sharks caught in Atlantic pelagic longline fisheries. Aquat. Living Resour. Vol. 23, no. 1, pp. 25-34.

Matsunaga, H. 2008, Standardized CPUE for blue sharks caught by the Japanese tuna longline fishery in the Atlantic Ocean, 1971-2005. Collect. Vol. Sci. Pap. ICCAT, 62(5): 1537-1541.

Palma, C., Gallego J.L. 2010, Estimation of the overall longline effort distribution (month and 5 by 5 degree squares) in the ICCAT area, between 1950 and 2007. Collect. Vol. Sci. Pap. ICCAT, 65(6): 2282-2296.

Watson J.T., Essington, T.E., Lennert-Cody, C.E. and Hall, M.A. 2009, Trade-offs in the design of fishery closures: Management of silky shark bycatch in the Eastern Pacific ocean tuna fishery. Conservation Biology. 23(3): 626-635.

Table 1. Number of longline vessels reported by CPCs by flag and year since 1980 in the Task I fleet characterization. 2010* information is preliminary.

Number vessels																																
CPC type	**FlagName**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010***
CP	Algerie																											296				
	Barbados																						31	32	32							
	Belize																													2	17	
	Brasil	13	9	14	16	15	13	17	15	8	22	26	18	47	55	42	37	45	48	67	70	89	124	133	117	89	99	91	96	93	40	
	Canada	43	39	35	32	32	20	31	70	39	52	165	339	154	422	352	435	425	506	286	367	364	355	344	60	145	131	63	63	63	44	
	China P.R.																		4	16	27	60	54					38		38	26	
	Croatia																												15			
	EU.Cyprus										20	20	20		19	20						20		26	22	38	34	34	26	27	30	
	EU.España	140	141	188	189	185			390																							
	EU.France																											3	18	11	33	
	EU.Greece																			6			459			320	407	384	303	197	249	
	EU.Ireland																			1	1											
	EU.Italy																				208		64					47	40	233	196	
	EU.Malta												53														436	358	312	306	155	
	EU.Portugal								15			1	1	1					3		55				79	72	74	78	75	101	85	96
	EU.United Kingdom																									1						
	FR.St Pierre et Miquelon																							1	1	1	1	1	1	1		
	Gabon																								13							
	Guinea Ecuatorial																														9	
	Iceland																			1				1								
	Japan	300	320	269	182	212	205	190	146	183	239	235	242	248	307	240	252	288	280	251	224	203	204	185	205	223	213	201	127	152	123	
	Korea Rep.	54	56	52	53	51	45	28	29	29	33	17	9	8	4	4	4	16	12	5	9	9	5						20	24	24	10
	Libya													3						10		6	19								1	
	Mexico		1	3	0	0	0	16	3	3	3	11	11	3	15	20	22	21	18			32	29	33			30	30	30	27	29	
	Namibia																				24	37	32	19		16	25	26	27	22	11	
	Panama	12	6	18	18	15	9	8													7							33	39	68	48	
	Philippines																					11	5	4		10		10	10	10	10	
	Russian Federation																										1					
	Senegal																													2	4	
	South Africa	5	5	7	3	3	5	1	4												20		133	43	26	32	23	15	29	25	39	
	St. Vincent and Grenadines																						6	43	43	46						
	Trinidad and Tobago										9	10		7	12	18	20	21	26	24	23	19	20	20	10	10	14		19	21		
	Tunisie																		40	40			42	42								
	U.S.A.						358	481		364	464	343	281	277	334	319	324	269	267	211	199	180	161	150	152	116	112	112	111	119	112	
	U.S.S.R.	8	4	4	1	2	2	2	5	3	2	1																				
	UK.Bermuda																	2	2	3	2	2										
	UK.Sta Helena																						1									
	Uruguay		1	2	10	15	15	6	5	4	3	2	1	3	4	3	6	6	7			8		9	12	12	12	12	9	9	9	12
	Vanuatu																											15				
	Venezuela	0	0	32	14	35	35	33	19	18	26	18	24	34	32	38	43	42	40	38	32	34	35			19					46	
CP Total		**575**	**582**	**624**	**518**	**565**	**707**	**813**	**701**	**651**	**873**	**849**	**999**	**785**	**1204**	**1056**	**1143**	**1135**	**1253**	**959**	**1268**	**1116**	**1779**	**1043**	**772**	**1150**	**1612**	**1847**	**1370**	**1551**	**1340**	**118**
NCC	Chinese Taipei	168	190	213	99	116	180	190	140	111	114	149	135	136	152	172	186	202	202		191	188	179	163	150	143	142	75	109	109	109	
	Guyana																											20	20	20	20	
NCC Total		**168**	**190**	**213**	**99**	**116**	**180**	**190**	**140**	**111**	**114**	**149**	**135**	**136**	**152**	**172**	**186**	**202**	**202**		**191**	**188**	**179**	**163**	**150**	**143**	**142**	**95**	**129**	**129**	**129**	
NCO	Argentina	0	0		0	0	0	1																								
	Cuba	22	23	83	27	31	17	10	10	14	10																					
	Faroe Islands																			1												
	Grenada																130										855					
	Japan (foreign obs.)												51																			
	NEI (ETRO)										4	10																				
	Seychelles																							2								
NCO Total		**22**	**23**	**83**	**27**	**31**	**17**	**11**	**10**	**14**	**14**	**10**	**51**				**130**			**1**				**2**			**855**					
Total all		**765**	**795**	**920**	**644**	**712**	**904**	**1014**	**851**	**776**	**1001**	**1008**	**1185**	**921**	**1356**	**1228**	**1459**	**1337**	**1455**	**960**	**1459**	**1304**	**1958**	**1208**	**922**	**1293**	**2609**	**1942**	**1499**	**1680**	**1469**	**118**

Table 2. Distribution of longline vessels in GRT categories by year. Note: Not all CPCs provide size (LOA or GRT) vessel information. This table only shows records with GRT information.

Num vessels		ClassID				
YearC	< 50	50-100	100-300	500-1000	> 1000	Total
1980	19	191	527	28		765
1981	19	198	556	22		795
1982	130	224	539	27		920
1983	58	202	364	20		644
1984	61	204	421	26		712
1985	269	165	444	26		904
1986	379	210	407	18		1014
1987	32	487	315	17		851
1988	250	188	318	20		776
1989	335	263	371	32		1001
1990	408	187	350	63		1008
1991	556	188	417	24		1185
1992	311	192	393	25		921
1993	688	173	431	64		1356
1994	541	253	366	68		1228
1995	816	188	377	78		1459
1996	630	197	423	87		1337
1997	736	230	402	87		1455
1998	482	193	276	9		960
1999	838	149	373	99		1459
2000	617	186	448	53		1304
2001	1131	239	446	142		1958
2002	600	206	62	69		937
2003	331	85	136	64		616
2004	682	97	110	69		958
2005	1948	155	144	63		2310
2006	1324	152	111	93		1680
2007	885	199	136	65		1285
2008	1038	220	78	82		1418
2009	813	232	108	87	6	1246

Table 3. Annual catch report of **all** sharks and other elasmobranchs in the Task I database by flag. *2010 data are preliminary; highlighted cells show CPCs that have prior years' catches and not yet reported in 2010.

Catch t Flag	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*
Argentina																																			12589	11126	12573	11034	7947	10461	8150	8956	9163	10057					
Barbados																																				14									18	14	13	15	9	
Belize																																													37	298		254	111	137	793
Benin																																				59	30	63												
Brasil																													2610	4367	1948	3044	2305	630	3419	3900	5319	5323	3487	3493	4011	4091	3041	2836	
Canada						28													1	2	1		1	9	20	26	344	206	1051	1051	758	1103	2090	2621	2835	2996	1659	2275	1799	1601	1615	1169	1172	575	1287	1442	1249	1017	173	120	126
Cape Verde																													2	1																					
Chile																													1			0																		
China P.R.																												34	45	23	27	22	79	157	306	772	628	860				1109	170	240	
Chinese Taipei																													1896	2121	2283	2128	1982	2069	1666	794		1565	1206	1266	2564	2712	2104	1556	1888
Colombia																											51	83	150	143	36	23	286	307	102	46															
Côte D'Ivoire																																55	101	90	111	107	103	134	79	58	47	68	63	102	48	73	60	76		5	
EU.Bulgaria																																0																			
EU.Cyprus																																							12	22		22	13	7	5	1	1	0	0	
EU.Denmark														158	170	265	233	289	112	72	176	158	84	45	38	72	114	56	33	35	48	86	81	91	94	88	75	70	86	107	75	77	55	5	1					17
EU.España	2	5	7	3	6	4	9	8	11	11	10	11	10	12	9	12	9	10	11	8	12	12	14	28	20	23	26	30	69	42	26	47	15	21	53	19	41	34968	32774	32741	35742	29955	24990	26726	29913	23775	26871	28992	33443	41255	37119
EU.Estonia																																												4							
EU.France												546	915	538	373	514	661	454	838	1104	896	768	208	799	425	293	310	347	537	420	681	487	772	955	1170	831	545	528	382	639	805	568	682	360	11652	11319	294	10463	10284	8736	1393
EU.Germany														4	3	3																							0	17	1	641									
EU.Ireland																																		17	16	41	23	32	169	164	209	527	305	18	25	6	11	11	9	6	353
EU.Italy																																													116	2	95	481	150	257	317
EU.Malta																																			49	34	38	39	34	25	29	28	36	24	26	25	28	28	24	26	31
EU.Netherlands																																																64	50	48	
EU.Poland																					0												0	0	1																
EU.Portugal																												3	3	2	1582	2572	1803	6522	5318	6318	6495	4485	3742	3784	4936	5242	5493	9735	4471	11600	11073	14210	14233	14869	16185
EU.Sweden																1				1	8	5	6	5	9	10	8	5	3	3	2	2	4	3	2	2	1	1	1	1	1	1									
EU.United Kingdom														21	13	13	20				3	2	1	2	5	12	6	3	3	15	9				0	12	18	5	1	10	23	24	16	5	140	30	3324	1991	1239	1617	
Falklands																																			0		0	0	0	0	0										
Faroe Islands		100	800	800	1214	1078	741	589	662	865	205	231	260	269		80	307	295	121	299	425	344	259	256	126	210	270	381	373	477	550	1189	1149	165	48	44	8	9	7	10										
FR.St Pierre et Miquelon																																												0	7	3		1	3	1	
Gabon																																				22	1267					123	536							
Ghana																																						1759													
Grenada																																				14	4	9	18	24	29	29			15	18					
Guinea Ecuatorial																																						0												0	
Guyana																																					765	2083	2562	2175	1156	798	1238	1811	3064	3043	2007	988	2360	370	
Honduras																																						10	4												
Iceland														2	2	4	3	3		1	1		1		1								1	153	143	216	223	182	169	110	144	195	335	258	201	123	99	36	111	20	116
Japan												200	168	263	346	389	92	465	299	313	474	593	976	411	603	682	548	452	639	825	759	663	778	1127	4804	4409	2455	1594	2009	1389	1096	836	1468	1486	2465	2269	2255	3239	4619	3242	3161
Korea Rep.																																										15									288
Libya																																									12									
Maroc																																						2245	2130	3460	2200	2161	2923	2996	3501	2067	2590	3974	2377	
Mexico																																			50	95				99	22		10	6	9	5	8	6	7	
Namibia																																							1	23			2694	2691	2434	8070	9509	4726	2151	230	
Norway		1824	2216	5763	8060	4045	1373		269				87	230	165	304	259	77	76	105	84	93	33	33	96	80	24	25	11	25	43	32	41	24	24	26	28	17	27	32	22	2026	1282	1516		1227	834				
Palestina																																									2										
Panama																																							202	23						262	951	1190	1630	
Philippines																																							3	0								1		
Russian Federation																																														18				
S. Tomé e Príncipe																													269	281	332	259	275	233	268	281	247	130	175	190	178	178	178	178	171	143	132			
Senegal																																											6596			5862	1359	1718	440	289	74
Seychelles																																						0		3	1									
South Africa																																						42	33		193	96	370	253	284	191	293	269	219	
St. Vincent and Grenadines																																					3		3		2842	3	2	2		3	9	4	5	
Sta. Lucia																																				1			6				6	15		6	5	24	9	
Togo																																												140	83	100				
Trinidad and Tobago																																		1	33	171	637	564	663	657	30	785	61	918	1354	1124	825	824	1077	452	582
Turkey																																													458	734	668	496	413	618	
U.S.A.																						589	709	1077	1147	3401	2515	2463	2324	2073	1661	1795	2098	3363	2686	3494	2623	1645	1270	955	1494	940	685	325	1551	363	238	541	552	592	640
UK.Bermuda																																				15	8	7	12	24	14						2	7	6	4	
UK.Sta Helena																																										27	2								
UK.Turks and Caicos																																													0						
Uruguay																						21	78	153	218	121	43	28	23	19	26	21	127	38	96	479	851	223	575	502	227	106	627	1127	992	781	409	391	520	1113	252
Vanuatu																																												54	35	83	5	1				
Venezuela																																							83	106	108	125	83	69	46	49	98	29	191	131
Total	**2**	**1929**	**3023**	**6566**	**9280**	**5155**	**2123**	**597**	**942**	**876**	**215**	**988**	**1440**	**1497**	**1081**	**1585**	**1584**	**1593**	**1458**	**1905**	**2080**	**2586**	**2370**	**2819**	**2709**	**4930**	**4258**	**4082**	**5487**	**5410**	**6513**	**8335**	**9622**	**15766**	**22456**	**26272**	**34964**	**65404**	**67577**	**61647**	**64942**	**64900**	**65247**	**68510**	**77827**	**91145**	**70699**	**82440**	**82796**	**83088**	**63467**

Table 4. Annual catch of the three main shark species (blue shark, porbeagle and shortfin mako) from 1990 forward in Task I database by flag. *2010 data are preliminary.

Catch t		Decade	YearC																				
	Prionace glauca	1990										2000											2010
Species	Flag	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
BSH	Belize															37	259		236	109	114	733	
	Benin								6	4	27												
	Brasil							743	1103		179	1689	2173	1971	2166	1667	2523	2591	2318	2000	1274		
	Canada	680	774	1277	1702	1260	1494	528	831	612	547	624	581	836	346	965	1134	977	843	0	0	0	
	Cape Verde					0																	
	China P.R.												750	420	600				952	149	197		
	Chinese Taipei														692	1006	1106	2393	2469	1952	1419	1727	
	EU.Cyprus											9			3	6	5						
	EU.Denmark	2	1	1		1	2	3	1	1		2	1	13	5	1						0	
	EU.España								29916	28137	29005	31094	25110	21037	22604	24684	21424	24249	25983	30405	37571	34020	
	EU.France	130	187	276	322	350	266	278	213	163	399	395	207	221	57	106	120	99	167	119	84	14	
	EU.Ireland										66	31	66	11	2	0	0		0	0	0	0	
	EU.Italy															113	1	95	46	75	175	165	
	EU.Malta					1	1	1	0	0	0	0	0	0	0	0	1	0	2	2	2	1	
	EU.Netherlands																		1	0	1		
	EU.Portugal	1387	2257	1583	5726	4669	5569	5710	3966	3318	3337	4220	4713	4602	7486	3888	7267	7111	9777	11033	11610	13281	
	EU.United Kingdom	1				0	12			1	0	12	9	6	4	6	5	242	6	6	110		
	FR.St Pierre et Miquelon																				1		
	Japan					2596	1589	1044	996	850	893	494	532	729	890	1245	1967	1959	2817	4322	2988	2915	
	Korea Rep.																					222	
	Mexico						0					0	6						0				
	Namibia										0			2213		1906	6616			1829	207		
	Panama										177	22						254	892	1134	1575		
	Russian Federation																18						
	Senegal													456					43	134	255	56	
	South Africa									23	21		83	63	232	128	154	90	82	126	119		
	Trinidad and Tobago													6	3	2	1	1	0	2	8	6	
	U.S.A.	829	1080	399	1816	601	641	993	396	451	318	429	148	68	1	72	68	47	54	137	107	172	
	UK.Bermuda						3	1	1	2	8							0	0	0	0		
	Uruguay		8	107	10	84	57	259	180	248	118	81	66	85	480	462	376	232	337	359	942	208	
	Venezuela															9	26	10	18	7	71	74	
BSH Total		3028	4307	3643	9577	9562	9634	9560	37610	33809	35093	39101	34447	32735	35572	36304	43071	40351	47044	53900	58830	53596	

Catch t		Decade	YearC																				
	Lamna nasus	1990										2000											2010
Species	Flag	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
POR	Benin								4	0	4												
	Canada	78	329	813	919	1575	1353	1051	1334	1070	965	902	499	237	142	232	202	192	93	124	62	84	
	Chile					1			0														
	EU.Bulgaria		0																				
	EU.Denmark	46	85	80	91	93	86	72	69	85	107	73	76	42								0	
	EU.España	26	47	15	21	53	19	41	27	27	20	20	25	57	35	15	14	36	13	45	90		
	EU.France	551	300	496	633	820	565	267	315	219	240	410	361	461	303	413	276	194	354	311	228		
	EU.Germany										0	17	1	3									
	EU.Ireland										8	2	6	3	11	18		4	8	7	3	0	
	EU.Italy															2	1	1		2	0	0	
	EU.Malta					0	0	1	0	1	0	1	1	0	0	0	1		0	0	1	0	
	EU.Netherlands																		0				
	EU.Poland			0	0	1																	
	EU.Portugal	2	1	0							0	7	4	10	101	54	16	6	0	3	17	7	
	EU.Sweden	2	2	4	3	2	2	1	1	1	1	1	1										
	EU.United Kingdom	9					0			1	6	8	12	10			24	11	26	15	11		
	Falklands				0		0	0	0	1	0	0	0	0									
	Faroe Islands	550	1189	1149	165	48	44	8	9	7	10												
	Guinea Ecuatorial																				0		
	Iceland			1	3	4	6	5	3	4	2	2	3	2	1	1	0	1	0	1	0	1	
	Japan				1	0	0	8	18	0	1								17	51	47	21	
	Norway	43	32	41	24	24	26	28	17	27	32	22	11	14	19		8	27					
	Seychelles									0													
	U.S.A.	2	5	4	50	108	35	78	56	13	3	1	1	1	0	1	0	0	0	1	1	3	
	Uruguay						3		5	14	3	4		8	34	8	28	34	3	40	14	6	
POR Total		1309	1990	2603	1910	2729	2140	1560	1859	1469	1403	1469	999	848	648	745	571	507	515	600	475	123	

Table 4. (Contined).

Catch t		Decade	YearC																			
	Isurus oxyrinchus	1990										2000										2010
Species	Flag	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
SMA	Belize																38		17	2	23	60
	Brasil							83	190		27	219	409	226	283	238	426	210	157	203	99	
	Canada						111	67	110	69	70	78	69	78	73	80	91	71	72	43	53	41
	China P.R.				34	45	23	27	19	74	126	306	22	208	260				157	21	43	
	Chinese Taipei														710	178	147	168	236	147	135	161
	Côte D'Ivoire		9	13	10	20	13	15	23	10	10	9	15	15	30	15	14	16	25		5	
	EU.Cyprus																	1	1	0	0	
	EU.España								3777	3347	2917	2769	2921	2859	3228	4108	2337	2586	2470	2523	3155	3002
	EU.France																				15	
	EU.Portugal	193	314	220	796	649	749	785	519	425	446	706	523	471	1874	485	1366	1449	1915	1354	1672	1652
	EU.United Kingdom										2	3	2	1	1	1	0	5	0	1	26	
	FR.St Pierre et Miquelon																		1	2		
	Japan	759	663	778	1126	1583	2209	1304	502	1159	271	402	161	571	385	970			155	246	207	224
	Korea Rep.																					29
	Mexico						10					10	16		10	6	9	5	8	6	7	
	Namibia										1			459		509	1415	1243	1002	295	23	
	Panama										25	1						0	49	43	39	
	Philippines										3	0								1		
	Russian Federation																0					
	Senegal																		8	17	21	
	South Africa									19	13		79	19	138	126	125	99	208	136	100	
	St. Vincent and Grenadines							0			3											
	Sta. Lucia																			0		
	Trinidad and Tobago										1		1	2	3	1	2	1	1	1	1	1
	U.S.A.	371	326	415	972	663	1739	470	409	348	159	456	395	415	142	411	187	130	223	198	220	219
	UK.Bermuda								1	2	2							0	0	0	0	
	Uruguay	26	13	20	28	12	17	26	20	23	21	35	40	38	188	249	146	68	36	41	106	23
	Vanuatu															52	12	13	1	0		
	Venezuela															58	20	6	11	2	35	22
SMA Total		1349	1326	1446	2966	2972	4870	2778	5570	5477	4097	4994	4654	5361	7324	7487	6336	6073	6753	5284	5985	5432

Table 5. Annual catch reported for sharks by species from Task I.

	Alopias superciliosus	Prionace glauca	Carcharhinus obscurus	Carcharodon carcharias	Isurus paucus	Carcharhinus signatus	Carcharhinus longimanus	Lamna nasus	Carcharhinus plumbeus	Sphyrna lewini	Isurus oxyrinchus	Carcharhinus falciformis	Sphyrna zygaena	Alopias vulpinus	Galeocerdo cuvier	
Catch t	Bigeye thresher	Blue shark	Dusky shark	Great white shark	Longfin mako	Night shark	Oceanic whitetip shark	Porbeagle	Sandbar shark	Scalloped hammerhead	Shortfin mako	Silky shark	Smooth hammerhead	Thresher	Tiger shark	Total
YearC	BTH	BSH	DUS	WSH	LMA	CCS	OCS	POR	CCP	SPL	SMA	FAL	SPZ	ALV	TIG	
1950								4								**4**
1951								3								**3**
1952								3								**3**
1953								4								**4**
1954								1								**1**
1955								2								**2**
1956								1								**1**
1957								3								**3**
1958								3								**3**
1959								3								**3**
1960								2								**2**
1961								1929								**1929**
1962								3023								**3023**
1963								6566								**6566**
1964								9280								**9280**
1965								5155								**5155**
1966								2123								**2123**
1967								597								**597**
1968								942								**942**
1969								876								**876**
1970								215								**215**
1971								788			200					**988**
1972								1272			168					**1440**
1973								1234			263					**1497**
1974								735			346					**1081**
1975								1196			389					**1585**
1976								1492			92					**1584**
1977								1128			465					**1593**
1978		4						1155			299					**1458**
1979		12						1580			313					**1905**
1980								1606			474					**2080**
1981		204						1382			999					**2586**
1982		9	0		0			598	0		1709	0			0	**2317**
1983		613			0		1	1169	0		975				1	**2759**
1984		121			0			726			1793				0	**2641**
1985		380			1		0	687	0		3803				0	**4872**
1986		1482			0		0	732	0		1951				0	**4166**
1987		1614	0	1	1			844	0		1028	0			6	**3495**
1988		1835	0	2	3			1025	0		1562				2	**4429**
1989		1810	1	2	2		1	1013	0		1648				2	**4478**
1990		3028	2	2	1		0	1309	0		1349				4	**5695**
1991		4307	1	3	1		0	1990	1		1326	13			7	**7650**
1992		3643	64		29		8	2603	111	363	1446	341	4		13	**8624**
1993	20	9577	36		8	0	11	1910	61	14	2966	139		2	11	**14756**
1994	18	9562	270		18	3	10	2729	146	33	2972	92	3	7	10	**15872**
1995	39	9634	80		17	1	14	2140	327	93	4870	127	1	9	20	**17369**
1996	14	9560	52		3	0	8	1560	468	50	2778	531	42		5	**15070**
1997	185	37610	48		29	21	12	1859	343	185	5570	343	83	30	5	**46323**
1998	114	33809	54		10	23	15	1469	154	16	5477	33	48	45	9	**41275**
1999		35093	38		2	27	2	1403	149	23	4097	140	38	1	1	**41014**
2000	43	39101	48		20	91	642	1469	174	272	4994	118	40	14	13	**47038**
2001	108	34447	1		51	30	543	999	181	319	4654	42	38	25	10	**41449**
2002	114	32735	2		67	1466	205	848	121	16	5361	358	1472	136	4	**42905**
2003	133	35572	0		63	24	179	648	120	22	7324	476	58	30	4	**44651**
2004	121	36304	0		52	0	189	745	49	20	7487	316	40	65	22	**45409**
2005	74	43071		8	0	5247	82	571	60	0	6336	74	56	104	1	**55684**
2006	83	40351			1	1035	78	507	40		6073	7	360	109	8	**48651**
2007	131	47044	19	177	65	1356	36	515	12	0	6753	232	61	158	66	**56627**
2008	108	53900	2		15	42	246	600	2	56	5284	31	109	70	64	**60530**
2009	135	58830	15		109	35	54	475	22	63	5985	70	17	148	69	**66026**
2010	27	53596	21	18	68	42	59	123	14	50	5432	38	9	33	12	**59542**

Table 6. Task II catch and effort catalog of available information provided by CPCs for shark species. The information is classified by flag and type of unit information provided, numbers of fish or weight.

			YearC																							
Code	***Sci name***	**Units**	**Flag**	**1988**	**1989**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
ALV	*Alopias vulpinus*	W(kg)	EU.Malta																					157	
			EU.Netherlands																			65			
			EU.Portugal													1582	102100	17393	23888	85317	107583	97732	52743	70902	
			Namibia														985								
			Senegal																				2500		
			South Africa													1850	100								
			Venezuela																		150				
		Num	Côte D'Ivoire																			1610			
			Mexico														51								
ALV Total																**3,432**	**103,236**	**17,393**	**23,888**	**85,317**	**107,733**	**99,407**	**55,243**	**71,059**	
BSH	*Prionace glauca*	W(kg)	Belize																36640	259253	421810	236450	109030	113823	733288
			Brasil												821521	866764	1043483	778051	939395	1894826	1620906	528034	822538	912624	
			Canada							318	11812	10909	20098	53510	18757	416	5000	5947	334	11423	4383	983	173	93	324
			China P.R.																			952026	149063	197410	
			Chinese Taipei															871453	1098256	1113061	2218863	2141768	1840847	1235170	1057672
			EU.Cyprus												8848			3386	6312	4824					
			EU.Denmark																						50
			EU.Malta											214	389						479	1490	1458	813	
			EU.Netherlands																			681		662	
			EU.Portugal							4749	25786	583290	466538	293629	547024	738623	4881600	4681092	4378111	7805008	7391721	10213964	11782248	12346997	636057
			EU.United Kingdom																	5449	3372	6043		110182	
			FR.St Pierre et Miquelon																					1044	
			Mexico												98				313	1039	395	76			
			Namibia														598117		1135953	4661788	7630840	3218592	1815567	901210	
			Panama																		254302	630049	1163218	1573529	
			Senegal													458000							133576		56153
			South Africa												61740	82694	63600	46107	98157	118527	69000	82679	125954	119216	
			Trinidad and Tobago														6000	2929	2345	617	692	422	1880	8220	5924
			Uruguay																		166855	347998	358879	941809	
			Venezuela																8543	26119	9869	17518	6729	66426	73962
		Num	Brasil									6531													
			China P.R.																				2441		
			EU.España												2										
			EU.Malta											12	19										
			Japan																					118964	113982
			Mexico													67									
			U.S.A.																					30214	58212
			UK.Bermuda																					48	
BSH Total										**5,067**	**37,598**	**600,730**	**486,635**	**347,365**	**1,458,399**	**2,146,564**	**6,597,799**	**6,388,965**	**7,704,359**	**15,902,413**	**19,793,008**	**18,378,773**	**18,313,600**	**18,678,454**	**2,735,624**
BTH	*Alopias superciliosus*	W(kg)	Brasil													1953	0	2544	18070	35527	17863	11202	2880	15318	
			EU.Portugal																	610		3263	2722		
			Mexico												7314										
		Num	Côte D'Ivoire																			793			
BTH Total															**7,314**	**1,953**	**0**	**2,544**	**18,070**	**36,137**	**17,863**	**15,258**	**5,602**	**15,318**	
CCP	*Carcharhinus plumbeus*	W(kg)	EU.Portugal																	314					
			Venezuela																		3141				
CCP Total																				**314**	**3,141**				
CCS	*Carcharhinus signatus*	W(kg)	Brasil															13633			1667				
			Senegal													1458000									
			Trinidad and Tobago																					47	70
		Num	Côte D'Ivoire																			15			
CCS Total																**1,458,000**		**13,633**			**1,667**	**15**		**47**	**70**
DUS	*Carcharhinus obscurus*	W(kg)	EU.Netherlands																					400	
DUS Total																								**400**	
FAL	*Carcharhinus falciformis*	W(kg)	Brasil														9421	3480	382	12739		5393	4550		
			Chinese Taipei															205525	24394	12947	2123	6123			
			EU.Portugal																	763			2242	12046	
		Num	Côte D'Ivoire																			263			
FAL Total																	**9,421**	**209,005**	**24,776**	**26,449**	**2,123**	**11,779**	**6,792**	**12,046**	
LMA	*Isurus paucus*	W(kg)	Trinidad and Tobago														2000	852	405	268	677	1053	1422	495	382
LMA Total																	**2,000**	**852**	**405**	**268**	**677**	**1,053**	**1,422**	**495**	**382**

Table 6. (Continued).

Code	Sci name	Units	Flag	YearC 1988	1989	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
OCS	*Carcharhinus longimanus*	W(kg)	Brasil												652	31792	19				49575	9646	3833	7020	2261	
			EU.Portugal																		369	48		3671	3536	
		Num	Mexico													239	40								
OCS Total															**652**	**32,031**	**59**			**49,944**	**9,694**	**3,833**	**10,691**	**5,797**	
POR	*Lamna nasus*	W(kg)	Brasil															227					154		
			Canada							2154	1015364	1339373	1008125	958173	905482	498440	235647	142371	231522	202169	192190	106832	124400	62361	83627
			Chile						1000			150													
			EU.Bulgaria			210																			
			EU.Denmark																						253
			EU.España	350		80			109	270	40		170		155										
			EU.Malta																	596			289	228	
			EU.Netherlands																			205			
			EU.Poland		150		50	150	900																
			EU.Portugal						200								10400	101193	54414	16208	6362	111	3300	16610	7114
			EU.United Kingdom																	148	11385	25973		11436	
			Falklands					80		40	100	300	940	120	95	135									
			Guinea Ecuatorial																					31987	
			Japan	890				585	210	145		100	75	790	840										
			Seychelles										80												
			South Africa																				4830		
			Uruguay																		24313	2660		14469	
		Num	Japan																					2616	1071
			U.S.A.																					97	620
POR Total				**1,240**	**150**	**290**	**50**	**815**	**2,419**	**2,609**	**1,015,504**	**1,339,923**	**1,009,390**	**959,083**	**906,572**	**498,575**	**246,047**	**243,791**	**285,936**	**219,121**	**234,250**	**135,781**	**132,973**	**139,803**	**92,685**
SMA	*Isurus oxyrinchus*	W(kg)	Belize																			17440	1600	23078	59862
			Brasil												116892	231508	2	106726	61602	65136	84001		55483	5302	
			Canada							17414	67425	110016	69484	70375	97022	66727		73255	79531	90899				53152	41040
			China P.R.																			157449	21044	43049	
			Chinese Taipei															893320	194720	148243	155558	204676	138973	117154	98312
			EU.Cyprus																		1282	1458	464		
			EU.Malta											277											
			EU.Portugal							1953	1898	73632	116415	73021	50278	54242	432706	1023881	529537	1327152	1470887	1985138	1417854	1720415	50325
			EU.United Kingdom																	24430	83	6		26027	
			Mexico												10095			9503	6424	9301	5248	8066	6114	7358	
			Namibia														142783		395115	827416	1344785	857873	293576	155296	
			Panama																			28871	48544	35858	
			Senegal																				16640		17572
			South Africa												112735	78523	19300	23748	109328	108993	85805	207893	135768	123871	
			Trinidad and Tobago														1000	599	601	818	638	1030	1074	667	598
			UK.Sta Helena																		340	330	180	430	
			Uruguay																		52492	41274	41023	105668	
			Vanuatu																	12130	13450				
			Venezuela																57950	19626	6290	11103	1802	32016	21871
		Num	China P.R.																				436		
			Côte D'Ivoire																			531			
			EU.Malta											4											
			Japan																					6064	7752
			Mexico													230	245								
			U.S.A.																					5262	3904
			UK.Bermuda																					2	
			Vanuatu																	472	355				
SMA Total										**19,367**	**69,323**	**183,648**	**185,899**	**143,677**	**387,021**	**431,230**	**596,036**	**2,131,032**	**1,434,808**	**2,634,616**	**3,221,213**	**3,523,138**	**2,180,575**	**2,460,669**	**301,236**
SPL	*Sphyrna lewini*	W(kg)	Brasil												93845	98518	3	19080	2895	164			3500		
			EU.United Kingdom																					11611	
			Venezuela																				1051	4658	
		Num	Côte D'Ivoire																			241			
			Mexico														102								
SPL Total															**93,845**	**98,518**	**105**	**19,080**	**2,895**	**164**		**241**	**4,551**	**16,269**	
SPZ	*Sphyrna zygaena*	W(kg)	EU.Portugal													200		7914		11725	13587	14190	5887	16991	
			Senegal													1430000							101669		
		Num	Côte D'Ivoire																			454			
SPZ Total																**1,430,200**		**7,914**		**11,725**	**13,587**	**14,644**	**107,556**	**16,991**	
TIG	*Galeocerdo cuvier*	W(kg)	Brasil																20	156					
			EU.Netherlands																			19313		33702	
			Trinidad and Tobago													500		308	77	754	1561	1569	125	15	
TIG Total																**500**		**308**	**97**	**910**	**1,561**	**20,882**	**125**	**33,717**	
WSH	*Carcharodon carcharias*	W(kg)	EU.Portugal																	7833					
			Senegal																						5728
WSH Total																				**7,833**					**5,728**

Table 7. Catalog of the available size (Task II Sz) or catch at size (Task II CAS) information submitted by CPCs by species and year. The values represent the number of measurements in each series.

SpeciesGrp	ScieName	SpeciesCod	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
4-Sharks (major)	Isurus oxyrinchus	SMA	8	48	21	17	16	2	169	22	284	4060	4256	8422	4468	5717	4195	4372	5868
	Isurus spp	MAK								3270	3366	3004				287		37	
	Lamna nasus	POR									27	4	2	1	6	2	54	123	826
	Prionace glauca	BSH	57	94	15	125	147	83	760	235	4715.48	5301	7967	23148	16097	27124	18284	26348	20947
5-Sharks (other)	Alopias spp	THR								40	64	151	53	54	70	25	103	63	65
	Alopias superciliosus	BTH													252				
	Alopias vulpinus	ALV															5		4
	Carcharhinus brevipinna	CCB									106	113							
	Carcharhinus falciformis	FAL									85	366	150	781	170	87	30	76	5
	Carcharhinus leucas	CCE										5		1			1		
	Carcharhinus limbatus	CCL									278	613	401	209	297	32	1	4	24
	Carcharhinus longimanus	OCS									78	109	48	110	19	29	58	26	26
	Carcharhinus obscurus	DUS									8	6							
	Carcharhinus plumbeus	CCP									3562	4158	1406	2142	1167	268			
	Carcharhinus signatus	CCS									1	4							
	Galeocerdo cuvier	TIG								24	2	11	7	1	26	2	13	4	1
	Hexanchus griseus	SBL															124	110	94
	Mustelus asterias	SDS																	25
	Mustelus mustelus	SMD																	32
	Scyliorhinus stellaris	SYT																	17
	Selachimorpha(Pleurotremata)	SKH										174			117				
	Sphyrna lewini	SPL									225	309			114				
	Sphyrna spp	SPN									159	470	110	404	160	89	32	127	85
	Sphyrna zygaena	SPZ									698	913			518				
	Squaliformes	SHX								100	3368.53	174	40	9					
	Squatina squatina	AGN															38		

Table 8. Detailed summary of the Task II information available on size frequencies for shark species.

Sci Name	Gear	Time strata	Geo strata	Frequency Type	Flag	Class interval	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Alopias spp	GN	mm	ICCAT	WGT	U.S.A.	1 kg (cp)									2		1						
	HL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)										1	1						
	LL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																63	65
			ICCAT	HGTW	U.S.A.	1 kg (cp)															103		
				WGT	U.S.A.	1 kg (cp)								40	62	149	51	54	70	25			
	RR	mm	ICCAT	WGT	U.S.A.	1 kg (cp)										1							
Alopias superciliosus	LL	mm	20x20	PCL	Brasil	5 cm (ul)													252				
Alopias vulpinus	LL	mm	1x1	TL	EU.Malta	1 cm (ll)															5		
			5x5	TL	EU.Malta	1 cm (ll)																	4
Carcharhinus brevipinna	GN	mm	5x5	FL	Côte D'Ivc	5 cm (ll)									106	113							
Carcharhinus falciformis	GN	mm	5x5	FL	Côte D'Ivc	5 cm (ll)									78	50							
		yy	5x5	FL	Côte D'Ivc	1 cm (ll)													114				
	HL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																	1
			ICCAT	WGT	U.S.A.	1 kg (cp)													1				
	LL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																76	4
				TL	Chinese T	5 cm (ll)														12	1		
			ICCAT	HGTW	U.S.A.	1 kg (cp)															29		
				WGT	U.S.A.	1 kg (cp)									7	183	85	653	55	75			
		qq	ICCAT	FL	Chinese T	5 cm (ll)											65	128					
						5 cm (un)										133							
Carcharhinus leucas	LL	mm	ICCAT	HGTW	U.S.A.	1 kg (cp)															1		
				WGT	U.S.A.	1 kg (cp)										5		1					
Carcharhinus limbatus	GN	mm	ICCAT	WGT	U.S.A.	1 kg (cp)													1				
	HL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)											2			1			
	LL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																4	24
			ICCAT	HGTW	U.S.A.	1 kg (cp)															1		
				WGT	U.S.A.	1 kg (cp)									278	613	399	209	296	31			
Carcharhinus longimanus	LL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																26	26
			ICCAT	HGTW	U.S.A.	1 kg (cp)															58		
				WGT	U.S.A.	1 kg (cp)									78	109	48	110	19	29			
Carcharhinus obscurus	LL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)									8	6							
Carcharhinus plumbeus	GN	mm	ICCAT	WGT	U.S.A.	1 kg (cp)										7							
	HL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)											22		5				
	LL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)									3562	4151	1384	2142	1162	268			
Carcharhinus signatus	LL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)									1	4							
Galeocerdo cuvier	LL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																4	1
			ICCAT	HGTW	U.S.A.	1 kg (cp)															13		
				WGT	U.S.A.	1 kg (cp)								24	2	11	7	1	26	2			
Hexanchus griseus	LL	mm	1x1	TL	EU.Malta	1 cm (ll)															124		
			5x5	TL	EU.Malta	1 cm (ll)																110	94
Isurus oxyrinchus	GN	mm	5x5	FL	Côte D'Ivc	5 cm (ll)									240	430							
			ICCAT	WGT	U.S.A.	1 kg (cp)											2						
		yy	5x5	FL	Côte D'Ivc	1 cm (ll)													344				
	HL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																11	5
			ICCAT	HGTW	U.S.A.	1 kg (cp)															5		
				WGT	U.S.A.	1 kg (cp)										2	13	5	2	4			
	LL	mm	10x20	FL	Canada	1 cm (ll)																	129
			1x1	FL	EU.Portug	5 cm (ll)														118			
					South Afri	1 cm (ll)																218	
			20x20	FL	Brasil	5 cm (ul)												1330					
			5x10	FL	Canada	1 cm (ll)																	642
			5x5	FL	Belize	1 cm (ll)																381	186
					EU.Portug	2 cm (ll)																	587
						5 cm (ll)													301	175	241		
					Namibia	1 cm (ll)													1043	702	335		
					South Afri	1 cm (ll)													71	197	81		
						1 cm (un)							132					322					
						2 cm (ll)										152	68						
					Venezuel	1 cm (ll)	8	48	21	17	16	2	2	4	4	6	4		4	4	1		
				HGTW	U.S.A.	1 kg (cp)																3056	3618
				INT-DR	Brasil	1 cm (un)							35										
				PCL	Namibia	1 cm (ll)											493	2857				166	
				TL	Chinese T	1 cm (ll)															154	185	301
						5 cm (ll)													411	425			
					Mexico	5 cm (ll)														116			
			ICCAT	FL	South Afri	2 cm (ll)									40								
				HGTW	U.S.A.	1 kg (cp)															2937		
				WGT	U.S.A.	1 kg (cp)										2761	3201	3202	2179	3839			
		qq	10x10	FL	Uruguay	5 cm (ll)													112	136			
			10x20	PCL	Japan	1 cm (ul)																355	400
			5x5	FL	Uruguay	5 cm (ul)															441		
			ICCAT	FL	Chinese T	5 cm (ll)											475	706					
						5 cm (un)										709							
					Mexico	1 cm (un)								18									
	TW	mm	ICCAT	WGT	U.S.A.	1 kg (cp)													1	1			
Isurus spp	GN	mm	5x5	FL	Côte D'Ivc	5 cm (ll)									282	265							
	HL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)										1							
	HP	mm	ICCAT	WGT	U.S.A.	1 kg (cp)								1									
	LL	mm	5x5	FL	Brasil	2 cm (ll)														287		37	
			ICCAT	WGT	U.S.A.	1 kg (cp)								3260	3078	2737							
	RR	mm	ICCAT	WGT	U.S.A.	1 kg (cp)								9	6	1							
Lamna nasus	LL	mm	10x20	FL	Canada	1 cm (ll)																	215
			1x1	TL	EU.Malta	1 cm (ll)															10		
			5x10	FL	Canada	1 cm (ll)																	475
			5x5	HGTW	U.S.A.	1 kg (cp)																5	3
				TL	EU.Malta	1 cm (ll)																22	9
			ICCAT	HGTW	U.S.A.	1 kg (cp)															2		
				WGT	U.S.A.	1 kg (cp)									27	4	2	1	6	2			
		qq	10x20	PCL	Japan	1 cm (ul)																94	123
			5x5	FL	Uruguay	5 cm (ul)															39		
	TW	mm	5x5	HGTW	U.S.A.	1 kg (cp)																2	1
			ICCAT	HGTW	U.S.A.	1 kg (cp)															3		
Mustelus asterias	LL	mm	5x5	TL	EU.Malta	1 cm (ll)																	25
Mustelus mustelus	LL	mm	5x5	TL	EU.Malta	1 cm (ll)																	32

Table 8. (Continued).

Sci Name	Gear	Time strata	Geo strata	Frequency Type	Flag	Class interval	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Prionace glauca	LL	mm	1x1	FL	EU.Portug	5 cm (ll)														2			
					South Afri	1 cm (ll)																225	
				TL	EU.Malta	1 cm (ll)															51		
			20x20	FL	Brasil	2 cm (ul)												4528					
			5x5	FL	Belize	1 cm (ll)																51	2127
					Brasil	2 cm (ll)														4890			
					EU.Portug	2 cm (ll)										3310							9975
						5 cm (ll)											656	1552	4061	4365	1314		
					Namibia	1 cm (ll)													2940	3282	3923		
					South Afri	1 cm (ll)													562	1523	1424		
						1 cm (un)							221					3267					
						2 cm (ll)											22						
					Venezuel	1 cm (ll)	57	94	15	125	147	83	97	76	43	17	38	4	14	8	1		
				HGTW	U.S.A.	1 kg (cp)																72	187
				INT-DR	Brasil	1 cm (un)							442										
				PCL	Namibia	1 cm (ll)											3272	10597				5388	
				TL	Brasil	2 cm (ll)																596	
					Chinese T	1 cm (ll)															5114	3885	5159
						5 cm (ll)													5481	8175			
					EU.Malta	1 cm (ll)																61	50
					Mexico	5 cm (ll)														1			
					South Afri	2 cm (ll)										292	1053						
					Uruguay	5 cm (ul)																9235	
			ICCAT	FL	South Afri	2 cm (ll)									337								
					U.S.A.	1 cm (ll)									4331.48								
				HGTW	U.S.A.	1 kg (cp)															41		
				WGT	U.S.A.	1 kg (cp)								86	4	24	163	32	28	9			
		qq	10x10	FL	Uruguay	5 cm (ll)													3011	4869			
			10x20	PCL	Japan	1 cm (ul)																6835	3318
			5x5	FL	Korea Rep	1 cm (cp)																	131
				TL	Uruguay	5 cm (ul)															6416		
			ICCAT	FL	Chinese T	5 cm (ll)											2763	3168					
						5 cm (un)										1658							
					Mexico	1 cm (un)								73									
Scyliorhinus stellaris	LL	mm	5x5	TL	EU.Malta	1 cm (ll)																	17
Selachimorpha(Pleurotrem	LL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)										174			117				
Sphyrna lewini	GN	mm	5x5	FL	Côte D'Ivo	5 cm (ll)									225	309							
		yy	5x5	FL	Côte D'Ivo	1 cm (ll)													114				
Sphyrna spp	HL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)											1	1					
	LL	mm	5x5	HGTW	U.S.A.	1 kg (cp)																127	85
			ICCAT	HGTW	U.S.A.	1 kg (cp)															32		
				WGT	U.S.A.	1 kg (cp)									159	470	109	403	160	89			
Sphyrna zygaena	GN	mm	5x5	FL	Côte D'Ivo	5 cm (ll)									698	913							
		yy	5x5	FL	Côte D'Ivo	1 cm (ll)													518				
Squaliformes	HL	mm	ICCAT	WGT	U.S.A.	1 kg (cp)											1						
	LL	mm	ICCAT	FL	U.S.A.	1 cm (ll)									3328.53								
				WGT	U.S.A.	1 kg (cp)								100	40	174	39	9					
Squatina squatina	LL	mm	1x1	TL	EU.Malta	1 cm (ll)															38		

Table 9. Estimated total annual number of hooks from the longline fishing effort distribution (EFFDIS 2011) from 1950 to 2009. Table presents the equivalent estimates from the prior version (EFFDIS 2009).

Year	EFFDIS 2011 Atlantic LL	EFFDIS 2009
1950	4,735,878	6,656,449
1951	3,165,992	5,066,898
1952	3,172,671	4,277,409
1953	3,943,696	3,943,731
1954	999,614	2,481,010
1955	2,033,497	3,147,997
1956	1,328,994	2,650,789
1957	7,134,038	7,695,035
1958	10,122,903	12,823,584
1959	22,838,392	22,681,560
1960	26,221,923	27,952,132
1961	35,497,041	36,669,891
1962	54,519,250	56,764,667
1963	62,767,416	66,146,205
1964	85,520,286	93,627,113
1965	99,425,107	116,032,995
1966	81,523,414	91,918,005
1967	67,397,041	67,757,677
1968	87,197,432	93,890,119
1969	123,814,291	133,956,961
1970	121,514,616	146,256,286
1971	144,193,724	169,291,255
1972	195,001,171	200,599,913
1973	219,066,657	220,395,165
1974	178,557,012	179,297,804
1975	221,553,949	206,932,614
1976	239,782,396	226,874,881
1977	235,146,634	211,844,342
1978	225,237,764	203,508,887
1979	238,971,877	205,496,237
1980	244,413,061	189,576,448
1981	231,183,341	214,240,692
1982	264,210,537	263,563,239
1983	212,586,950	202,057,245
1984	219,338,434	217,369,061
1985	275,091,499	261,478,531
1986	281,107,484	285,433,618
1987	263,894,437	265,421,038
1988	269,148,801	259,898,555
1989	266,447,427	275,089,537
1990	310,733,062	313,453,705
1991	295,203,045	312,462,357
1992	297,398,309	318,036,973
1993	329,159,666	362,797,941
1994	349,030,418	387,663,439
1995	312,948,294	352,054,196
1996	354,464,344	366,013,980
1997	314,954,688	330,385,523
1998	298,794,292	313,271,514
1999	339,358,085	360,528,510
2000	416,404,658	391,075,848
2001	418,632,016	390,515,893
2002	338,987,404	330,198,058
2003	365,897,902	368,242,020
2004	365,318,344	370,286,738
2005	288,225,423	284,955,438
2006	283,911,821	298,558,705
2007	298,542,813	283,405,574
2008	289,619,448	
2009	270,383,223	

Table 10. Summary of conventional tag releases and recaptures for blue shark available in the ICCAT database.

Number of tag blue shark (*Prionace glauca*)													
			Years at liberty										
Year	Releases	Recaptures	< 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10+	15+	Error	Unk	% recapt
1962	10	0											
1963	4	0											
1964	40	0											
1965	73	0											
1966	94	0											
1967	1	0											
1968	1	0											
1969	25	0											
1970	48	0											
1971	84	1		1									1.2%
1972	103	1	1										1.0%
1973	49	0											
1974	95	1	1										1.1%
1975	184	2	1			1							1.1%
1976	41	1	1										2.4%
1977	245	6	4	2									2.4%
1978	496	4	4										0.8%
1979	574	5	3	1	1								0.9%
1980	581	8	6	1		1							1.4%
1981	359	4	3		1								1.1%
1982	279	5	1	1	2					1			1.8%
1983	960	16	7	6	1					1		1	1.7%
1984	513	7	5	1	1								1.4%
1985	67	1		1									1.5%
1986	233	8	4	2				1				1	3.4%
1987	278	4	2	2									1.4%
1988	245	6	2	4									2.4%
1989	408	11	8	1		2							2.7%
1990	905	34	20	7	2	3		1				1	3.8%
1991	757	28	20	3	1		2	2					3.7%
1992	799	56	34	9	8	2	1	1			1		7.0%
1993	935	48	29	12	4	1	1				1		5.1%
1994	1238	81	50	16	11			2	1			1	6.5%
1995	1926	126	55	40	20	5	2		1		1	2	6.5%
1996	1579	118	79	21	12	4	1					1	7.5%
1997	1421	107	62	20	17	6						2	7.5%
1998	791	49	24	18	3	1					1	2	6.2%
1999	713	50	34	13	2	1							7.0%
2000	527	38	26	6	4	1					1		7.2%
2001	546	40	23	7	6	3					1		7.3%
2002	312	29	13	11	3	1					1		9.3%
2003	375	28	16	8	4								7.5%
2004	193	11	5	4				1				1	5.7%
2005	361	8	6	2									2.2%
2006	271	24	18	5							1		8.9%
2007	291	9	5	1	3								3.1%
2008	210	11	9	2									5.2%
2009	281	4	4										1.4%
2010	3	0											
Grand Total	20524	990	585	228	106	32	7	8	2	2	8	12	4.8%

Table 11. Summary of conventional tag releases and recaptures for shortfin mako available in the ICCAT database.

Number of tag Shortfin mako (*Isurus oxyrinchus*)								
			Years at liberty					
Year	Releases	Recaptures	< 1	1 - 2	2 - 3	3 - 4	4 - 5	% recapt
1962	1	0						
1963	2	0						
1964	3	0						
1965	3	0						
1966	2	0						
1968	1	0						
1969	3	0						
1970	2	0						
1973	1	0						
1974	4	0						
1975	1	0						
1976	1	0						
1978	25	4	1	2			1	16.0%
1979	3	0						
1980	2	1	1					50.0%
1981	1	0						
1982	2	0						
1983	3	0						
1984	3	0						
1985	11	1	1					9.1%
1986	2	0						
1987	24	2	1	1				8.3%
1988	11	1					1	9.1%
1989	12	2		2				16.7%
1990	62	5		4	1			8.1%
1991	139	12	7	3	1		1	8.6%
1992	180	20	9	9		2		11.1%
1993	132	9	4	5				6.8%
1994	78	14	9	3	1	1		17.9%
1995	66	18	13	4	1			27.3%
1996	17	4	4					23.5%
1997	7	1	1					14.3%
1998	11	0						
1999	7	2	2					28.6%
2000	13	0						
2001	6	5	3	2				83.3%
2002	2	2	2					100.0%
2003	3	0						
2004	5	4	3	1				80.0%
2005	5	5	4			1		100.0%
2006	10	8	6	2				80.0%
2007	13	8	7	1				61.5%
2008	29	8	5	3				27.6%
2009	13	0						
2010	1	1	1					100.0%
Total	922	137	84	42	4	4	3	14.9%

Table 12. Summary of conventional tag releases and recaptures for porbeagle available in the ICCAT database.

Number of tag porbeagle (*Lamna nasus*)										
			Years at liberty							
Year	Releases	Recapture	< 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	Error	% recapt*
1961	1	1			1					100.0%
1962	13	13	5	5	2				1	100.0%
1963	2	2	2							100.0%
1982	1	1			1					100.0%
1983	4	4	1		1		1	1		100.0%
1984	2	2			1			1		100.0%
1985	2	2				1	1			100.0%
1986	3	3	1		1			1		100.0%
1987	15	15	1	2	3		1	8		100.0%
1988	11	11	1	1	1	1	2	5		100.0%
1989	1	1				1				100.0%
1991	15	5	2	1		1		1		33.3%
1992	8	2		1	1					25.0%
1993	15	15	3	2	2	5	1	2		100.0%
1994	36	35	7	10	11	4	1	2		97.2%
1995	30	30	6	8	5	9	1		1	100.0%
1996	8	8	3	2	2	1				100.0%
1997	7	6	4	2						85.7%
1998	2	2	2							100.0%
1999	5	5	1		2			2		100.0%
2002	1	1			1					100.0%
2003	1	1			1					100.0%
2007	16	0								
2009	47	1							1	2.1%
Total	246	166	39	34	36	23	8	23	3	67.5%

Table 13. Summary of the conventional tag releases for shark species intended for the ERA analysis.

Year	*Alopias superciliosus*	*Alopias vulpinus*	*Carcharhinus falciformi*	*Carcharhinus longiman*	*Carcharhinus obscurus*	*Carcharhinus plumbeus*	*Carcharhinus signatus*	*Carcharodon carcharias*	*Galeocerdo cuvier*	*Isurus oxyrinchus*	*Isurus paucus*	*Lamna nasus*	*Prionace glauca*	*Sphyrna zygaena*	*Total*
1962										2			20		22
1963										4			6		10
1964			4		10	2				6			76	12	110
1965			20	10	4	4			10	6			146		200
1966					4					4			188		196
1967					2								2		4
1968					6					2			2		10
1969					2					6			48		56
1970										4			63		67
1971					10	2							109		121
1972					4								109		113
1973			2		22				2	2			63		91
1974			4		24	4			4	8			186		230
1975					12	12			2	2			265		293
1976					6	2				2			74		84
1977			2			2			2				266		272
1978		6	2		14					42			606		670
1979				6	2				4	6			627		645
1980		2		2	16				2	2			586		610
1981	2		2	2	12	2			6	4			372		402
1982					8				2	4			285		299
1983					18	2				6			957		983
1984					8	4				6			522		540
1985		2			6	16				20			76		120
1986		2			4	6				4			245	4	265
1987			2		10	4			8	44			317		385
1988					22	16			4	20			282		344
1989		4	8		32	8			4	20			462		538
1990		6			26	6			4	114			960	2	1118
1991		10		6	48	26		2	22	256		18	941		1329
1992	2	8	2	4	18	10			14	330		12	896		1296
1993	4	4	4		20	10			14	246			1067		1369
1994	2	2	4	2	30	6			16	134			1231	2	1429
1995	2	2	8	2	12	12				100			1893		2031
1996		8	2	2	8	4		2	4	32			1574		1636
1997			2			16			2	16			1410	5	1451
1998					4					24			758		786
1999		2								10			711		723
2000	24			3	2					30	10		591		660
2001				1	2				2	2			521		528
2002					2								312		314
2003										6			360		366
2004					3	4			4	2			196		209
2005										1			294		295
2006					3	5				2			229		239
2007			2	1					1	5		16	427		452
2008	4		1	3			4			6	1		169	1	189
Total	40	58	71	44	436	185	4	4	133	1542	11	46	21500	26	24100

Table 14. Releases and recaptures of conventional tags for shark species in the ERA list.

Tags		Releases	Years at large				
Sci Name	Year	Numb	0	1	3	4	5 Total
Alopias superciliosus	*1981*	2					2
	1992	2					2
	1993	4					4
	1994	2					2
	1995	2					2
	2000	24					24
	2005			1			1
	2008	4					4
Alopias vulpinus	*1978*	6					6
	1980	2					2
	1985	2					2
	1986	2					2
	1989	4					4
	1990	6					6
	1991	10					10
	1992	8					8
	1993	**4**					**4**
	1994	2					2
	1995	2					2
	1996	8					8
	1999	2					2
Carcharhinus falciformis	1964	4					4
	1965	20					20
	1973	2					2
	1974	4					4
	1977	2	2				4
	1978	3					3
	1979	1	2				3
	1980	1	2				3
	1981	2					2
	1987	3	2				5
	1989	8					8
	1992	2	2				4
	1993	5					5
	1994	4					4
	1995	8					8
	1996	2					2
	1997	2					2
	2007	2					2
	2008	1					1
Carcharhinus longimanus	1965	10					10
	1979	6					6
	1980	2					2
	1981	2					2
	1991	6					6
	1992	4					4
	1994	2	1				3
	1995	2					2
	1996	2					2
	2000	3					3
	2001	1					1
	2006	1					1
	2007	1					1
	2008	3					3
Carcharhinus obscurus	1900	2					2
	1964	10					10
	1965	4					4
	1966	4					4
	1967	2					2
	1968	6					6
	1969	2					2
	1971	10					10
	1972	4					4
	1973	22					22
	1974	24					24
	1975	12					12
	1976	6					6
	1978	14					14
	1979	2					2
	1980	16					16
	1981	12					12
	1982	8					8
	1983	18					18
	1984	8					8
	1985	6					6
	1986	4					4
	1987	10					10
	1988	22					22
	1989	32					32
	1990	26					26
	1991	49	2	2		2	55
	1992	19					19
	1993	20	2				22
	1994	31	2				33
	1995	13					13
	1996	8					8
	1997	1					1
	1998	4					4
	2000	2					2
	2001	2					2
	2002	2					2
	2004	3					3
	2006	3					3

Tags		Releases	Years at large				
Sci Name	Year	Numb	0	1	3	4	5 Total
Carcharhinus plumbeus	1964	2					2
	1965	4					4
	1971	2					2
	1974	4					4
	1975	12					12
	1976	2					2
	1977	2					2
	1981	2					2
	1983	2					2
	1984	4					4
	1985	16					16
	1986	6					6
	1987	4					4
	1988	16				2	18
	1989	8					8
	1990	6					6
	1991	26			2	2	30
	1992	11					11
	1993	10					10
	1994	6	2				8
	1995	14					14
	1996	5					5
	1997	16					16
	2004	4					4
	2006	5					5
Carcharhinus signatus	2008	4					4
Carcharodon carcharias	1991	2					2
	1996	2					2
Galeocerdo cuvier	1965	10					10
	1973	2					2
	1974	4					4
	1975	2					2
	1977	2					2
	1979	4					4
	1980	2					2
	1981	6					6
	1982	2					2
	1987	8					8
	1988	4					4
	1989	4					4
	1990	5	2				7
	1991	22		2			24
	1992	15					15
	1993	14					14
	1994	17	2			2	21
	1996	4					4
	1997	2					2
	1998	1					1
	2001	2					2
	2004	4					4
	2007	1					1
Isurus paucus	2000	10					10
	2008	1					1
Sphyrna zygaena	1964	12					12
	1986	4					4
	1990	2					2
	1994	2					2
	1997	5					5
	2008	1					1

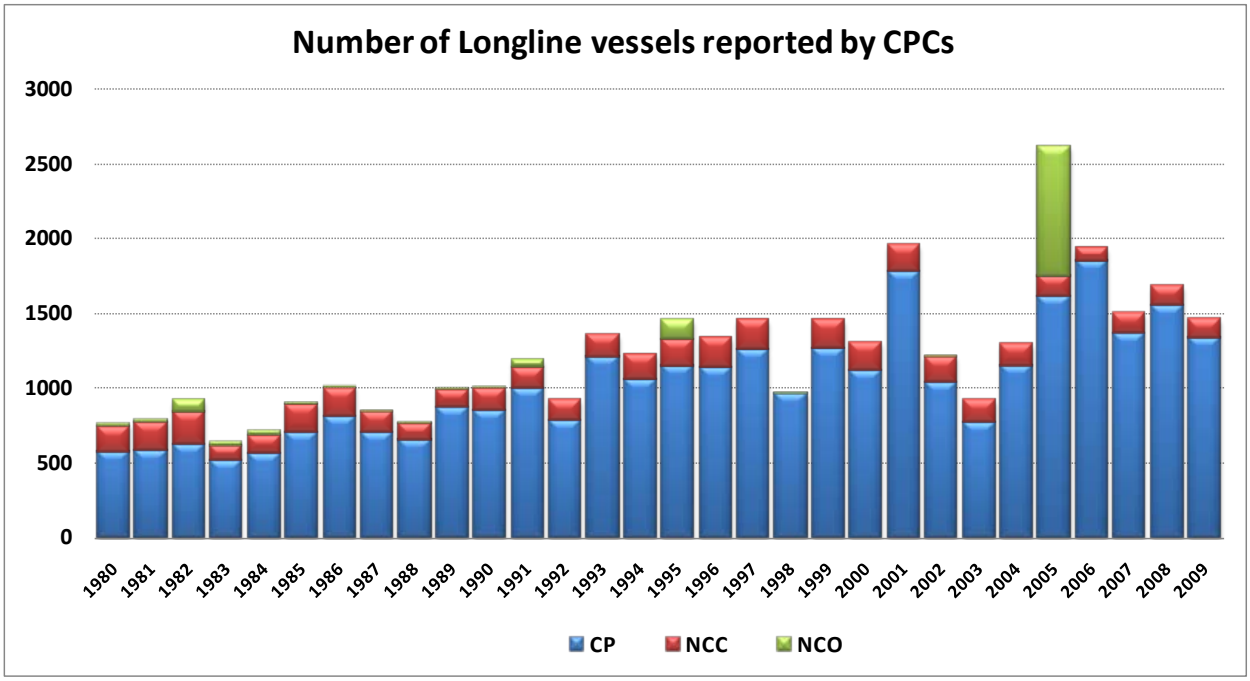

Figure 1. Number of longline vessels reported by CPCs to ICCAT in the Task I fleet characterization since 1980.

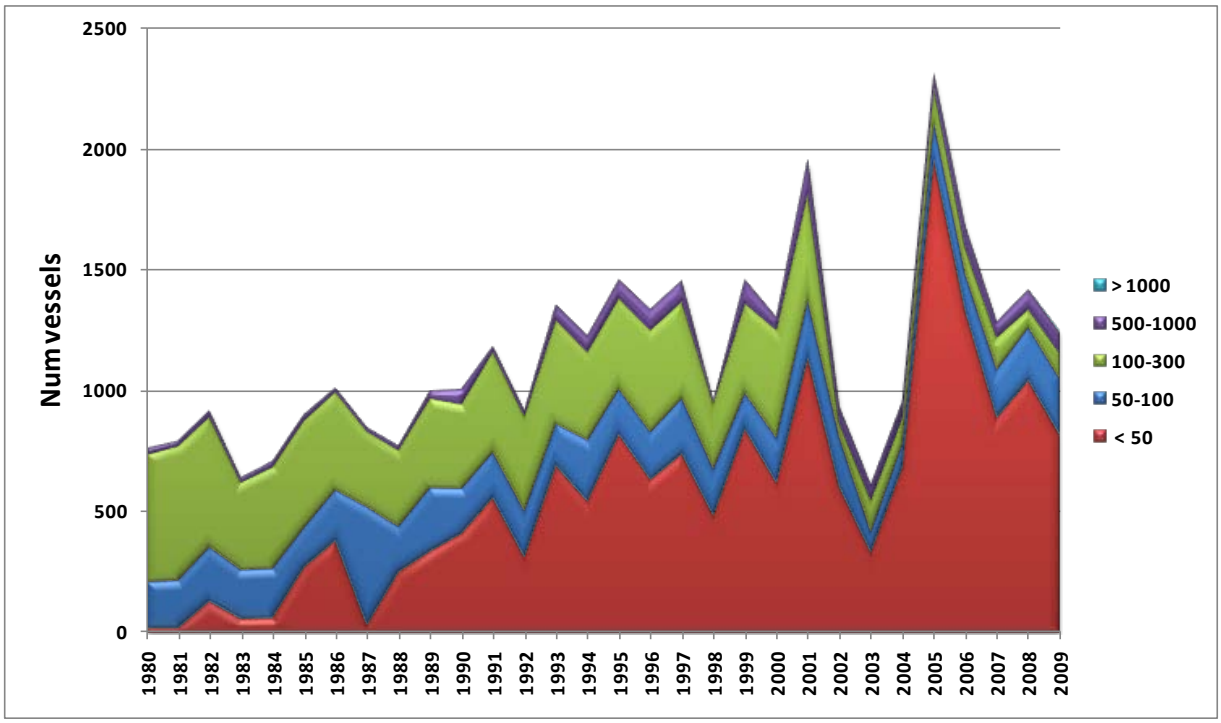

Figure 2. GRT class distribution of longline vessels reported by CPCs to ICCAT in the Task I FC. Note not all reports include size (LOA or GRT) information, plots includes only records with GRT information.

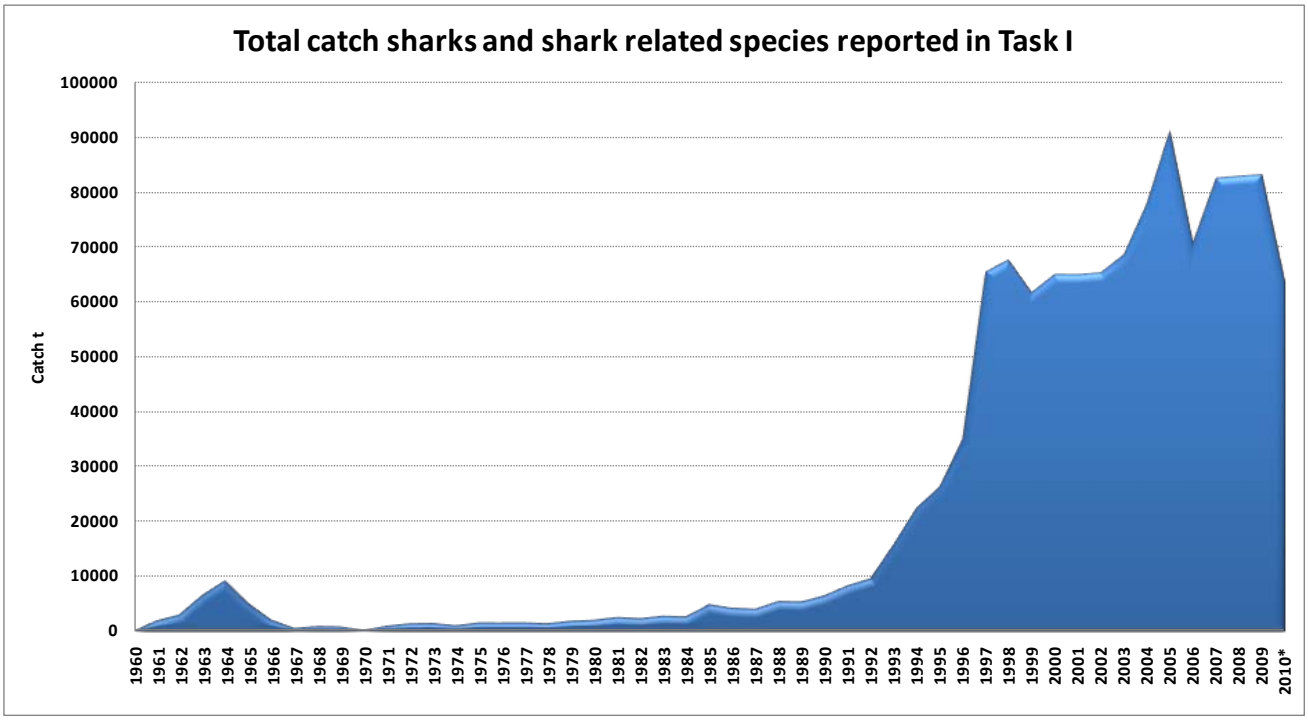

Figure 3. Annual trends of all sharks and shark related species reported in Task I since 1960. Compulsory report of shark statistics started in 1992; data for 2010 are preliminary.

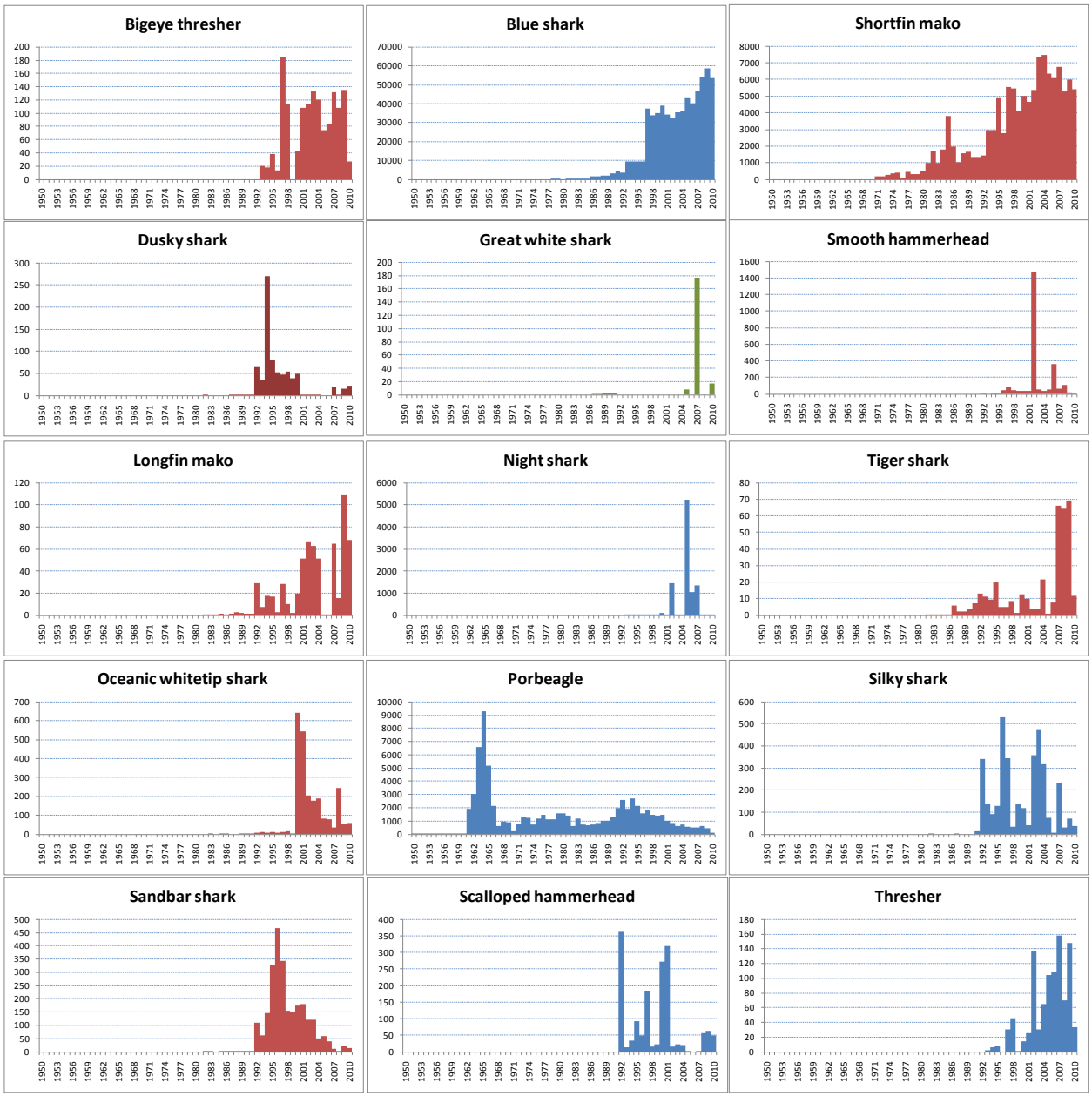

Figure 4. Reported catches of sharks by species available in the ICCAT database from Task I reports.

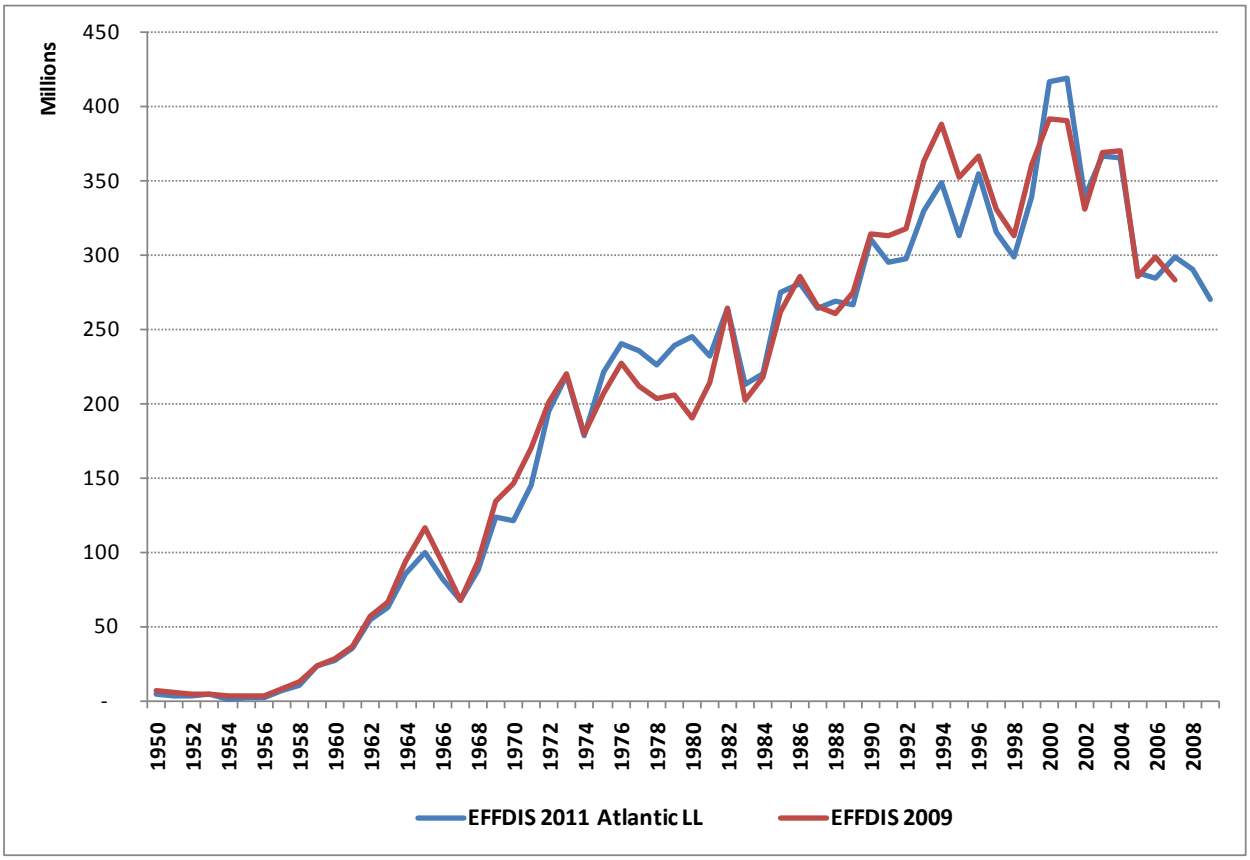

Figure 5. Comparison of the total annual number of hooks from the longline fishing effort distribution (EFFDIS) between the current (2011) and prior (2009) calculations.

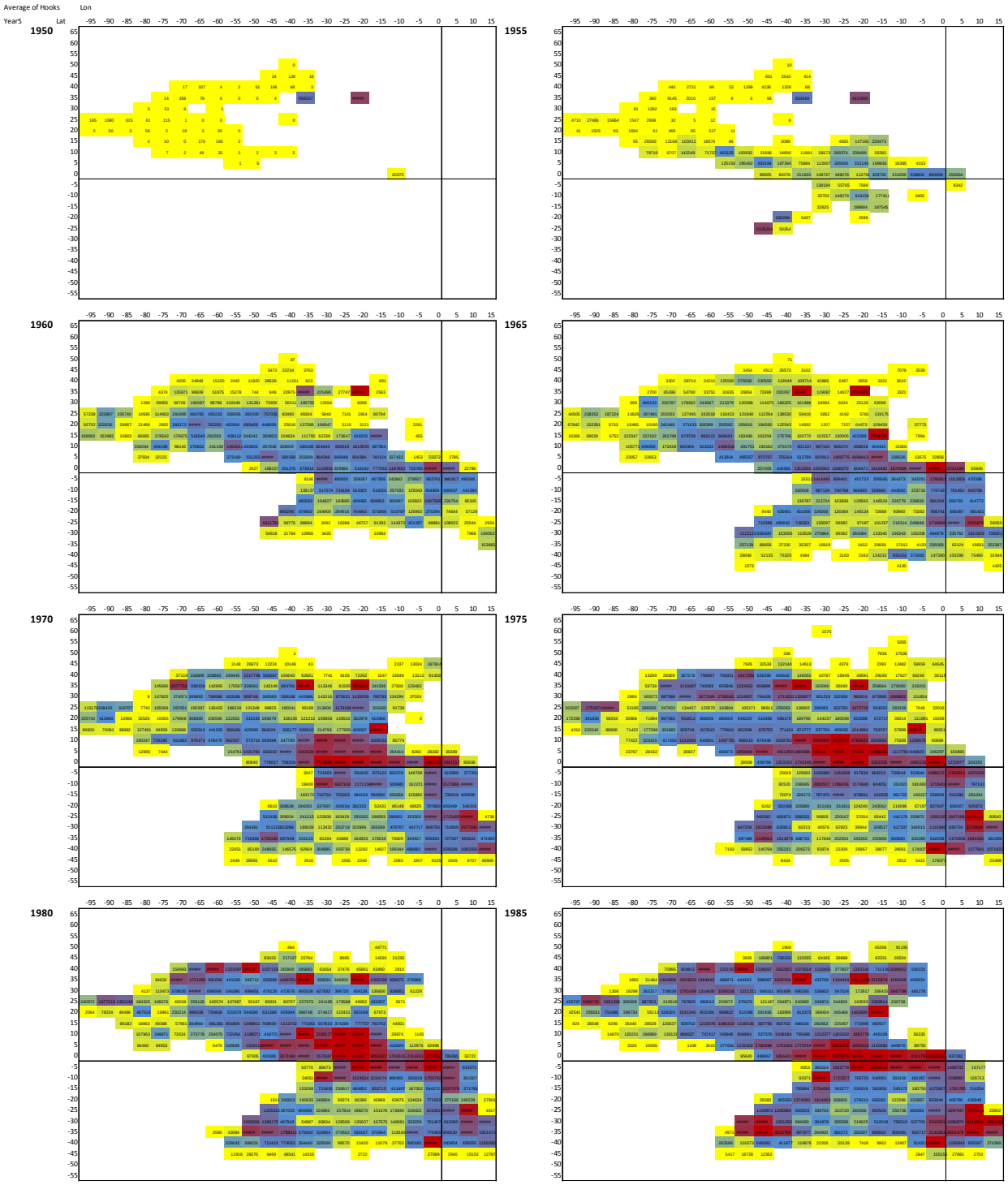

Figure 6. Density plots of the mean estimated longline fishing effort distribution (Atlantic only) in 5x5 degree cells. Each plot represents the average of 5 years. Yellow shading indicates cells with about 0.10 percentile of effort, blue shading indicates cells with about 0.5 percentile, and red shading indicates cells with about 0.90 percentile.

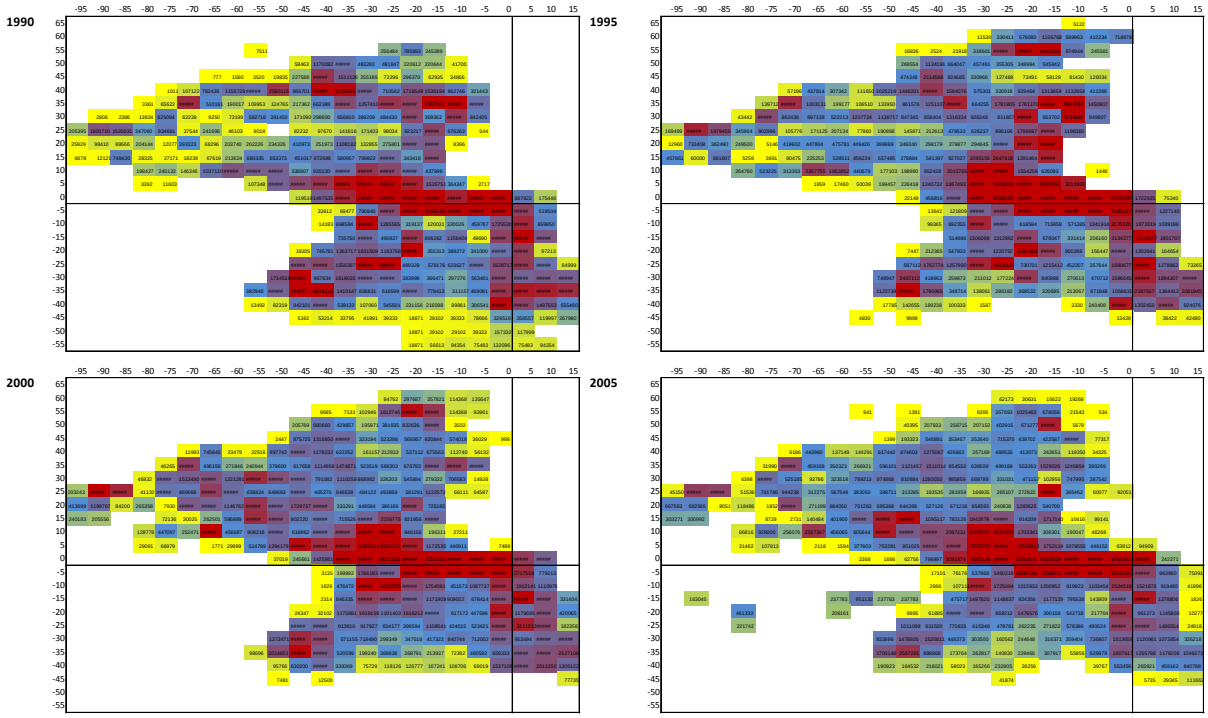

Figure 6 (Continued). Density plots of the mean estimated longline fishing effort distribution (Atlantic only) in 5x5 degree cells. Each plot represents the average of 5 years. Yellow shading indicates cells with about 0.10 percentile of effort, blue shading indicates cells with about 0.5 percentile, and red shading indicates cells with about 0.90 percentile.

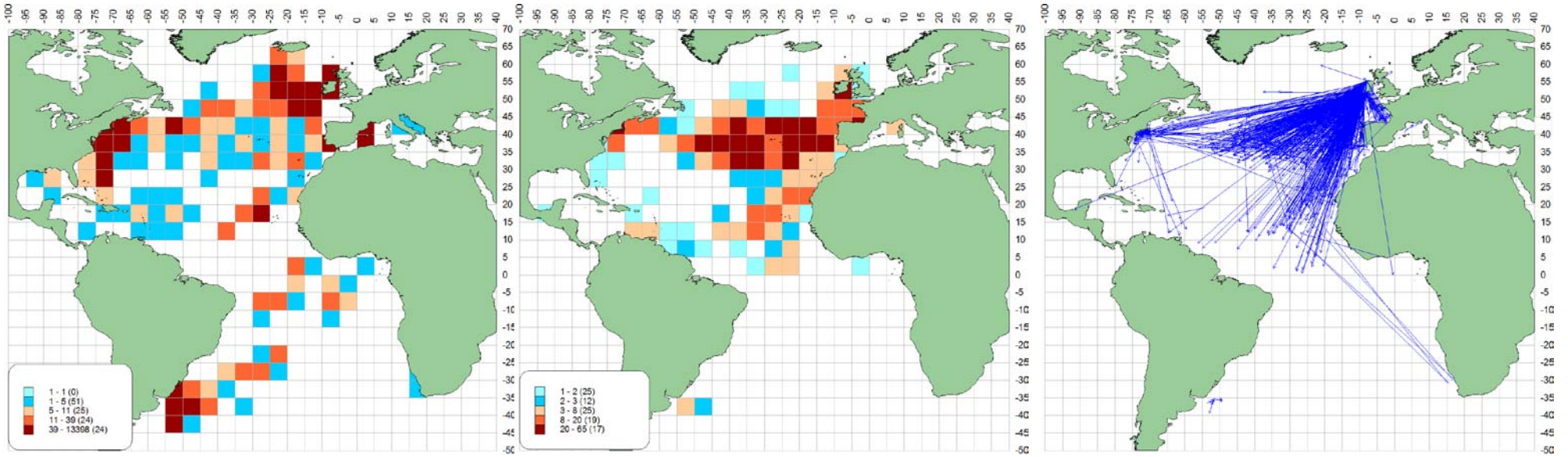

Figure 7. Density plots of blue shark tag releases (left), recaptures (center), and straight displacement of recaptured sharks.

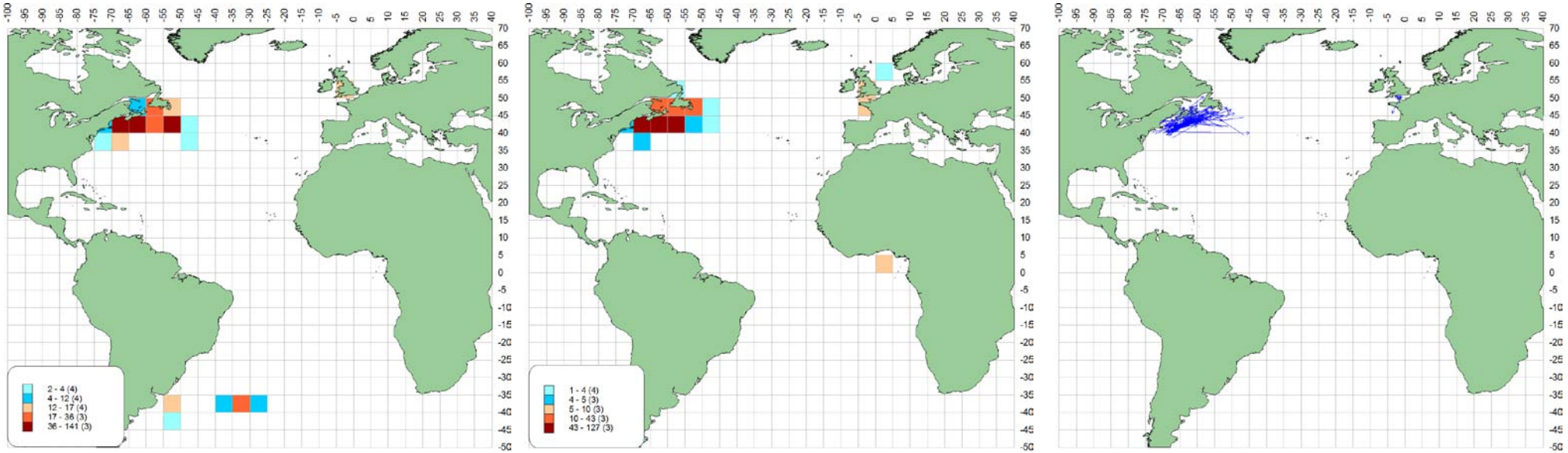

Figure 8. Density plots of porbeagle shark tag releases (left), recaptures (center), and straight displacement of recaptured sharks.

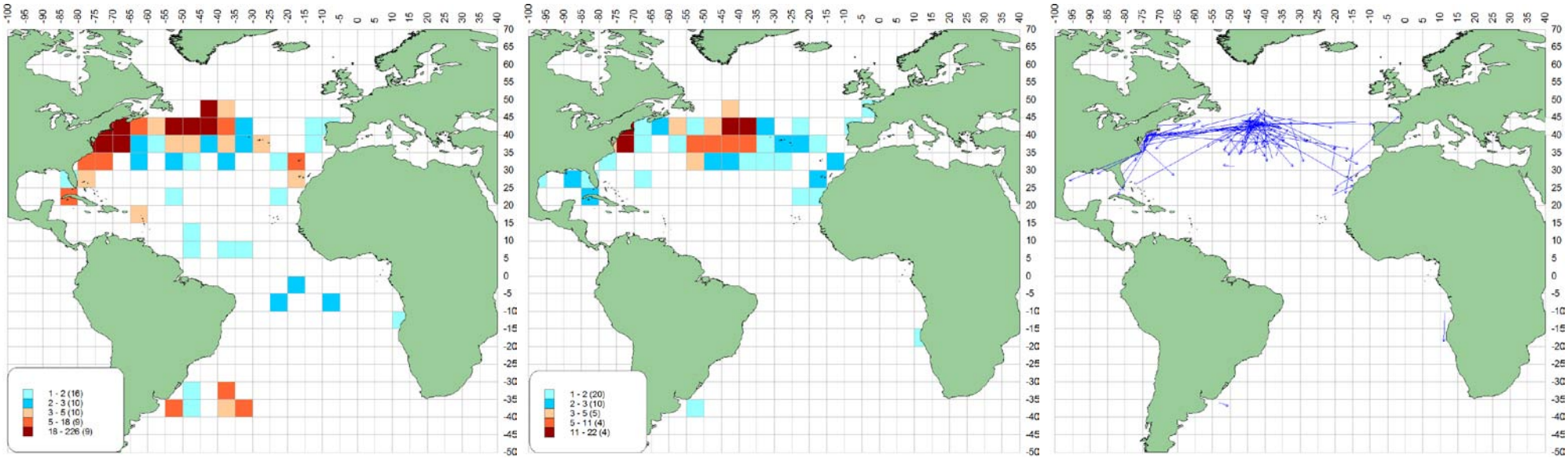

Figure 9. Density plots of shortfin mako shark tag releases (left), recaptures (center), and straight displacement of recaptured sharks.

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 Tagging
3. Review of the information for the Ecological Risk Assessment (ERA)
   3.1 Productivity
   3.2 Susceptibility
4. Review of the relative abundance indices and other fishery indicators for shortfin mako shark
5. Methods and data required for the shortfin mako assessment
6. Other matters
7. Recommendations
8. Adoption of the report and closure

Appendix 2

LIST OF PARTICIPANTS

CONTRACTING PARTIES

SCRS CHAIRMAN
Santiago, Josu
Head of Tuna Research Area, AZTI-Tecnalia, Txatxarramendi z/g, 48395 Sukarrieta (Bizkaia), Spain
Tel: +34 94 6574000 (Ext. 497); 664303631, Fax: +34 94 6572555, E-Mail: jsantiago@azti.es

BRAZIL
Burgess, George
Florida Program for Shark Research, Florida Museum of Natural History, University of Florida, Gainesville, Florida 32611 United States
Tel: +352 392 2360, Fax: +352 392 7158, E-Mail: gburgess@flmnh.ufl.edu

Frédou, Thierry
Professor Adjunto, Universidade Federal Rural de Pernambuco, Depto. de Pesca e Aquiculutra, Avenida Dom Manuel Medeiros s/n - Dois Irmaos, Recife PE
Tel: +55 81 3320 6508, Fax: +55 81 3320 6501, E-Mail: tfredou@depaq.ufrpe.br

Lucena Frédou, Flávia
Profesora Associada, Universidade Federal Rural de Pernambuco, Depto. de Pesca e Aquicultura, Avenida Dom Manuel Medeiros s/n - Dois Irmaos, Recife PE
Tel: +55 81 3320 6508, Fax: +55 81 3320 6502, E-Mail: flucena@ufpa.br

EUROPEAN UNION
Carroceda Carballal, Arancha
Ministerio de Ciencia e Innovación, Instituto Español de Oceanografía, C.O. de A Coruña, Paseo Marítimo Alcalde Francisco Vázquez, 10, P.O. Box 130, 15001 A Coruña, Spain
Tel: +34 981 205 362//981 21 8151, Fax: +34 981 229 077, E-Mail: arancha.carroceda@co.ieo.es

Coelho, Rui
Instituto Nacional dos Recursos Biológicos I.P./ IPIMAR, Avenida 5 de Outubro s/n, 8700-305 Olhão, Portugal
Tel: +351 289 700 520, Fax: +351 289 700 535, E-Mail: rpcoelho@ualg.pt

Neves dos Santos, Miguel
Instituto Nacional dos Recursos Biológicos I.P./ IPIMAR, Avenida 5 de Outubro s/n, 8700-305 Olhão, Portugal
Tel: +351 289 700 504, Fax: +351 289 700 535, E-Mail: mnsantos@ipimar.pt

Ortiz de Urbina, Jose María
Ministerio de Ciencia e Innovación, Instituto Español de Oceanografía, C.O de Málaga, Apartado 285 - Puerto Pesquero s/n, 29640 Fuengirola Málaga, Spain
Tel: +34 952 47 1907, Fax: +34 952 463 808

JAPAN
Fukui, Shingo
Assistant Director, Far Seas Fisheries Division, resources Management Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, 1-2-1 Kasumigaseki, Chiyoda-Ku, Tokyo 100-8907
Tel: +81 3 3502 8204, Fax: +81 3 3595 7332, E-Mail: shingo_fukui@nm.maff.go.jp

Hiraoka, Yuko
Researcher, Tuna Fishery Resources Group, National Research Institute of Far Seas Fisheries
Tel: +81 453 36 6046, Fax: +81 543 35 9642, E-Mail: yhira415@affrc.go.jp

Miura, Nozomu
Section Chief, International Business and Planning Division, Federation of Japan Tuna Fisheries Co-operative Associations, 22 Kudankita 2-Chome, Tokyo, Chiyoda-Ku
Tel: +81 3 3264 6167, Fax: +81 3 3234 7455, E-Mail: miura@japantuna.or.jp

Semba, Yasuko
National Research Institute of Far Seas Fisheries, 5-7-1 Chome Orido, Shizuoka Shimizu-Shi
Tel: +81 3 4336 6045, Fax: +81 3 4335 9642, E-Mail: senbamak@fra.affrc.gjo.jp

Yokawa, Kotaro
Section Chief, Ecologically Related Species Section, Tropical Tuna Resources Division, National Research Institute of Far Seas Fisheries, 5-7-1 Orido, Shimizu-ku, Shizuoka-City Shizuoka 424 8633
Tel: + 81 543 36 6046, Fax: + 81 543 35 9642, E-Mail: yokawa@fra.affrc.go.jp

NAMIBIA
Holtzhausen, Johannes Andries
Ministry of Fisheries &Marine Resources, NatMIRC, 10 Atlantic Str. Box 912, Swakopmund
Tel: +264 64 410 1145, Fax: +264 64 404 385, E-Mail: hholtzhausen@mfmr.gov.na

UNITED STATES
Cortés, Enric
Research Fishery Biologist, NOAA-Fisheries, Southeast Fisheries Science Center, Panama City Laboratory, 3500 Delwood Beach Road, Panama City, Florida
Tel: +1 850 234 6541, Fax: +1 850 235 3559, E-Mail: enric.cortes@noaa.gov

Díaz, Guillermo
NOAA-Fisheries, Office of Science and Technology (ST4), 1315 East-West Highway, Silver Spring, Maryland 20910
Tel: +1 301 713 2363, Fax: +1 301 713 1875, E-Mail: guillermo.diaz@noaa.gov

URUGUAY
Domingo, Andrés
Dirección Nacional de Recursos Acuáticos-DINARA, Sección y Recursos Pelágicos de Altura, Constituyente 1497, 11200 Montevideo
Tel: +5982 400 46 89, Fax: +5982 41 32 16, E-Mail: adomingo@dinara.gub.uy

Miller, Philip
Centro de Investigación y Conservación Marina – CICMAR, Av. Giannattasio km. 30,5 esq. RomaEl Pinar
Tel: +598 99 680 750, Fax:E-Mail: philip.miller@cicmar.org

OBSERVERS FROM NON-GOVERNMENTAL ORGANIZATIONS

Oceana
Greenberg, Rebecca
Oceana, 1350 Connecticut Ave. NW - 5th Fl., Washington, DC 20036 United States
Tel: +34 911 440 880, Fax: +34 911 440 890, E-Mail: rgreenberg@oceana.org

Pew Environment Group
Morgan, Alexia
Pew Environment Group, 901 E Street NW, 10th floor, Washington, DC 20004, United States
Tel: +1 352 262 3368, Fax: +1 202 552 2299, E-Mail: alexia.morgan2@gmail.com

****

ICCAT SECRETARIAT

Pallarés, Pilar
Kell, Laurie
Ortíz, Mauricio
Palma, Carlos

Appendix 3

LIST OF DOCUMENTS

SCRS/2011/085 At haulback fishing mortality of elasmobranches caught in pelagic longline fisheries in the Atlantic Ocean. Coelho, R., Fernandez-Carvalho, J. , Lino P.G. and Santos, M.N.

SCRS/2011/086 Maturity of the bigeye thresher (*Alopias superciliosus*) in the Atlantic Ocean. Fernandez-Carvalho, J., Coelho, R., Amorim, S. and Santos, M.N.

SCRS/2011/090 Standardization of mako sharks caught by Japanese longliners in the Atlantic in the period between 1994 and 2009. Kimoto, A. and Yokawa, K.

SCRS/2011/091 Review of information of other sharks caught by Japanese longliners in the Atlantic. Yokawa, K.

SCRS/2011/092 Movimientos y uso de hábitat del tiburón azul (*Prionace glauca*) en el Océano Atlántico suroccidental: resultados obtenidos mediante telemetría satelital. Miller, P., Cortés, E., Carlson, J., Gulak, S., Forselledo, R.and Domingo, A.

SCRS/2011/093 Distribución de las capturas de tiburón tigre (*Galeocerdo cuvier*) por la flota Uruguaya de palangre pelágico en el Océano Atlántico Sur. Miller, P., Forselledo, R. and Domingo, A.

SCRS/2011/094 Ítems alimenticios del tiburón tigre (*Galeocerdo cuvier*) en aguas sub-tropicales del Océano Atlántico Sur Occidental. Miller, P. and Domingo, A.

SCRS/2011/095 Aves en la dieta del tiburón azul (*Prionace glauca*). Lenzi, J., Jiménez, S. and Domingo, A.

SCRS/2011/096 Estructura poblacional de *Lamna nasus* (Bonnaterre, 1788) en el Atlántico sudoccidental. Forselledo, R., Bessonart, M. and Domingo, A.

SCRS/2011/097 Abundancia relativa y estructura poblacional de 6 especies de tiburones capturados por la flota uruguaya de palangre pelágico en aguas uruguayas entre 1998-2009. Mas, F., Domingo, A. and Defeo, O.

SCRS/2011/098 Captura de tiburones por la flota de palangre pelágico en aguas uruguayas entre 1998-2009: diversidad y CPUE. Mas, F., Domingo, A. and Defeo, O.

SCRS/2011/099 Habitat use and movements patterns of oceanic whitetip, bigeye thresher and dusky sharks based on archival satellite tags. Carlson, J.K. and Gulak, S. J.B.

SCRS/2011/100 Diel vertical movements of a scalloped hammerhead, *Sphyrna lewini*, in the northern Gulf of Mexico based on high-rate archival pop-off tag data. Hoffmayer, E.R., Franks, J.S. and Driggers III, W.B.

SCRS/2011/101 Habitat, seasonal movements and environmental preferences of dusky sharks, C*archarhinus obscurus*, in the northern Gulf of Mexico. Hoffmayer, E.R., Franks, J.S. and Driggers III, W.B.

SCRS/2011/102 Habitat use patterns and environmental preferences of juvenile silky sharks, *Carcharhinus falciformis*, in the northern Gulf of Mexico. Hoffmayer, E.R., Franks, J.S. and Driggers III, W.B.

SCRS/2011/103 Sharks caught by the Brazilian tuna longline fleet: a review. Frédou, F.L., Tolotti, M., Frédou, T., Carvalho, F., Hazin, H., Burgess, G., Coelho, R., Waters, J., Travassos, P. and Hazin, F.

Appendix 4

DATA INPUTS REQUIRED FOR THE ERA

PRODUCTIVITY

	Males	Females
Length		
Lmax		
Growth, age		
Linf		
K		
t0		
a50 (median age)		
Amax (maximum age)		
L50 (median length)		
Length-Weight (W=al^b)		
a		
b		
Reproduction		
Litter size		
Lbirth (length at birth)		
Parturition frequency (yr)		
Gestation period (months)		

SUSCEPTIBILITY

Availability (horizontal overlap between fishery and species distribution)
Species distributions (information on distribution)
Effort (total number of hooks from ICCAT TASK II by 5x5 grids by year)

Encounterability (vertical overlap between gear deployed and species vertical distribution)

	Gear	
Species	Depth range	Time of day gear soaks

Provide range depth of gear deployed and hours that gear typically soaks

	Species	
Depth range	Preferred depth	Time of day

Provide preferred range depth of animal based on archival tag information and any other relevant information

Selectivity (probability that gear will catch animal)

Example:

year=1995	N	
Lengths	males	females
40-50		
50-60		
60-70		
70-80		

Provide length-frequencies of animals caught, ideally by year and sex

Post-capture mortality (probability that animal will not survive the encounter with the fishing gear)

	STATUS (before animal is brought onboard)			
Number of animals	Unknown	Alive	Dead	Other

DISPOSITION OR ACTION TAKEN (after animal is brought onboard)				
		Discarded	Released	
Unknown	Kept	dead	alive	Lost

Provide (if available): (1) status (dead, alive, other) of the animal when it is first seen on the line, and (2) what happens to the animal after it is brought onboard. Ideally reported by year. Provide NUMBERS, not percentages.