出國報告(出國類別：其他)

參加 ICCAT 2006 熱帶鮪類會議報告

服務機關：行政院農業委員會漁業署
中華民國對外漁業合作發展協會
姓名職稱：張水鍇 / 科長、劉弘一 / 漁業統計員
派赴國家：法國賽特
出國期間：中華民國 95 年 4 月 24 日至 4 月 28 日
報告日期：中華民國 95 年 6 月 1 日

摘要

一、 本次會議已確定我國熱帶鮪類之 2003 及 2004 年包含誤報量之產量值;以統計方式檢視 TASK1 之歷史趨勢，亦未發現可質疑之處，變異大之年代，都符合我國漁業之變動。

二、 日本巨額資助之「日本資料改善計畫」，確定對改善 ICCAT 沿岸開發中國家之統計資料系統及資料蒐集之量及質，有相當大之成效，日本亦藉此提高其國際聲譽及影響力。

三、 本次會議已釐清數項資料之疑義，部分將請相關漁業國解釋修正。這些資料將用於預計明年舉辦之熱帶鮪類資源評估會議中，提高評估結果之準確性。

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壹、目的

『國際大西洋鮪類資源保護委員會』(ICCAT) 係爲保護大西洋鮪類資源而於1969 年成立之區域性國際組織，其每年皆會召開會議，針對管轄水域內之鮪類資源狀態進行評估及提出管理措施。在該組織下設有研究統計常設委員會（SCRS)，主要負責漁獲統計及資源評估等事宜，經由各鮪類評估小組會議及全席會議等前後兩項會議之評估及討論後，提出管理建言，供 ICCAT 委員大會作出管理決議。近年來，ICCAT 除採取禁漁期、禁漁區及漁獲體長限制等管理措施外，也開始逐漸對於不同魚種，採取漁獲配額之管理措施，加強資源之管理。

本次會議爲 SCRS 之熱帶鮪類資源評估工作小組，在預計明年召開之資源評估會議之前，先行召開之資料準備會議，其主要目的在於整體回顧大西洋包括大目鮪、黃鰭鮪及正鰹等熱帶鮪類之相關漁業及生物資料，重新檢視分析各國歷年熱帶鮪類之 TASK1 總量資料、作業與體長資料(TASK2)的品質，及單位努力漁獲量資料；檢視迦納漁港蒐集之 圍網資料品質；討論日本之加強熱帶鮪類資料蒐集計畫；並討論漁業指標、生物參數、MULTIFAN 模式應用可行性等，以使下次之資源評估會議能獲致更準確有效之結論。

貳、會議時地、代表

會議自 4 月 24 日至 4 月 28 日於法國賽特的地中海暨熱帶研究中心舉行，除ICCAT 秘書處人員外，另有來自法國、西班牙、日本、塞內加爾、美國等共 20 餘位科學家參加，我國由漁業署張水鍇科長及中華民國對外漁業合作發展協會漁業統計員劉弘一參加，會議主席由法國代表 Dr. Renaud Pianet 擔任。

參、工作紀要

一、漁獲總量資料（TASK1）：

依去年 ICCAT 大會我國代表團提出之 2003 年大目鮪產量之修正數字，包含洗魚量後應爲 21,563 噸，2004 年爲 17,717 噸。本次會議發現秘書處資料庫，2003 年數字並未依此修正。爲避免會中引起對我國洗魚資料之討論，我代表遂於會前與秘書處討論修改 2003 年產量，並請其刪除我國之前特別提報之「回籍船」產量，合併爲台灣漁獲量。渠原先疑慮去年年會尚未確定接受我國大目鮪產量修正值，但最後小組仍同意我方解釋將大目鮪改爲 21,563 噸，並於會議紀錄中明文同意修正。至於將回籍船產量與國籍船產量合併案，小組最後亦接受我方說明，認爲分開對資源研究無益，僅會增加困擾，故同意合併顯示。

會中秘書處表示要合併繁雜之不明國家（NEI）產量，及合併類似漁法之統計值，與會代表對此有許多討論。NEI 熱帶鮪類（主要爲大目鮪）在延繩釣漁獲量估計，主要來自商業資料；而表層漁業則爲歐盟科學家監測並提供給 ICCAT。秘書處將 NEI 漁獲與提報漁獲依國家、年度列表，分析是否有被重複計數情況，以利資料之整併。我國亦提出對眾多漁法及分區之定義感到迷惑，秘書處提供之會議資料顯示，ICCAT 資料庫中有兩套我國資料（LL 及 LLFB），亦有多種分區方式，造成我國提報上及資料引用上之困擾。秘書處亦注意到此種不一致現象，不只發生在我國資料，故未來將考慮如何使資料一致化。

在 TASK1 漁獲資料的趨勢檢查及潛在問題確認方面，工作小組檢閱每年漁獲變動及標準化殘差，針對各國 TASK1 分析資料之長期變異，許多國家因漁業型態改變，故其 TASK1 出現大幅變動，有很大變異性，會中各國需現場回應其國家 TASK1 變動原因，無回應者則作成紀錄，請其後續再作回應。會中對此有相當多之檢視與討論，目的在於釐清秘書處之資料，以決定明年資源評估之基礎資料。

在分析黃鰭鮪資料時，美國及歐盟質疑我國趨勢異常。我代表解釋該變異應是來自目標魚種的改變，早期 70 年代我國以黃鰭鮪爲目標，80 年代以長鰭鮪爲主，90 年代大目鮪漁業開始，黃鰭鮪產量即增加。美國認同這種說法，可以解

釋長期趨勢變動。

針對大目鮪資料，美國代表認爲我國 1970 年代變異大，之後就沒有資料；我代表回應，此現象是因秘書處資料的洋區定義太複雜，因而我方早期提報方式與現在提報方式有些不同，故在分析時，應以船隊爲單位，而非分洋區檢視。秘書處及法國皆同意。

討論鮪釣業 NEI 漁獲量在最近幾年急降至零現象時，秘書處表示這是依據現有可得資料整理，不一定真是零；美國同意，認爲可能仍存在但被報到印度洋。我代表則向美國提出，台、日降低 IUU 的合作行動，消毀或正常化許多船，這也是重要原因之一，美國認同。

二、作業與體長資料（TASK2）:

關於我國之資料提供，秘書處原表示我國未提送熱帶鮪類 2003、2004 TASK2（含作業資料及體長資料）資料，另我國也未提供歷年正鰹體長資料。我代表澄清表示我方應已依規定於一個月前提供 2003-04 資料，另我國正鰹資料並不多，若需要，我方應提供使用。隨後秘書處另一代表證實確有收到我方提供之資料。

三、日本資料改善計畫：

會議中討論並回顧數篇日本出資之資料改善計畫（JDIP）的相關文件，以迦納及塞內加爾兩個國家爲重點，內容包含派員教導如何採樣；利用該計畫所發展之軟體進行資料建檔、資料確認、計算 TASK1 等工作。

在迦納方面，對於主要針對熱帶鮪的表層漁業，明顯增加了資料收集的質與量，並且成功訓練當地人士之資料彙整與統計軟體使用，同時奠定改進相關船隊及採樣資料收集的基礎，因此可使迦納漁業採樣資料維持足夠的涵蓋率。工作小組同時建議 JDIP 所發展的軟體可拓展使用於迦納之其他漁業上。

針對如何改進迦納漁業統計資料的收集方面，會中建議（1）增加作業日誌的涵蓋率、（2）採樣全部圍網及餌釣漁船於 Tema 卸售之漁獲資料、(（3）在不同卸魚時間，利用兩階段採樣 400 條魚。

在塞內加爾方面，工作小組討論 2006 年 3 月在塞內加爾舉行的培訓課程之報告，並計畫延伸推動局部合作以增加資料蒐集、歷史資料取得、監控家計型漁業及休閒漁業、區域合作交流等計畫，另外特別強調地區資料蒐集的實際訓練。

四、顯示資源變動之漁業指標：

當沒有充足資訊掌握漁業資源情況時，漁業指標是瞭解漁業情況、環境及影響的最佳工具，會中討論各種可利用的指標以及一些分析方法，爲 2006 SCRS 熱帶鮪類工作小組會議預作準備，另外也考慮漁業指標進一步的使用及發展。

肆、會議建議

本次會議在檢討熱帶鮪類資料後，作以下建議：。

一、工作小組建議持續並盡快完成 ICCAT 資料庫(TASK1、2)之更新，工作應包括細分 TASK1 以及整併一些遺失的資料，特別是在 NEI 資料方面；歐盟以及其他有關的科學家應該持續努力區分 FISM 1991 年之前的資料，包括 TASK 1（從早期至 1990 年）以及 TASK 2（1980～1990 年)，並且提供從早期起之同質努力量時序列資料。

二、工作小組證實來自 Tema 在阿比尚(Abidjan)卸售的船隊之採樣資料未包含在 ICCAT 資料庫中，與會代表建議納入此資料，至於漁獲物和來自這些船隊的努力量資料，建議秘書處調查是否已完全納入迦納報告中。

三、秘書處所編製，用來指出資料提供涵蓋缺失之電子表格非常有用但不夠普及，建議置於 ICCAT FTP 站，並讓 SCRS 各國代表都能瞭解，因爲 SCRS 將要利用此資訊，向大會建議用來評估資源狀況的資料的品質及數量。

四、考量到熱帶鮪類漁業之複魚種漁獲狀況，漁業指標應該彙整更多訊息一同分析，因此建議應在魚種小組報告之某地方，插入漁業層級（而非魚種層級）

之某些漁業指標。

五、考慮目前使用的熱帶鮪類長度與重量的關係式爲 20 年前所估計的，而近年來在熱帶鮪類資源結構有重大改變，因此工作小組建議更新三個魚種的體長體重關係式。

六、工作小組同時建議取得各魚種市場價格的變動，以了解漁船之目標魚種的變動。

七、工作小組建議提升熱帶漁業重要沿岸國的參與，例如：迦納、象牙海岸，巴西及委內瑞拉等。

八、迦納的家計型漁業之熱帶鮪類漁獲量可能非常大，工作小組建議調查，以掌握其真實漁獲量。

九、工作小組也建議考慮從 FAO 找回一些正鰹統計資料的可能性。

十、會議中有介紹 IOTC 爲蒐集及驗證鮪釣資料所開發的 FINNS 系統，工作小組建議測試應用這個系統在一些 ICCAT 國家來收集鮪釣統計資料之可行性。

十一、會中也考慮到需要爲歐盟及相關船隊建立可靠的黃鰭鮪和正鰹資源指標，故工作小組建議歐盟科學家持續這方面的努力。而由於 MULTIFAN 模式可以延伸應用於不同魚種小組進行資源評估，故小組也將向「方法工作小組」提出應用此軟體進行評估的可能性，以便確定模式所需之最佳參數組合，另進行敏感性分析以評定在缺乏部分資料時之可信度。

十二、小組建議秘書處採取行動，確保日本資料改善計畫、ICCAT 資助計畫所回收的歷史資料及新資料的品質，並會併入 ICCAT 資料庫中，供資源評估用。

伍、心得與建議

一、我國在大西洋已取代日本成爲遠洋漁業的最大國，因此我們也掌握大量漁業資訊，在政府嚴加管理下資料品質將大大提升，若大量鼓勵專家學者進行相

關漁業生態資源研究，影響力將不容小覷。

二、會場上同時感受到『日本資料改善計畫』所得到的重視，一方面委員會迫切希望確實掌握，整個管理洋區的漁業資源及資訊，另一方面沿岸國經由協助，漁業管理能力的大量提升，但出資的日本應該是最大的贏家，國際聲譽以及影響力都相對提高，這也是值得我國效法的。

三、會議要求各國在今年秋季之 SCRS 熱帶鮪類小組會議之前，提供最新修訂之大目鮪及黃鰭鮪資源指標及體長別漁獲量資料，以瞭解資源概況。熱帶鮪類爲我國大西洋重要漁獲對象，我國應提早準備，提供資料及分析成果，以盡漁捕國之義務並保障權益。

陸、會議報告

本次會議之會議紀錄草稿（附件）

REPORT OF THE 2006 ICCAT INTER-SESSIONAL MEETING OF THE TROPICAL SPECIES WORKING GROUP

(Séte, April 24-28, 2006)

1. Opening, adoption of agenda and meeting arrangements

The meeting was chaired by Dr. R. Pianet (EC-France), who welcomed the Workshop participants (**Appendix 2**).

The chairman reviewed the objectives for the meeting. The Agenda (**Appendix 1**) was adopted after some adjustments.

The following served as rapporteurs: P. Kebe, G. Scott and P. Pallarés (Item 2); C. Brown and A. Delgado de Molina (Item 3); D. Gaertner (Item 4); N. Miyabe and P. Pallares (Item 5); A. Fonteneau, I. Mosqueira and S. Cass-Calais (Items 6); R. Pianet (Items 7-8); Secretariat (other items).

The chairman noted that scientists from many members' countries involved in the tropical species fisheries were not present at the WG, which could at prejudice our work. The SCRS chairman mentioned that some ICCAT funds are available to help participation in species group meetings, but they were used to support primarily the working groups having an assessment.

Appendix 3 lists the documents that were presented at the meeting.

2. Update of basic information

2.1. Task 1 (catches)

Task I (catch statistics) were presented by the Secretariat for the period 1950-2005 for the 3 tropical species (yellowfin, bigeye and skipjack) by flag, fleet, gear and area (Tables 1-3, for the period 1990-2004). One main objective was to try to disaggregate FISM (France, Cote d'Ivoire, Senegal and Morocco) and NEI (Not Elsewhere Indicated) surface catches by flag to better monitor future changes in information related to those catches, which are periodically updated or revised (Table 4).

2.1.1. Changes in Task I

The detailed catch table for the three tropical species presented by the Secretariat was reviewed by the group and the following corrections and adjustments were proposed.

Venezuela catch information in the Secretariat data base labeled as unclassified gear for the period 1957 to 1969 should be changed to longline gear (Novoa & Ramos, 1976)

In order to avoid confusion, it was recommended that the Task I catch data recorded for Chinese Taipei deregistered vessels be included under the Chinese Taipei flag.

During the meeting, Chinese Taipei presented revised 2003 Task I for bigeye (21,563 t, instead of 18,682 t) and yellowfin (6,486 t. instead 4,946 t.) and the corresponding Task II. According with the new data 4,097 t of bigeye correspond to the North Atlantic and 17,466 t to the South. For yellowfin the new figures will be 4,946 t in the Eastern Atlantic and 1,540t in the West.

The Secretariat will include these revised information into the ICCAT data base and updated Task I tables will be available to the Tropical Species Group in September.

The Working Group undertook an analysis of catch residuals to examine the available time series of catch by fleet, looking for unusual patterns which should be further investigated. Section 2.1.5 (Residual Analyses) describes the results of this analysis.

2.1.2. Mixed FISM Fleet.

The mixed FISM fleet used in ICCAT data base includes catch from four countries (France, Cote d'Ivoire, Senegal and Morocco) for the period up to 1990. Document SCRS/2006/045 presented information on the FISM historical data as well as recommendations about how to proceed with these data. Based on this document, EU scientists informed the group of the possibility of reporting Task I catch information by flag to provide a more detailed view of the history of the fishery. It was noted that from a scientific perspective, the information would not likely improve our ability to estimate stock status, but nonetheless, would be a useful exercise to describe the evolution of flag-related catch histories for this fleet. It was also noted, however, that separation of Task 2 data by flag for this fleet would not be an easy task as original logbook information for the period prior to 1980 is no longer available in electronic format.

2.1.3. NEI longline fishery.

The estimates of NEI longline catch of tropical species (mainly bigeye) were based on the available trade data. None of the countries included in this category have submitted information about these catches to the Secretariat. The estimates of non-reported harvest by flag should be kept in the ICCAT data base as they are considered to represent the best available scientific information.

2.1.4 NEI Surface fishery.

Many of the NEI surface catches were monitored by the EU scientists and the entire detailed information for Task1 and Task2 was submitted to the Secretariat. As several of the countries with vessels monitored by EU scientists reported catch, it is possible that inclusion of these surface fishery NEI estimates could represent information already reported by the respective countries. The Secretariat presented in Table-4 the catch by country included in this NEI category and the catch reported officially by the same country. Both time series data were analyzed by the group and to avoid double counting the following decision were agreed:

-Senegalese catch reported as NEI will be removed and included in the Senegal catch time series. It was noted that there were only minor differences between the catch reported by Senegal and the catch recorded as NEI and attributed to Senegalese vessels.

To better determine if NEI reports for Cape Verde and Ghana represent catches already reported by these countries, the vessel names and vessel catches included in the NEI reports will be submitted to the Secretariat who will use this information to try to identify if the NEI and country-reported catches are from the same vessels.

The origin of Malaysian surface fishery catch in NEI was not clearly identified and needs further investigation. The Vanuatu surface fishery catch in NEI is probably incomplete and needs further investigation.

The Seychelles surface fishery catch will be removed from NEI and included in the Seychelles time series.

For all the catches reported in NEI and incorporated into a specific flag time-series, the Secretariat should retain information about the sources of these data.

Additional quality control of the catch time series and understanding of the interactions between the various fisheries can be achieved by graphical analysis of the catch composition of the various fleets over time and by finer scale geographical areas. The Working Group recommended that a series of catch composition graphics be prepared on the basis ofthe ICCAT CATDIS data. These figures were completed for the longline catches at the meeting (Figures 1-3). The Working Group recommended that the Secretariat prepare similar figures for use by the various species groups of the surface gears and other gear types using software provided to the Secretariat by an IRD scientist. .

2.1.5 Task I Residual Analysis

To examine trends and identify potential problems in the TASK 1 catch data, the working group reviewed plots of annual catch series and their standardized residuals. Series were chosen for further review if any annual standardized residual was greater than 3.0 or less than-3.0, and the maximum annual catch was greater than 500 metric tons. Standardized residuals more extreme than ±3.0 are typically caused by rapid changes in the catch

level of a fleet. This can be due to changes in reporting (e.g. changes in area, fleet or gear codes), accurately reported landings that are highly variable or rapidly increasing/decreasing, or by inaccurately reported landings that are quite different from the average landings of the fleet. Recommendations were made to review the accuracy of certain catch series. The working group recommendations are summarized in Appendix 4

2.2 Task 2 (catch-effort and size samples)

The Secretariat presented the catalog of ICCAT Task-2 data (catch & Effort and size sampling) available in ICCAT data bases. The preliminary view of the information conducted by the working group dididnot allow a thorough evaluation of the degree of impact of missing data on the ability of SCRS to provide reliable advice on stock status. Thus, the Secretariat presented the Task I and Task II data catalogues for the more recent period (Tables 5-7) in a way that allows easier identification of missing data. This information can be used to identify critical missing data components which impacts our ability to provide scientific advice on the status of Atlantic tuna resources.. The Working Group recommended that the spreadsheets developed to support this analysis be provided on the ICCAT FTP site and that SCRS Officers, Statistical Correspondents and Lead Scientists be made aware of its availability, as the SCRS will need to utilize this information to advise the Commission on the quantity and quality of data available for conduct of stock assessments and on mechanisms to improve the situation.

The Working Group also discussed the possibility of incorporating into the ICCAT data base, several different measures of effort as well as additional information related with effort. The age of the vessels was considered as an interesting piece of information to incorporate to the register of vessels forms.

The criteria used to submit Task-2 size data (size intervals, kind of frequencies, etc.) was introduced for review and comment, but the group decided to submit this issue to the Sub-Committee on Statistics for general discussion.

2.3 Ghana statistics

Considering the importance of the Ghana catches (about 20% of the total tropical catches in the last 5 years), further analyses of the Ghanaian task1 data were conducted. As in the European purse seine fleets Ghanaian catches need to have species composition correction. Since 1985 a multispecies sampling scheme is applied to the catches and species composition of the catches were corrected following the system define by the WG of Juvenile Tropical Tunas (Brest, 1984). This system was used over the 80s and 90s. Since 1991, species composition is corrected by the ICCAT Secretariat from sampling data on a quarterly basis.

Table 8 shows the number of fishes measured by month, species and gear in Tema. Data covers all the fleets based in Tema. Table 9 shows the same information for the Ghanaian fleet landing in Abidjan. Combining both sources of information, the overall coverage seems to be scarce in the historical period (prior to 1985), good in the intermediate (1987-1997) and low in the most recent period, in particular since 2000. Good sampling conducted in Abidjan in the last three years (2002-2004) compensates for the decrease in sampling effort in Tema. However, data collected in Abidjan from fleets based in Tema are not reported to ICCAT to avoid duplication. Nevertheless the Group considered that there is not a problem with duplication ofofof samples and recommended incorporating the Abijan samples of Tema vessels into the ICCAT data base. The group also recommended verifying that the total catch and effort information collected in Abidjan has been fully reported to ICCAT. If not, this information should be also incorporated.

Table 10 shows the sampling coverage of the European and associated fleets. Comparing the coverage rate of both fleets, the Ghanaian sampling coverage can be considered to fall withinwithin the limits established by similar fleets (1 fish measured by 1-1.5 t. caught) for the period 1985-1997 and below these limits during earlier and moremore recent years. Nevertheless the variability in the Ghanaian catch is lower than in the European fleets in both the range of sizes as well as in the species composition due to the homogeneity of the fishing mode and the restriction in the fishing area. Consequently adequate sampling coverage could be lower than that of the European fleet.

In order to evaluate the quality of the catches by species (Task 1) estimated from sampling, the group analyzed other available information. Figure 4 shows the species composition estimated by Bannerman & Bard (2002) from samples on a monthly basis. The comparison of this information with the sampling coverage shows that the

lowest variability corresponded to the period with higher sampling coverage (1989-1999). However, other factors, such as seasonality, can also contribute to the variability.

Figure 5 shows the species composition of Task1 estimated from sampling. The estimated species composition pattern stays relatively stable for the first period and seems to be more variable since 1997. One possible explanation of this increase in inter-annual variability would be related with the procedure used to estimate the species composition. The analyses of the species composition estimates conducted by Bannerman et al. (2005) showed that use of the whole range of sample sizes in the estimation increases the variability because a small number of large fish (yellowfin or bigeye) dramatically changes the estimated proportion of species in the sample (because of the high weight of large fish). This possible effect was explored by analyzing the range of sizes in the samples used to estimate the species composition in the period of higher variability. Figure 6 shows the yellowfin and bigeye average sample length and proportion of fish less than 65 cm. in the sample. For the years with high variability the percentage of fish less 65 cm. represents almost the 100% of the sample. That means that variability would be due to (an)other reason(s) than the range of sizes used. The group concluded that no improvement in the method used can be done with the information available.

The Working Group discussed the possibility that the Ghanaian artisanal fishery has significant catches of tropical tuna. The Working Group recommended that Ghanaian scientists investigate this possibility and evaluate the amount of catches of this fishery.

2.4 Review of Enhanced Data Collection Activities Pertinent to Tropical Species

The Working Group reviewed several documents pertinent to enhancement of data collection activities funded by the Japanese Data Improvement Project (JDIP) and undertaken to address data issues in some African surface fisheries. Documents JDIP/SC3/2006/04, 05, 066, 07 and 11 were discussed. (they should appear in Appendix 3) It is apparent from the reports that the JDIP-sponsored program in Ghana should result in increased quantity and quality of data collected on the Ghanaian surface fisheries targeting tropical species (see section 2.3 for more discussion). Training in the use of software designed to assist in this data collection (ADVTH and TTGHANA) was judged successful and should provide a basis for improved quality and quantity for the data collected on the size and species composition from the fleet, should the Ghanaian fishery samplers maintain adequate coverage. The Working Group endorsed the conclusions made in JDIP/SC3/2006/05. It was also recommended that members of the Working Group who had provided this training remain in contact with samplers in Ghana and that Ghanaian scientists be encouraged to prepare scientific documents describing the results of recent sampling activities for the SCRS to consider at its upcoming (and subsequent) meetings. The Working Group also recommended exploration into extension of the software now being utilized in the Ghanaian fishery to other surface and longline fisheries. It was recommended that a proposal to do such, be considered for future funding by the JDIP or the Data Fund.

The group also reviewed the sampling recommendations made by the Group for Improving the Collection of Fisheries Statistics in Ghana (GICFSGH), (Anon., 2004 should be added in reference list). Based on this information the Group decided to reinforce the recommendations made by the GICFSGH in particular:

- Increasing the logbooks coverage
- Sampling all PS and BB vessels landing in Tema
- Sample size of 400 fish taking in two stages at different time of landing

This sampling strategy would result in a coverage close to that reached in the best historical period.

The group encouraged the Ghanaian scientists to submit new data and information on the new system to the SCRS.

The Working Group also discussed the report of the first training session held in Senegal in March 2006, at which attending scientists and technicians from Angola, Cape Verde, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea (Rep.), Senegal and Sao Tomé & Príncipe were invited. The Working Group endorsed the recommendations held in JDIP/SC3/2006/07 which are designed to reinforce regional cooperation for improvement of statistical data collection, recovery of historical data, improvement in monitoring of artesanal and sport fisheries, and furthering communication among regional partners. The Working Group recommended follow-up on the recommendations, especially on development of more hands-on training for regional data collections.

In addition to improvements in data collections, the Working Group discussed the need to incorporate the historical data recoveries and new data collections into the ICCAT database so that the information can be taken into account during resource assessments. In addition, it will be necessary to incorporate these data to provide a basis for quantifying and monitoring the success of the capacity building programs started. The Working Group also recommended that the Secretariat undertake actions to assure that these data are both quality assured and incorporated into the data base maintained by ICCAT for stock assessment purposes.

2.5 Shifting Baselines?

The Working Group endorsed the recommendation of SCRS/2006/44 relating to the need to recover, incorporate into the ICCAT database, and include in stock assessment analyses conducted by SCRS, a more complete history of fishery activities of the Atlantic tuna fisheries starting in the 1950s, to avoid the so-called shifting baseline syndrome. With respect to tropical tunas, it is recommended that estimated catch at size across all the fleets be developed on the basis of the available data starting in the 1950s for bigeye, yellowfin, and skipjack.

3. Review of fishery indicators

In the absence of a full stock assessment, various fishery indicators may provide the best available clues to current stock status, condition of the fishery, and potential ecological impacts. The Group discussed the potential utility of various such indicators, and recommended that specific analyses be conducted in preparation for the Fall 2006 meeting of the SCRS Tropical Tunas Species Group (and updated each year thereafter), and that other indicators be considered for future development.

Fishery indicators relevant to stock status

The Group stressed the importance of updating the various abundance indices which have been used in the most recent stock assessments for each species. These CPUE indices, and the parties responsible for creating them, are listed in **Table 11**.

The Group also discussed a number of other analyses which may provide some indication of stock status in the absence of a full assessment (**Table 12**). One such analysis would be a standardized catch rate series for purse seine, focusing on the larger sizes of yellowfin tuna, probably by restricting the analysis to free school sets and associated effort. Such an analysis should provide a better indicator for the older ages, reduce the difficulties in discriminating fluctuations in recruitment from changes in fishing mortality, and avoid some of the problems with standardizing effort associated with sets on floating objects (FADs). For this approach, it was considered that search time may be the best measure of basic effort. It was also suggested that the analysis data set might be further restricted to effort associated with free school sets by assuming that vessels which travel longer distances overnight are moving between FADs, as they can't be searching for free schools at night. However, this approach would likely require further study, including the incorporation of VMS data, to determine if it is both feasible and appropriate. A new EU funded project – CEDER, Catch, Effort and Discards Estimates in Real Time – which started in 2006 will be partially dealing with this question. Other factors which might be considered include the changes over time which have resulted in reduced time necessary to make sets and to offload catch (increasing efficiency of effort over time).

Another set of useful indicators are the changes in average weight of fish in the catch over time. A reduction in average weight may be reflective of increasing or sustained high fishing mortality, although an initial reduction in average size is expected in a fishery and changes may also reflect changes in selectivity or recruitment pulses (at smaller sizes). The Group requested that the Secretariat prepare figures for the trends in average weight in the catch for each species, calculated from the available catch-at-size data. These series should be calculated for each gear group, as well as an overall average trend weighted by the respective catches among gears. Since contrast is often lost if analyses are restricted to recent years, the Group stressed that these series should be calculated beginning with the earliest years possible (a general recommendation, whenever possible, for all indicators). The Secretariat agreed to process the most current data available following the July 31 submission deadline, providing catch-at-size and average weight trends two weeks prior to the Fall 2006 Tropical Tunas Species Group meeting. The Secretariat further indicated that recalculation incorporating minor corrections and carryovers might be possible, subject to time and workload constraints, during the following two weeks leading up to the meeting.

It would be useful to compare the size frequency distribution, by species and gear group, for the most recent year relative to the average distribution from the previous 5 years. Plots of the changes in temporal-spatial distribution and quantity of catch and effort across years were also considered to be useful descriptors of fishery trends. Likewise, changes in average distance traveled by vessels may reflect fishing trends and conditions. Since changes in a stock are often detectable first at the periphery of its distribution (less optimal habitat), analyses of the catch and effort of fisheries along the fringes of the species distribution are recommended. Within the purse seine fishery, calculation of the annual percentage of sets by fishing mode (free school vs. FAD) would be useful for understanding the changing selectivity of the fishery over time..

Fishery indicators relevant to multi-species fisheries and ecosystems

The Group stressed that the tropical tuna fisheries are multi-species fisheries, with strong interactions between the selectivities and fishing mortalities among yellowfin, skipjack and bigeye tunas. Considering this, it may be useful to develop new indicators reflecting the status of the fishery as a whole. Along these same lines, it was also recognized that the tropical tuna fisheries influence the pelagic ecosystem. Several papers were discussed which are relevant to the selection and development of fishery indicators which may reflect the multi-species nature of the fishery and the impact on the ecosystem. These included:
To be consistent, the references should be in the biblio, not in titles
- *Indicators for Sustainable Development of Marine Capture Fisheries (FAO, 1999) + ref in the biblio*

These guidelines have been produced to support the implementation of the Code of Conduct for Responsible Fisheries. General information is provided on the issues of sustainable development of fisheries in order to clarify why a system of indicators is needed to monitor the contribution of fisheries to sustainable development. Information is also provided on the type of indicators and related reference points needed. The process to be followed at national or regional level to establish a Sustainable Development Reference System (including identification of objectives, selection of indicators and reference points) and its implementation is described.

- *Current usage of fisheries indicators and reference points, and their potential application to management of fisheries for marine invertebrates (Caddy, J.F., 2004). + ref in the biblio*

In this document a summary of the fisheries indicators is presented. These indicators increase in complexity and precision as the knowledge in fisheries are increased. The indicators can measure the productivity, the biomass and the exploitation rate, but also, it is necessary to continue observing the characteristics of the ecosystem, the habitat, the environment and the socioeconomic conditions that characterize the fishery. The integration of the diverse indicators and reference points in the management, would assure a better administration of the resources.

- *What community indicators can measure the impact of fishing? A review and proposals (Rochet M-J. & V.M. Trenkel, 2003)*

In this document, diverse population indicators are reviewed that could be used as indicators of the impact of the fishing. A classification is made on the diverse types of indicators. The total mortality rate, exploitation rate or the average size are easy to interpret indicators; on the contrary, indicators based on the composition of species, such as diversity indices, are difficult to interpret and the effect of the fishing on them is not easily predicted. New candidate indicators are proposed: the change in fishing mortality required to reverse population growth rate, the proportion of non-commercial species in the community, and the average length and weight in the community.

- *The FAO framework for use of quantitative indicators and performance measures to manage target species and ecosystem impacts, Keith Sainsbury (CSIRO Australia) and Mike Sissenwine (NMFS USA)[powerpoint presentation]*

This presentation describes the FAO Guidelines for the Ecosystem Approach to Fisheries (EAF), which provide a framework for implementation. The authors conclude that the steps are clear and the methods to support them are available. They maintain that we have enough general understanding about fisheries and marine ecosystems to establish credible starting hypotheses and to identify where existing strategies are likely to be weak and how to improve them. Precaution and future learning are part of the framework, and the authors conclude that there are no practical reasons to delay a start to the EAF.

- An overview of yellowfin tuna stocks, fisheries an stock status worldwide. A. Fonteneau (SCRS/2005/097)
This paper makes a comparison of yellowfin stocks worldwide and stresses the importance of extending the series of data analyzed from the beginning of the fishery until the present. Examples of fishery indicators shown include catch trends by fishery and time period, changes in exploitation area and average weight trends.

The Group emphasized the importance of a multi-specific approach in the evaluation of the tropical tuna fisheries, as well as ecosystem considerations. Fishery assessment and management which consider both human benefits as well as ecological well-being are clearly important. Many of the measures and methods hold promise and should be pursued wherever possible, but some may involve further study and the incorporation of fishery independent data (which may or may not be available at present). It is recommended that these approaches be considered for incorporation in future analyses, and specific research in this area is welcomed.

Other non- fishery indicators

Along this line and consistent with ecosystem approaches, the Group also emphasized the need to further evaluate and understand the relationships between environmental conditions and indicators and tuna fishery success. The Group recommended working toward identifying reliable environmental indicators for explaining tuna availability and abundance. It would also be desirable to better understand the effects of relative price paid for yellowfin, bigeye and skipjack on changes of targeting between these species.

4. Review of biological parameters

The Working Group was informed by the SecretariatS about the progress realized in the constitution of an ICCAT catalogue gathering the main parameters characterizing the biology of the tunas. The Secretariat presented the recent updating and correction tasks made in the tagging data base as well as some new information with respect to the apparent large migrations observed for the tropical tunas. The availability of the basic data on the ICCAT web site, at least two weeks before a working Group or a SCRS meeting, should be helpful for detecting and correcting errors in the data base of each species.

The Working Group pointed out the lack of an update in the catch-at-size data, and consequently the impossibility to perform and to analyse changes over time of some useful fishery indicators such as mean weight by fleet, apparent total mortality, etc. The situation is specifically dramatic for skipjack for which catch-at-size has not been updated since 1998 (including catch-at-size for 1966). The ICCAT Secretariat explained the reasons for these discrepancies and, taking into account the recommendation made by the Working Group, stated that the new catch-at-size data should be available for the next SCRS meeting.

In spite of the lack of recent catch-at-size updates but with the aim of favouring multispecies approaches in tropical tuna fisheries, comparisons of changes over the years in the total mortality Z for the 3 species were conducted during the 2005 Tropical Species Group meeting on methods to reduce mortality of juvenile tropical tunas with the use of the catch-at-size data provided by the Secretariat.S An apparent Z estimate for each species was performed on the basis of the following equation

$$Z = K*(L_{\infty} - L\,moy) / (L\,moy - L\,c),$$

where L_{∞} and K represent the conventional parameters of the von Bertalanffy's growth curve, Lc = the length at which fishes are fully recruited, and $Lmoy$ the average length for fishes fully recruited (Beverton and Holt, 1956). Unfortunately, as mentioned, it was not possible to update this indicator during the present Working Group meeting.

A new fishery ("demographic") indicator was tentatively analyzed during the meeting. This indicator, termed "Skew" hereafter, is based on the reasonable assumption that an increase in fishing effort reduces the proportion of older individuals in the population and as a result the age/size composition becomes more skewed (Rosenberg and Brault (1991) in Caddy, 2004). This indicator is defined as:

$$Skew = N^{-1} \sum [(X_i - X_{moy}) / s]^3,$$

where N is the number of age/size classes, X_i is the relative abundance of the ith class, X_{moy} and s are the average abundance and the standard deviation respectively. The changes over the years of this indicator for the 3 species are showed in Figure 7. The general trend depicted in this figure (i.e., assumed to reflect an overall

increase in fishing mortality) reinforces that was observed in the previous analysis of Z (even though some discrepancies may exist between both indicators).

The Working Group recognizes the interest of this type of indicators and suggests that this type of indicators be compared with the changes over time of the status of the stocks as estimated by the conventional assessment models in futures analyses. Furthermore, the Working Group pointed out the need to assess the accuracy of such indicators by simulation studies.

The usefulness of other fisheries indicators such as mean length of catch, median age at maturity, etc (for a review of potential fisheries indicators, see Rochet et Trenkel, 2003; Caddy, 2004, among others) was briefly discussed by the Working Group.

In addition, the Working Group recognizes the interest of having information on sex-ratio-at-size on a regular time basis.

The Working Group also noted the necessity to update of the length-weight relationships of the main species, particularly for the small fishes caught under FADs; the neeed to recover the old data for comparisons was also stressed..

5. Review of time/area disaggregated models (e.g., MULTIFAN-CL)

Within SCRS as well as other scientific bodies, stock assessment analyses which accommodate more biological realism than traditional approaches are being more widely applied. In these cases, the data requirements are often more demanding than the more traditional stock assessment approaches. SCRS has been evaluating the applicability of more time/area disaggregated models for several stocks and there has been recent application of one such integrative statistical stock assessment approach (MULTIFAN-CL) for Atlantic bigeye tuna. The Working Group reviewed the most recent model structure applied to the available catch, effort, and size data. They are summarized as follows:

Regional structure: One of the advantages of using MULTIFAN -CL is the incorporation of spatial structure so that the movements among regions can be estimated. As a first step, 3 simple and large regions (north of 25N, between 25N and 15S, and south of 15S) separating out tropical and temperate waters were defined.
Time step: A quarterly time step (Jan.-Mar., Apr.-Jun., Jul.-Sept., Oct.-Dec.) was chosen to represent processes of population dynamics, such as mortality, recruitment, movement and growth.
Growth: The maximum age in quarters was set to be 32 (8years) with the 32nd quarterly age treated as a plus-group. Growth was assumed to follow a VB growth curve. The first 8 quarters of growth were modelled separately with the VB parameters for this period estimated internally in the assessment model.
*Period analyze**d**:* The analysis was conducted for the period of 1961-2000, which encompasses the period when there was little fishing in earlier years as well as heavy fishing in recent years.
Definition of fisheries: Following the discussions of past SCRS assessment meetings on bigeye and taking into account the characteristics of various fisheries, 14 fisheries were defined (Table 13). The purse seine fishery was separated into 3 different time frames and one baitboat fishery (Dakar-based) was similarly separated into 2 periods. These separations were made according to the known changes in port sampling protocol as well as the changes occurred in fishing operation, i.e., the introduction of the use of fish aggregating devices (FADs) which took place since around 1990. There is a difference in size of fish caught by various baitboat fisheries, and that is why the fisheries were kept separately. Among the longline fisheries, the Japanese fishery was separated from the rest, as this fishery provided reasonably good quality data (catch, effort and size), and was considered to provide better information regarding the trend of stock. The remaining longline fisheries include various countries and miscellaneous other gears.
*Preparation of catch and effort **data** :* The catch and effort data were prepared by fishery and quarter. All catches were in weight except for the Japanese longline fishery for which number of fish was used instead of weight. The total catch for the period was the sum of the fishery catches and is a complete time series. However, there are some fisheries for which no effort indicators were available. In some cases, a simple GLM was applied to calibrate the effort (See Miyabe *et al*, 2005) between series for which effort was recorded in substantially different units within a fishery. The Japanese longline data were standardized for each quarter by the GLM model described in the same paper.
Preparation of size data: Length data are categorized by 2 cm intervals from 20 to 220 cm (a total of 111 classes). Weight data are only prepared for the Japanese longline fishery by 1 kg interval (1kg – 220 kg, 220 classes).

Preparation of tag data: Tag release and recovery information were aggregated by release region, year and quarter of release, and recoveries were aggregated by recovery fishery and the size of fish at release. In total, there were 129 tag release groups.
Assumptions ***about*** *recruitment:* It is assumed that recruitment occurs at the beginning of every quarter. There is assumed to be a weak relationship between stock and recruitment, and therefore the prior was set such that the reduction of recruitment would be small (10% reduction) when the equilibrium spawning biomass decreased to 20 % of its unexploited level. The initial population was assumed to be in an equilibrium in which fish died only due to natural mortality.
Assumptions on selectivity: Selectivity was assumed to smoothly vary with age but time-invariant within a fishery. Longline fisheries were assumed to have non-decreasing (flat-topped) pattern as the fish becomes older. The Japanese longline fisheries for three regions (fishery 9-11) share the same selectivity and, similarly, the other longline fisheries share the same values among regions. Purse seine shares the same selectivity between 1965-85 (fishery 1) and 1986-1990 (fishery 2). Purse seine fishery for 1991-2000 is expected to have higher selectivity for younger fish than the previous years since this fishery introduced the FADs fishing in which significant number of small fish are caught.
Assumptions on Catchability: Catchability except for the Japanese longline fishery is allowed to vary slowly over time, with random steps take every two years. That of the Japanese longline fishery is assumed to be constant over time, as the fishing effort for this fisher was standardized to take account of targeting changes before it was input to the model.

Other assumptions on effort deviation, tag-mixing, tag reporting rate and others were also made (see Miyabe *et al*, 2005).

After the presentation of the model structure, the group discussed data needed to fully support this type of model in general, as well as on the specific structure defined for bigeye.

Regarding the structure of the model the group considered that the tagging information available did not justify the spatial structure defined. In fact, the current structure assumes a fixed movement rate between regions but different among ages, an assumption which likely is violated. As a consequence, the Group recommended to substitute the current three areas to only one as an alternative scenario. Considering the low tag recovery rates, in particular from LL, the Group recommended the incorporation of the tagging data only for mortality rate and growth estimation, but not for migration rate estimation purposes. The Working Group also agreed that electronic tagging would be a good tool for getting movements information.

In relation to data needed to allow estimation of the full suite of parameters for these models, the Group agreed that more detailed information than that existing in the ICCAT data base is needed. As a general rule, disaggregated information on catch and effort data as well as raw sampling data are needed. Catch and effort data would be at least by 1ºx1º square by quarter for all the fleets and even more detailed effort information would likely to allow standardization for relative abundance indices. Also additional biological information would improve the model structure and consequently the results. The Working Group decided to submit these issues to the Sub-Committee on Statistics for discussions and possible recommendations for refining the data reporting requirements of Contracting Parties.

Considering that these type of models could be extended to other stocks assessments, the Working Group agreed that it would be helpful to conduct analyses in order to define the best data sets needed by the models. Also sensitivity analyses would need to be carried out to evaluate the effects of the lack or deficiency of data. Simulations could be an appropriate approach for these analyses. The Working Group considered that this issue should be submitted to the Methods WG for consideration.

The Working Group also discussed data deficiencies related to the fisheries defined in the current bigeye MULTIFAN-CL model structure. Low catch-effort and size data coverage appears to the main problem, also the high level of aggregation of several fisheries and the effort data reported in very different units are problematic. The Working Group also identified specific cases in which effort should be done to improve the data existing in the ICCAT data base. In this sense the effort series for the European purse seine fleets would be replaced by effort properly standardized, which is not the current case. Also, European scientists should work on improvement in the method used to identify effort targeted to FADs and to free schools.

6. Evaluation of alternative management measures

The Working Group reflected on the possible ways a new analysis of management measures for tropical tunas could be carried out. A number of realistic scenarios could be considered in this analysis.

Scenarios under consideration.

- Both the previous and present time-area closures will be evaluated.
- Effort reduction in the PS fleet by projecting the current trend in reduction of nominal effort in the European fleet. This will also be applied to other PS fleets. Other scenarios can also be investigated.

To evaluate the different management measures two different calculations would be done: short term effects calculations and long term effects calculations.

Short term effects. Calculations would be conducted to estimate the loss in catches due to the implementation of the different management measures. To evaluate the short term effects we will take as reference the most recent period (2001-2004). Implementation will be considered complete, as no information is available to model the dynamics of compliance for the various fleets. For time-area closures, it will be assumed that effort is not redistributed.

Long term effects. This analysis will be based on a multi-gear Yield-per-Recruit, considering two fleets: Surface fleets (PS and Equatorial BB) and Longline. Only yellowfin and bigeye tuna will be considered, and the results of the most recent assessments will be used. Fishing mortalities will be adjusted according to the catch reductions implied by the management scenarios under consideration for the different fleets. Other values of catch reduction per gear will also be explored, to provide information on the maximum benefits in terms of YPR obtainable in this fishery.

Given the intention to carry out a new assessments for Atlantic bigeye tuna, and possibly also for yellowfin tuna, in 2007, the Working Group considers it beneficial to carry out the proposed analysis based on the results of the upcoming assessment(s). This would also allow the incorporation of data obtained after the establishment of the new time-area closure

The group also outlined that a new assessment on skipjack should be done, as the last one was done in 1999 and any multispecies analysis needs to have assessments for the three main species..

7. Uncertainties related to the multi-specific nature of surface fisheries

The main characteristic of the surface tropical tuna fisheries is that it is exploiting primarily 3 species having very different life history:

- Yellowfin which is a typical long live tropical species reaching large sizes, exploited by both surface (juveniles and adults) and longline (adults) fisheries more or less at a similar extent;
- Bigeye which is a long live semi-tropical species reaching large sizes too, exploited by surface (juveniles) and mainly longline (adults) fisheries;
- Skipjack, a small tropical species with a much shorter life, only exploited by surface fisheries.

The consequence of this is that any management measure taken for one species according to its own stock assessment evaluation may have important consequences on the other species, that have to be taken in account. In the pass, yellowfin and bigeye size limits as well as the moratorium implementation were good examples of this situation.

Similar considerations are also valid for the longline fishery which is also multi-specific.

Consequently, the working group consider that it is necessary to assess the impact of any management decisions taken according to a single species on the others to facilitate the final decision by the Commission.

Some of the studies made within the frame of the EU funded FEMS project as the “Operational Model” for bigeye, yellowfin and skipjack or the analysis of the consequences of uncertainties in the estimation of the species composition on mono-specific assessments may give some answer to this problem.

The WG recommends that some tentative demonstration paper be made for the species group meeting in September, presenting the results of this project.

8. Recommendations

1- The Working Group recommended to continue and finalize as soon as possible the update of the ICCAT database (Task 1 & 2). Work should include the split of aggregated Task 1 catches as well as the incorporation of missing information. The Secretariat should work with the NEI data set. Scientists from the EU and other concerned scientists should try to split as far as possible the FISM statistics before 1991: task 1 (beginning to 90) and 2 (1980-1990) and provide an homogeneous effort series from the beginning.

Deleted: Work

2- The Working Group verified that sampling data from the Tema based fleets landing in Abidjan were not included in the ICCAT database. It was recommended to include these data. Regarding the catch and effort data from these fleets it was recommended to the Secretariat to investigate if those data are fully reported by Ghana. Otherwise it should be also incorporated.

3- Considering that the spreadsheets developed by the Secretariat to identify coverage deficiencies is an useful tool it was recommended that it should be provided on the ICCAT FTP site and that SCRS Officers, Statistical Correspondents and Lead Scientists be made aware of its availability, as the SCRS will need to utilize this information to advise the Commission on the quantity and quality of data available for conduct of stock assessments and on mechanisms to improve the situation.

4- Taking into account the multispecies component of the tropical tunas fisheries it was considered that fishery indicators should be more informative analyzing together. Thus it was recommended to include some where (new section in the executive reports, other?) some indicators at the fishery (and not only species) level (as cpue and mean weight trends of the main species caught).

5- Considering that the length-weight relationships currently used for the tropical species have been estimated years ago (more that 20 years) and that important changes in the tropical tunas fisheries have occurred (FAD fishery). The Working Group recommended to uupdateuthe length-weight relationships of the 3 species and specially for fishes less than 1 m ..In order to curry out statistical comparison analyses the Secretariat should contact the scientists involved in these studies in order to obtain the original data on a voluntary basis. .

6- The Working Group also recommended to get time series of the market price by species and main categories (from SPC?) in order to better understand changes in targeting strategies.

7- The lack of participants from the coastal countries was matter of concern. The Working Group recommended seeking ways to enhance the participation of some countries important for the tropical fisheries (ICCAT special fund) as Ghana, Ivory Coast, Brazil, Venezuela

8- The possibility that the Ghanea artisanal fisheries caught significant amount of tropical tunas was discussed. The Working Group recommended to investigate this possibility.

9- The Working Group also recommended to examine the possibility of recovering some FAO statistics on skipjack

10- After a presentation of the system FINNS developed by the IOTC for collecting and validating LL statistics, the Working Group recommended to examine the possibility of using this system to collect longline statistics in some ICCAT countries.

11- The need of having reliable YFT and SKJ cpue index for EU and associated fleet was considered. The Working Group recommended to the EU scientists to make effort on that. Considering that models as MULTIFAN could be extended to different SCRS stocks assessments, the Working Group submit to the Methods WG the possibility of conducting simulations analyses in order to define the best data sets needed by the models as well as sensitivity analyses to evaluate the effects of the lack or deficiency of data.

12- Due to the recent updates in the tagging data base the Working Group recommended to validate the new data base.

13- The Working Group recommended that the Secretariat undertake actions to assure that historical data recovered and new data collected with support of JDIP, Data Fund, or other sources funded by ICCAT are both quality assured and incorporated into the data base maintained by ICCAT for stock assessment purposes.

14- With respect to tropical tunas, it is recommended that estimated catch at size across all the fleets be developed on the basis of the available data starting in the 1950s for bigeye, yellowfin, and skipjack.

15- The Working Group endorsed the recommendations held in JDIP/SC3/2006/07 which are designed to reinforce regional cooperation for improvement of statistical data collection, recovery of historical data, improvement in monitoring of artesanal and sport fisheries, and furthering communication among regional partners

16- The Working Group reinforced the recommendations made by the GICFSGH in particular:

- Increasing the logbooks coverage
- Sampling all PS and BB vessels landing in Tema
- Sample size of 400 fish taking in two stages at different time of landing

The Working Group considered that this sampling strategy would result in a coverage close to that reached in the best historical period.

17. The Working Group endorsed the conclusions made in JDIP/SC3/2006/05. It was also recommended that members of the Working Group who had provided this training remain in contact with samplers in Ghana and that Ghanaian scientists be encouraged to prepare scientific documents describing the results of recent sampling activities for the SCRS to consider at its upcoming (and subsequent) meetings. The Working Group also recommended exploration into extension of the software now being utilized in the Ghanaian fishery to other surface and longline fisheries. It was recommended that a proposal to do such, be considered for future funding by the JDIP or the Data Fund.

9. Other matters

No other matters were discussed.

10. Report adoption and closure

The Workshop reviewed main sections of the report during the meeting. It was agreed that the report would be adopted by correspondence.

The Chairman thanked participants for their hard work. In turn, the Working Group thanked the Chairman and the IRD for hosting the Working Group meeting at its fine facility in Sete. The meeting was adjourned.

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Appendix 1

AGENDA

1. Opening, adoption of agenda and meeting arrangements
2. Update of basic information
   - 2.1 Task I (catches)
   - 2.2 Task II (catch-effort and size samples)
   - 2.3 Ghana statistics
   - 2.4 Review of Enhanced Data Collection Activities Pertinent to Tropical Species
   - 2.5 Shifting Baselines?
3. Review of fishery indicators
4. Review of biological parameters
5. Review of time/area disaggregated models (e.g., MULTIFAN)
6. Evaluation of alternative management measures
7. Uncertainties related to the multi-specific nature of surface fisheries
8. Recommendations
9. Other matters
10. Report adoption and closure

Appendix 2

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Appendix 3

LIST OF DOCUMENTS

SCRS/2006/044 Note upon the period used to run the SCRS Sequential Population Analysis on tropical tunas. FONTENEAU, A.

SCRS/2006/045 Note upon the historical standardised fishing efforts in the FIS and French purse seiners task2 statistics that have been routinely submitted to ICCAT secretariat during the 1969-1997 period. FONTENEAU, A & R. PIANET.

Appendix 4

PRELIMINARY ANALYSIS OF TASK 1 CATCH DATA FOR TROPICAL TUNAS

1. Methods

The standardized residuals were calculated using equation 1,

$$\text{Std Residual} = \frac{(X - \mu)}{SD} \qquad (1)$$

where X is the annual catch (metric tons), μ is the average catch and SD is the standard deviation of the annual catch series. Annual catch values equal to zero were excluded from the calculation because zeros can indicate a catch equal to zero, or unreported catch.

Series were chosen for further review if the any annual standardized residual exceeded ±3.0 (indicating a value 3 times greater/less than the mean) and the maximum annual catch was greater than 500 metric tons.

2. Results and Discussion

2.1 BIGEYE TUNA

To examine trends and identify potential reporting problems in the TASK 1 catch data, the working group reviewed plots of annual catch series and their standardized residuals. Task 1 catch series of bigeye tuna were initially examined by FLAG, FLEET, AREA and GEARCODE. After the initial results were examined, the group recommended that some catch series be combined due to discontinuous codes used to designate fleet, gear or fishing area. This initial examination led to the following recommendationsThe following combinations were recommended by the working group:

1) Combine the catch series of Brazil SW LL and Brazil SW LLHB
2) Combine the all northern Atlantic catches from the Chinese Taipei LLFB fleet.
3) Combine southern Atlantic catches from the EC-España LLHB fleets.
4) Combine the ETRO and SE regions for the Ghana baitboat fleet. Also, combine BB and BBF designations because this fleet code was not used consistently throughout the time period. .
5) Combine northern and southern Atlantic catches for the Panama LLFB fleet.
6) Combine all north Atlantic catches for the Libyan longline fleet.

After these recommendations were implemented, 36 catch series included annual standardized deviations residuals more extreme than ±3.0. These are summarized in Figure 1. In most cases, the working group attributed these deviations to natural variability, or rapid changes in the actual reported catches. Yet the working group felt that some catches series were unusual or problematic, and recommended verification of the catch levels. The comments and recommendations of the group are summarized below.

Specific recommendations are highlighted with a gray background.

1) **SW Brasil LL + LLHB:** verify the anomalous high 2003 and 2004 catches.

2) **SW Brasil SURF:** the catches were much higher than average during the initial years. However, the total catches are modest. No recommendations were made regarding this catch series.
3)
4) **N Chinese Taipei LLFB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
5) **SE Chinese Taipei LLFB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.

6) **NORT Cuba LL:** the group was not able to comment on this catch series due to a lack of information regarding the fishery.
7) **ETRO EC.España BB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
8) **ETRO EC.España PS:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
9) **CANA EC.España BB:** the high catch (>9000 mt) reported in 1994 was examined and found to be accurate.

10) **NE EC.España BB:** the group recommends that unreported catches during 1987-1997 be investigated. It is likely that they were reported using a different region code (i.e. Canary Islands or NE).

11) **NE EC.España LLHB:** verify the high 1975-1977 catches.

12) **S EC.España LLHB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
13) **ETRO EC.France BB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
14) **ETRO EC.France PS:** the group noted that the total landings of tropical tunas were higher than average during the mid-1990s, and that the proportion of BET was higher than usual during the same period. No recommendations were made regarding this catch series.
15) **AZOR EC.Portugal BB:** the group noted the high variability of the catch series, but felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
16) **MDRA EC.Portugal BB:** the group noted the high variability of the catch series, but felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
17) **SE EC.Portugal BB:** the group noted the high catch in 2003 but felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
18) **SE+ETRO Ghana BB+BBF:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
19) **SE Ghana PS:** the group noted the lack of reported data 1987-1997 and agreed that fishing may have been discontinuous. No recommendations were made.
20) **SE Japan BBF:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
21) **SE Japan PSG:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
22) **NORT Korea LLFB:** the group noted the discontinuity in the catch data, and felt that the catch trend was appropriate given the history of the fishery (no vessels during the discontinuity). Therefore, no recommendations were made.
23) **ATL-Korea-BBF:** the group noted that Korean vessels reported under the flag of Ghana after the mid-1980s. No recommendations were made regarding this catch series.

24) **ATL-Libya-LL:** verify catch series and determine whether the carry-over from 1994-2000 was appropriate.

25) **ETRO Panama PS:** verify rapid changes in reported catches.

26) **ATL-Panama-LLFB:** verify rapid changes in reported catches.

27) **SE-South Africa-BB:** verify unusually high catches during the late 1980s.

28) **SE U.S.A. PSG:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.

29) **NE-U.S.S.R-LLMB:** determine whether these catches actually occurred. Check corresponding FAO statistics. Decide whether these catches should be excluded for the purpose of stock assessment analysis.

30) **SE-U.S.S.R-LLMB:** determine whether these catches actually occurred. Check corresponding FAO statistics. Decide whether these catches should be excluded for the purpose of stock assessment analysis.

31) **SW Uruguay LLHB:** verify the high catches 1981-1984.

32) **NW-Venezuela-BB:** verify the unusually high reported catches during 1983-1985.

33) **NW-Venezuela-LL:** verify the high catches reported during 1981-1986.

34) **NW-Venezuela-PS:** verify the high catches reported during 1983-1984.
35) **ATL NEI LL:** the group noted the decrease in the catches attributed to N.E.I.. Activity of the NEI fleets has decreased in recent years, as some of those boats have been re-flagged under CP or member flags. However, the group consider that estimates of catch by the NEI fleets is likely to be underestimated. (should be consistent with para on YFT)
36) **ETRO NEI BB:** the group noted the decrease in the catches attributed to N.E.I. due to efforts by ICCAT to classify some NEI catches by flag..
37) **ETRO NEI PS:** the group noted the decrease in the catches attributed to N.E.I. due to efforts by ICCAT to classify some NEI catches by flag.

2.2 YELLOWFIN TUNA

To examine trends and identify potential reporting problems in the TASK 1 catch data for yellowfin tuna, the working group reviewed plots of annual catch series and their standardized residuals (Figure 2). Task I Ccatch series of yellowfin tuna were examined by FLAG, AREA and GEARCODE. (Figure 2). A number of comments relating to each of the plots presented were made by the group:

Specific recommendations are highlighted with a gray background.

1) **ATL NEI LL:** the group noted the decrease in the catches attributed to N.E.I.. Activity of the NEI fleets has decreased in recent years, as some of those boats have been re-flagged under CP or member flags. However, the group consider that estimates of catch by the NEI fleets is likely to be underestimated. It was also suggested to verify the consistency of YFT/BET ratio for these fleets.
2) **CANA EC.España BB:** The high variability appears to be quite common in this fishery and other similar ones located at the limit of distribution of the tropical species. Environmental variability seems to greatly affect the spatial distribution and abundance of yellowfin.

3) **ETRO Angola BBI:** This fleet has decreased greatly, although it is not clear whether and at which level is operating in the present day. Perhaps this could be verified.

4) **ETRO Cape Verde BB:** The high variability in catches appears to be partly related to operational difficulties of the fleet. Greater clarification of the catch data from Cape Verde, specially the increase observed on the last few years, is required.

5) **ETRO Chinese Taipei LLFB:** The recent increase in the catch could be related to changes in targeting by this ese fleet.
6) **ETRO EC.España BB:** Catches at the start of the series correspond to a period of exploratory fishing carried out by boats operating in the North Atlantic. Following a petiodperiod without BB activity, a new fleet was built, and thetherefore the increase yin the 1985-2004 period likely reflects the development of this fishery.
7) **ETRO EC.España PS:** The group considered this plot to reflect the known dynamics of the fishery. The initial build up of the fishery, followed by the development of the FAD fishery, has given way to a decrease in the overall effort deployed by this fleet.
8) **ETRO EC.France PS:** The drop and recovery of catches is related to the displacement of this fleet to other fishing areas (Indian Ocean), and their later retiurnreturn to the Atlantic.
9) **ETRO Ghana PS:** The initial years of this fishery were followed by a period of inactivity. Catches have increased steeply over the last few years, driving up the average of the whole series. The difference between the two periods of activity could be related with sampling in species composition.

10) **ETRO Japan BBF:** Some unusually high catches were recorded in the past, but this fleet is not operating anymore.
11) **ETRO Korea LLFB:** This fleet has moved out of the Atlantic in recent years.
12) **GOFM U.S.A. LL:** The initial increase in catches was related to the fleet and crews gaining experience in this area, while the later decrease was motivated by the movement to other fishing areas.
13) **MDRA EC.Portugal BB:** The high variability appears to be quite common in this fishery and other similar ones located at the limit of distribution of the tropical species. Environmental variability seems to greatly affect the spatial distribution and abundance of yellowfin.
14) Same as above for CANA EC.España BB.
15) **NW U.S.A. LL:** The pattern observed appears to be consistent with the development of a new fishery.

16) **SW Brasil BB:** The yearly changes in the later period for this fleet were considered by the group to deserve further investigation.

17) **SW Brasil LL:** The group would like further clarification on the actual catches and activity of this fleet. A complete time series would be most useful for understanding the very recent surge in catches.

18) **WTRO Cuba LL:** Recent activity of this fleet has not been reported to ICCAT. New information should be gathered.

19) **WTRO Japan LLHB:** The patterns are generally as expected, although some gear changes might be behind some sudden changes.

20) **WTRO Venezuela LL:** The high catches at the begginingbeginning of the fishery are likely to reflect the existnceexistence of a fishery previous to the first reported datapointsdata points. The group recommends that these high catches be verified.

21) **WTRO Venezuela PS:** Yearly fluctuations in this fleet seems to be related to chzngeschanges in targeting (SKJ to YFT) and overall variability in the area. The group recommends that these high catches be verified.

2.3 SKIPJACK TUNA

To examine trends and identify potential reporting problems in the TASK 1 catch data for skipjack tuna, the working group reviewed plots of annual catch series and their standardized residuals (Figure 3).

Specific recommendations are highlighted with a gray background.

1) Canary Islands Baitboat: The analysis of the skipjack catches (Figure 3) for the Canarian baitboats shows some large fluctuations over time (sometime larger than a factor 2). These fluctuations may reflect changes in accessibility of skipjack due to environmental factors, bearing in mind the location of these islands with respect to the central distribution of this species.
2) Spanish Purse Seine: The general pattern observed for the skipjack catches reported for the Spanish purse seiners depicts the increase in fishing effort until 1992 followed by a dramatic decrease in the last decade.

3) French Purse Seine: The French purse seiners catch pattern is similar to the Spanish purse seine one, but in this case with a steady decrease in the mid-eighties.

4) French baitboats: The variability of the catch between successive years is relatively large for the French baitboats operating from Dakar (Senegal). The series shows a decreasing trend since 1968 when the maximum of catch was reached.

5) Venezuelan Baitboat: The strange pattern observed for the Venezuelan bait boats (no intermediate catches between the beginning of the fishery and a maximum at about 3,000 t occurring in the first year)

was discussed by the Working Group. It was suggested that the ICCAT secretariat check the data base in order to verify this point.

6) Venezuelan Purse Seine: In contrast the large fluctuations observed for the Venezuelan purse seiners can easily be explained by the history of this fishery and are specifically related with the partial reallocation of the fishing effort of this fleet in the eastern Pacific Ocean.

7) Brazilian Baitboat: In the absence of participation of Brazilian scientist in this working group it was not possible to provide more information on the trend and the variability of the catch reported by the Brazilian baitboats. Nevertheless no anomaly was detected for this time series.

8) Portuguese Baitboat: As seen for the Canarian baitboat fishery, the catches reported by the Portuguese baitboats show short-term fluctuations. Environmental factors and the northern location of this fishery may be an explanation of this pattern.

9) Other Catch Series: The general patterns observed for the Japanese, Cuban and USA fleets seem to be in agreement with the history of these fisheries.

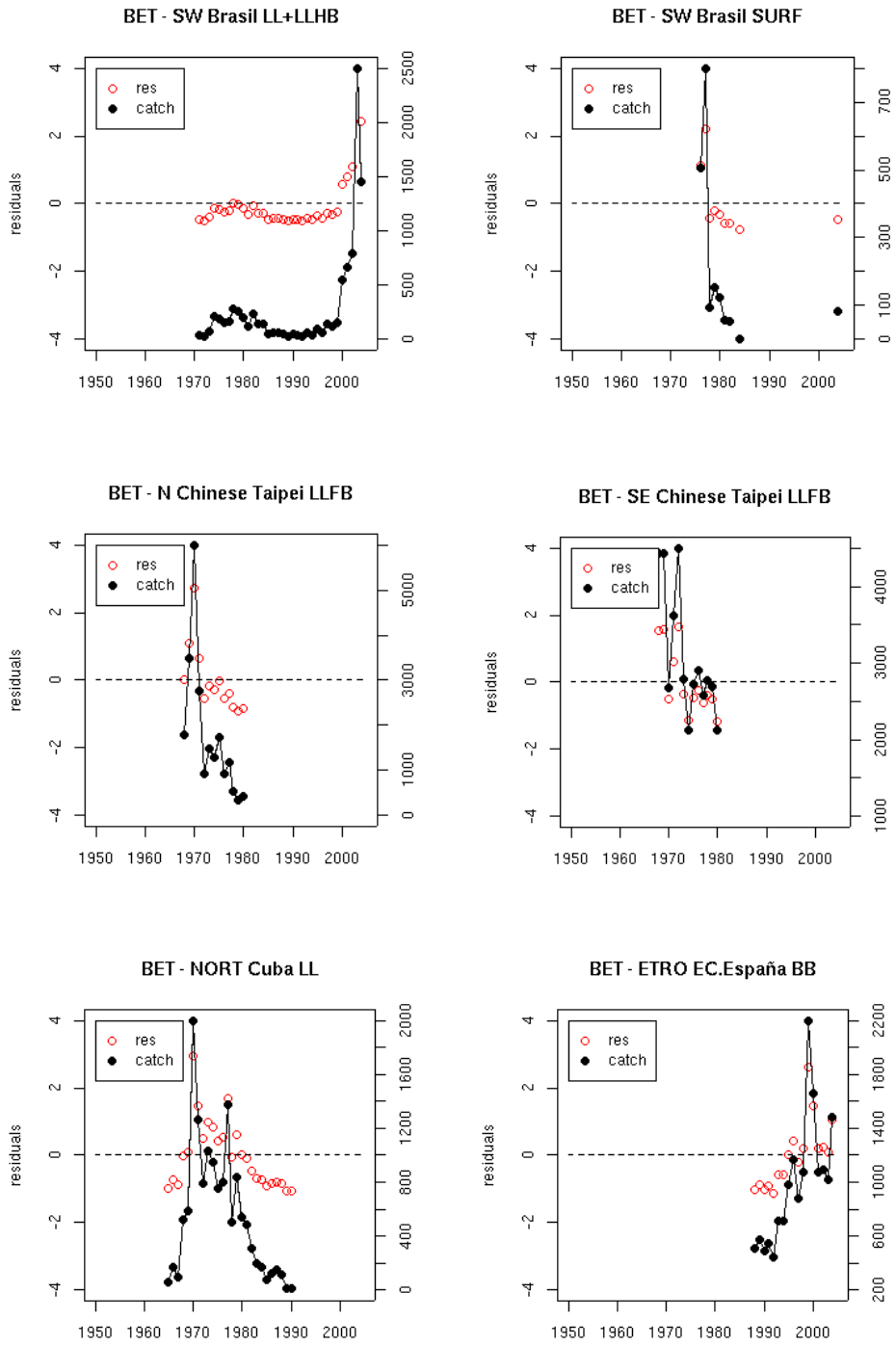

Figure 1. The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

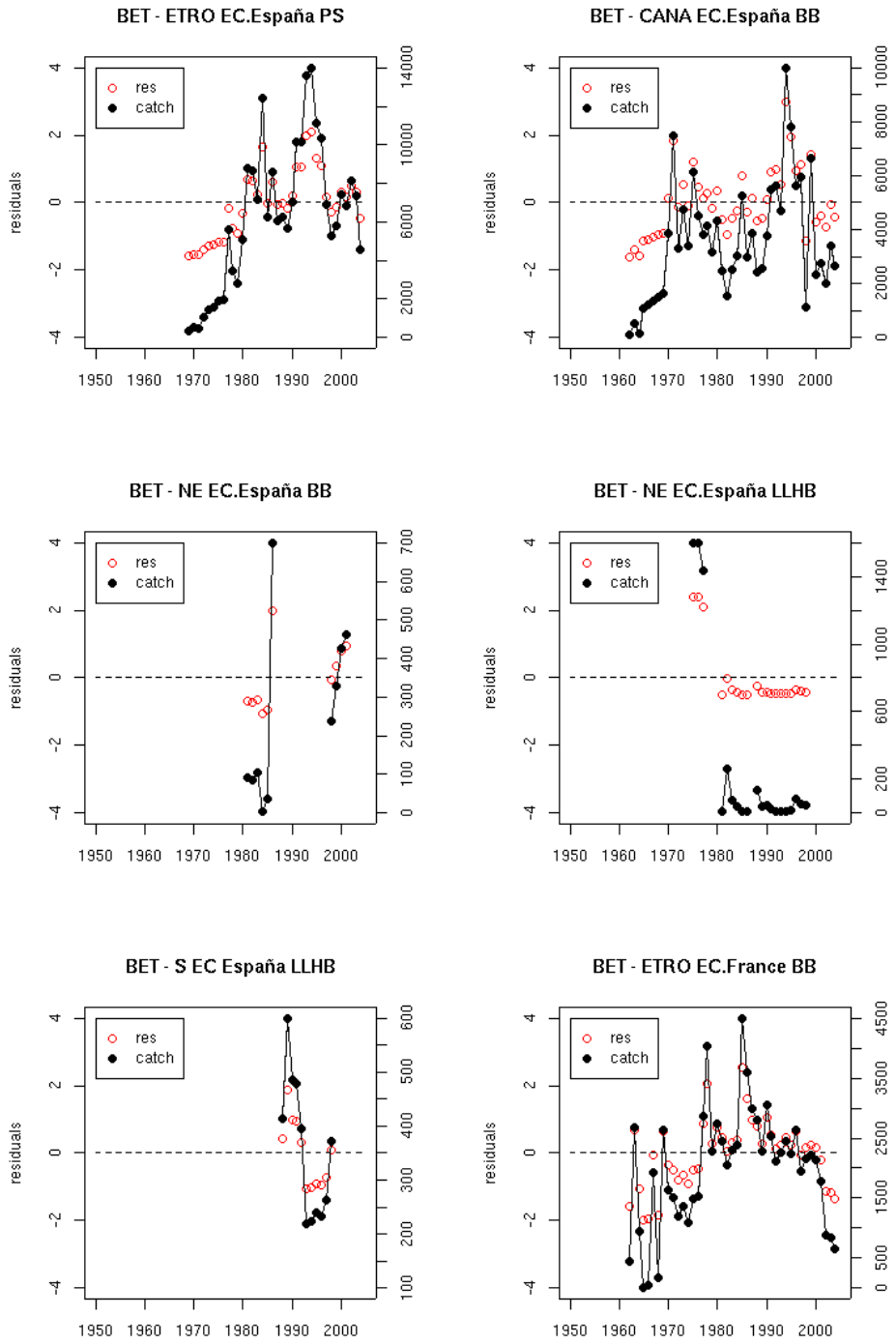

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

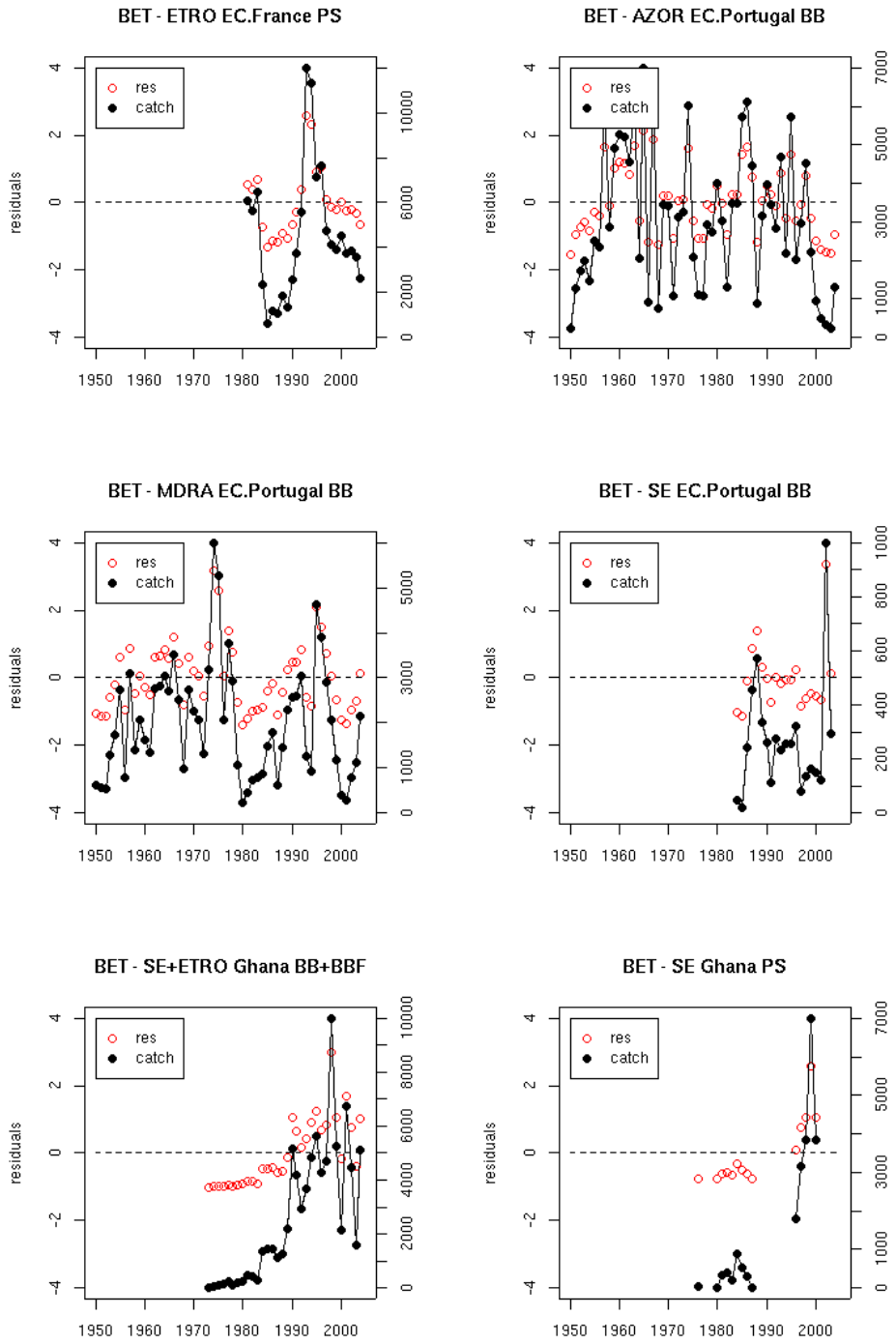

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

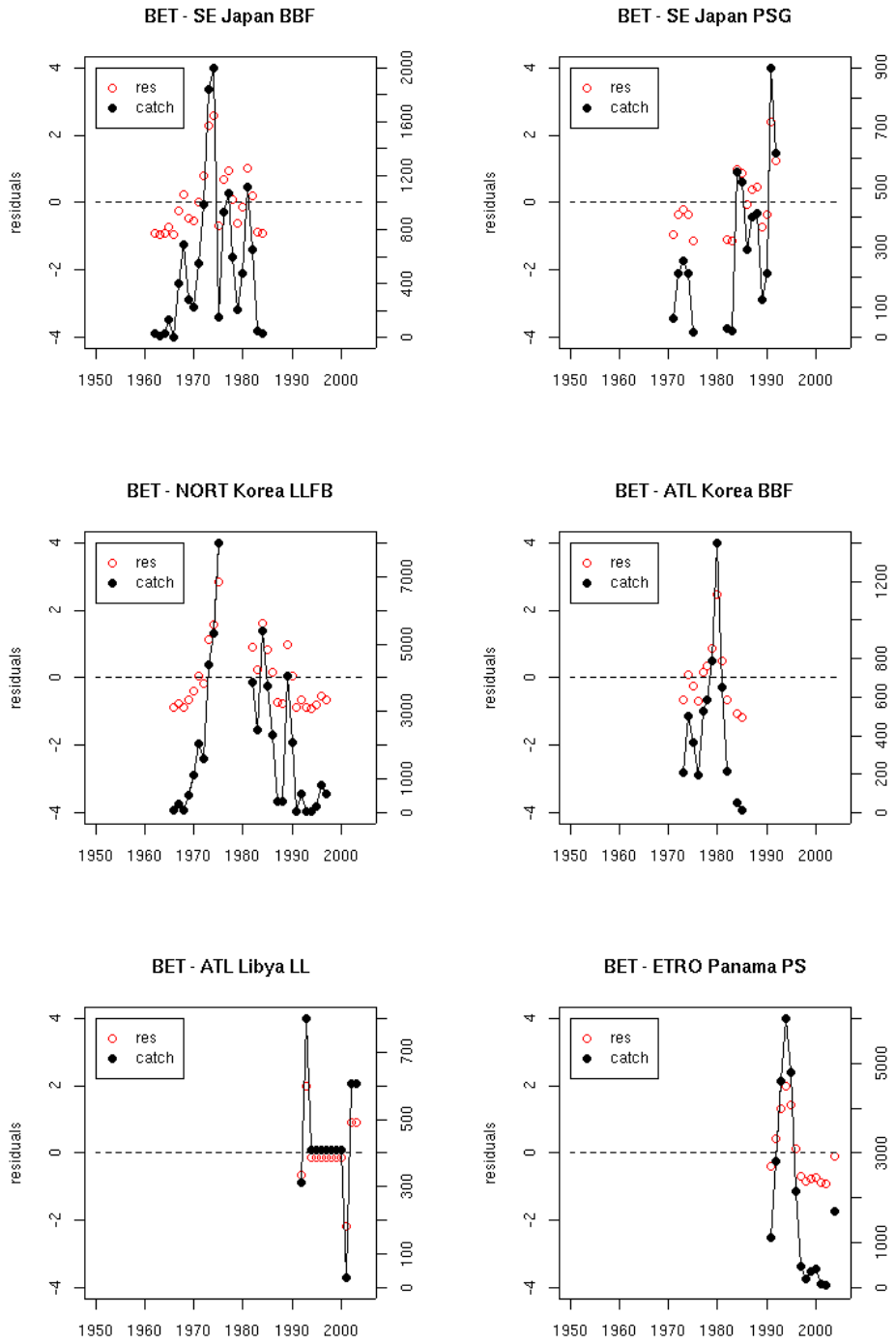

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

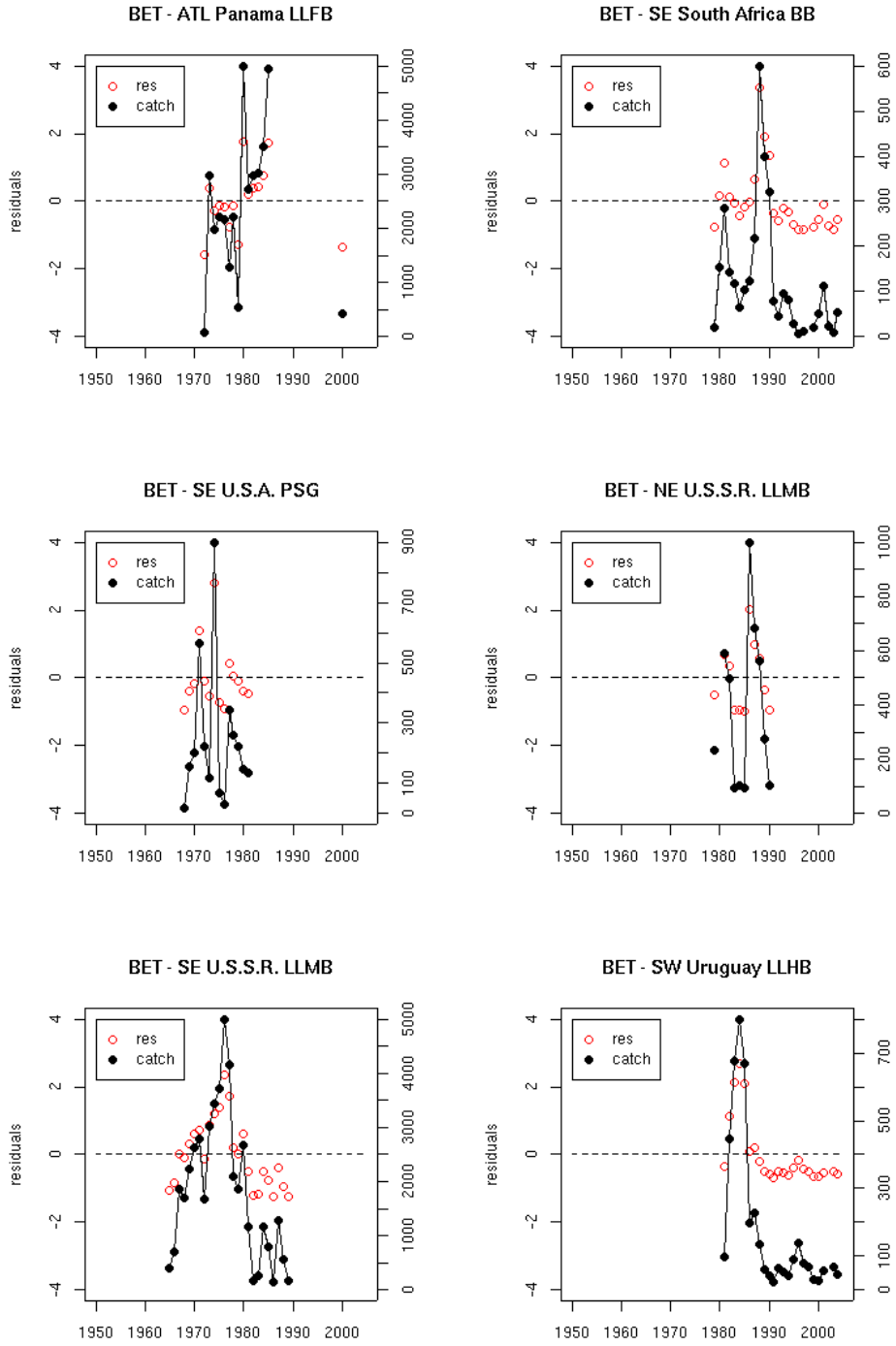

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

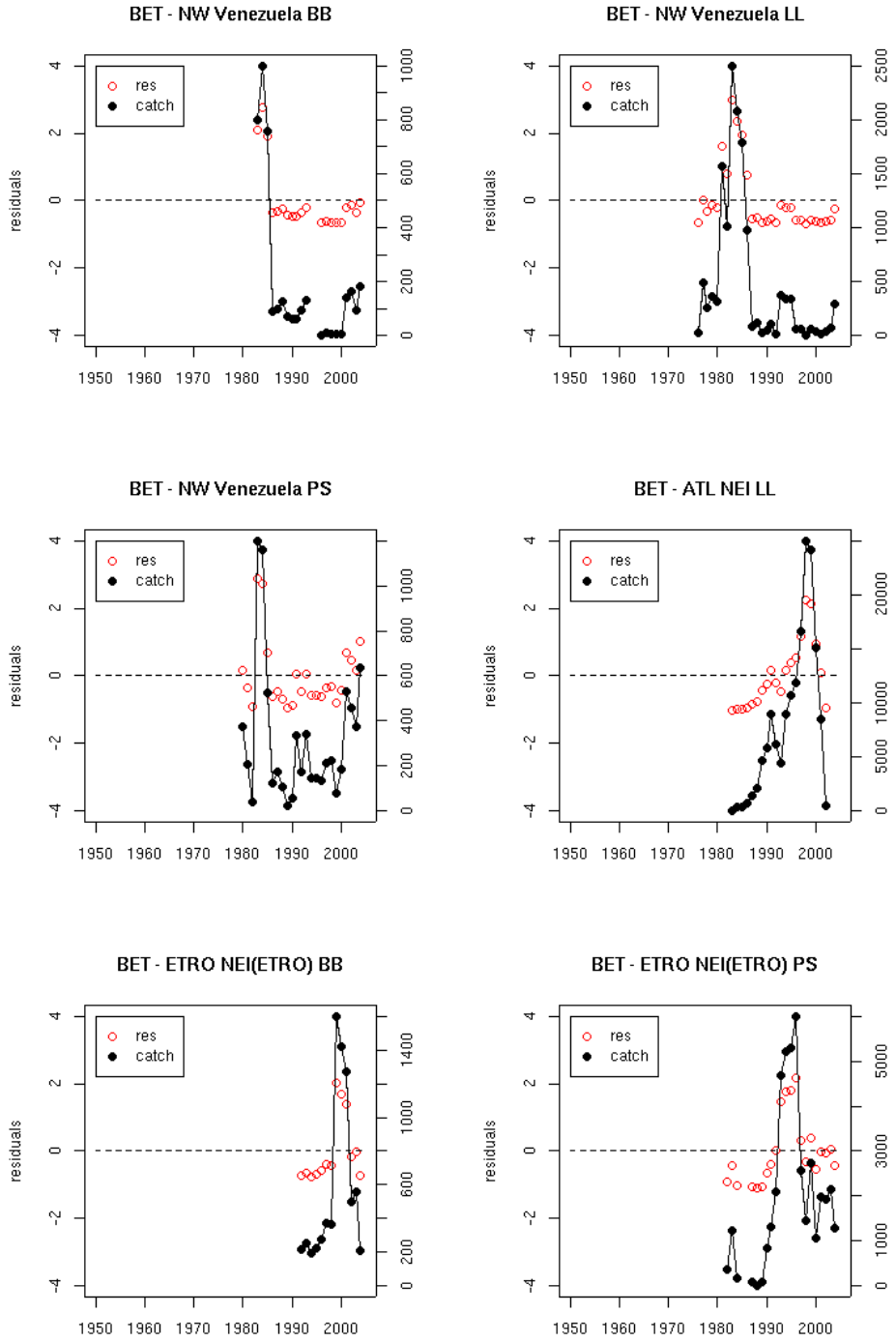

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

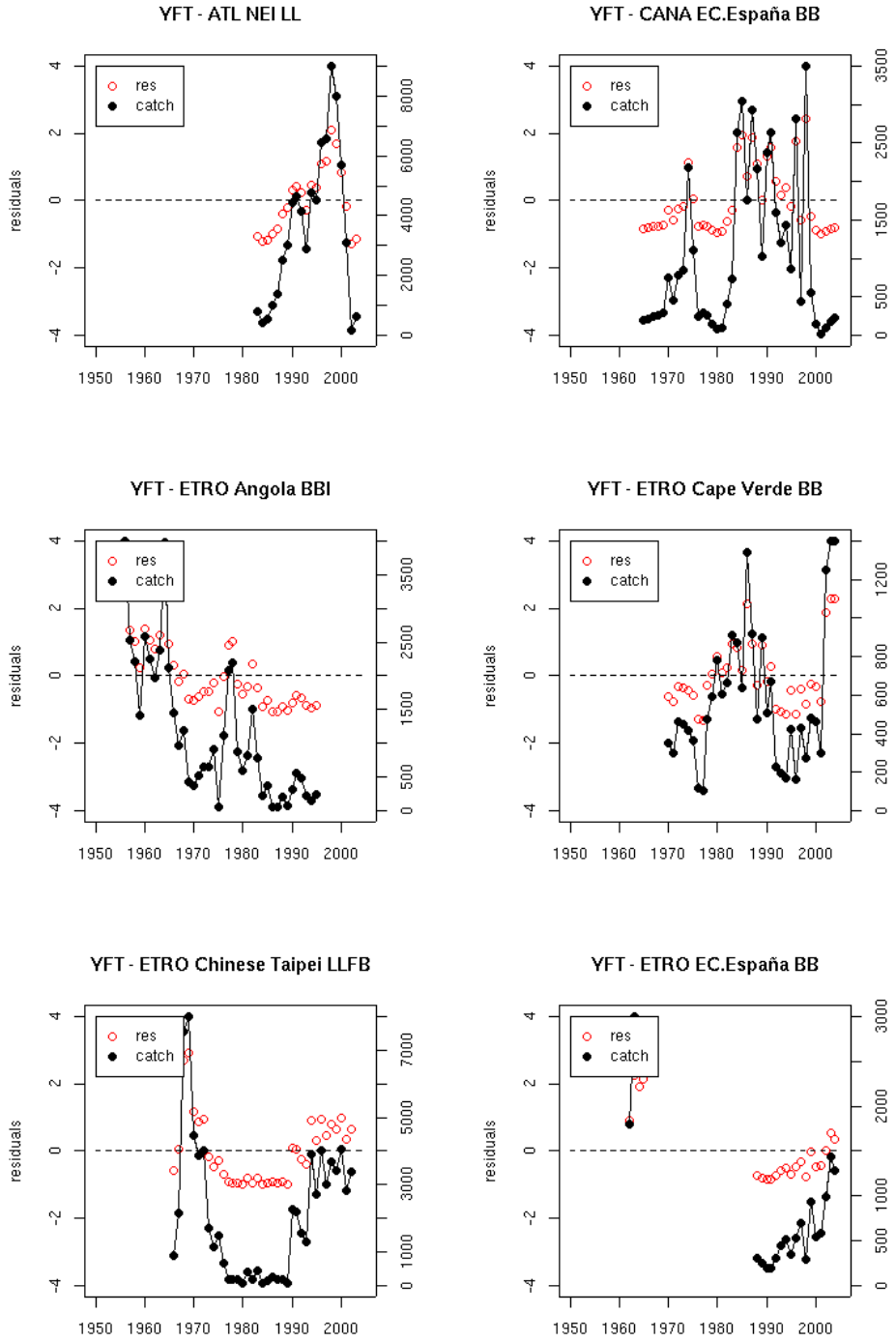

Figure 2. The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

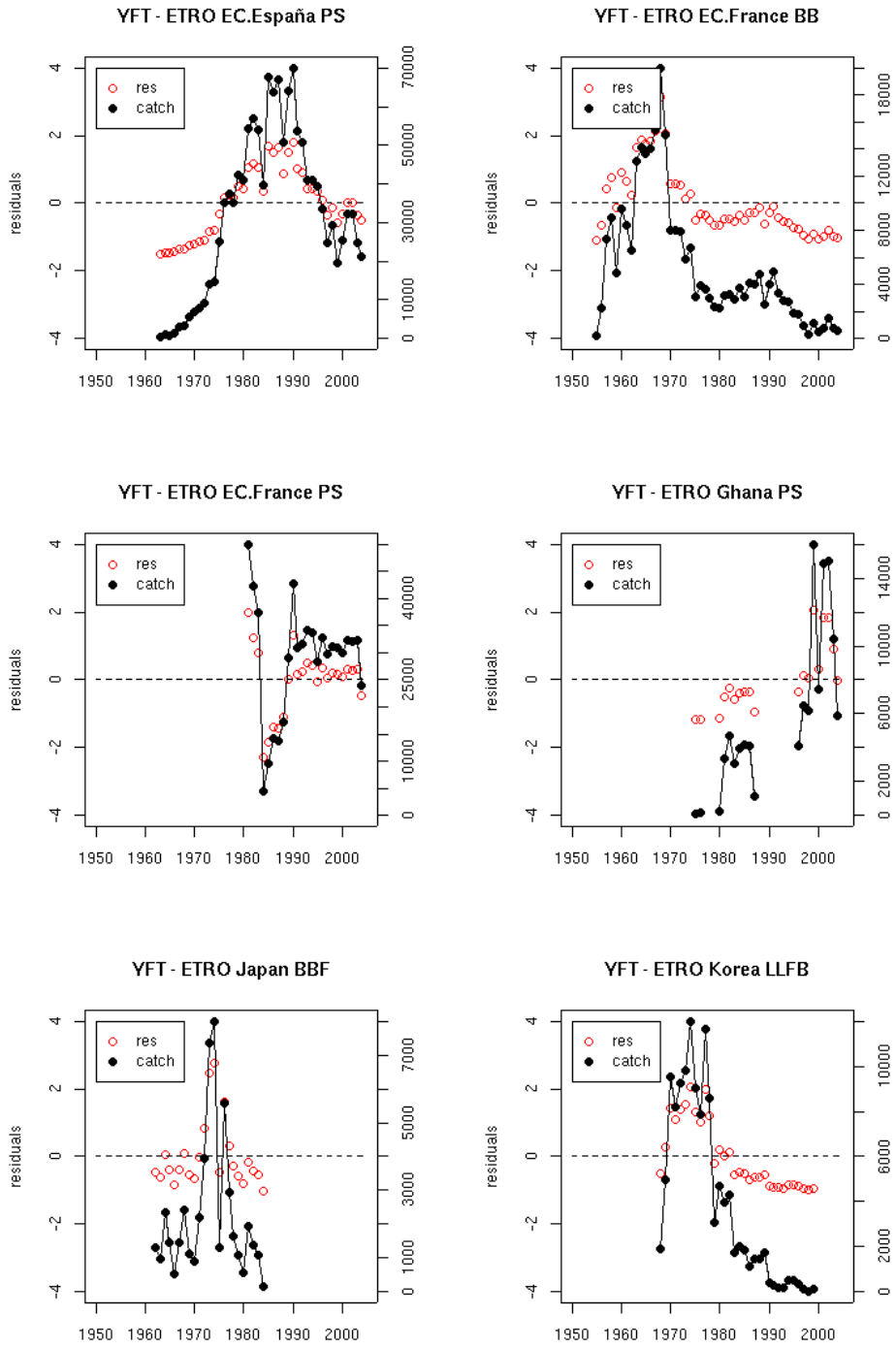

Figure 2 (continued). The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

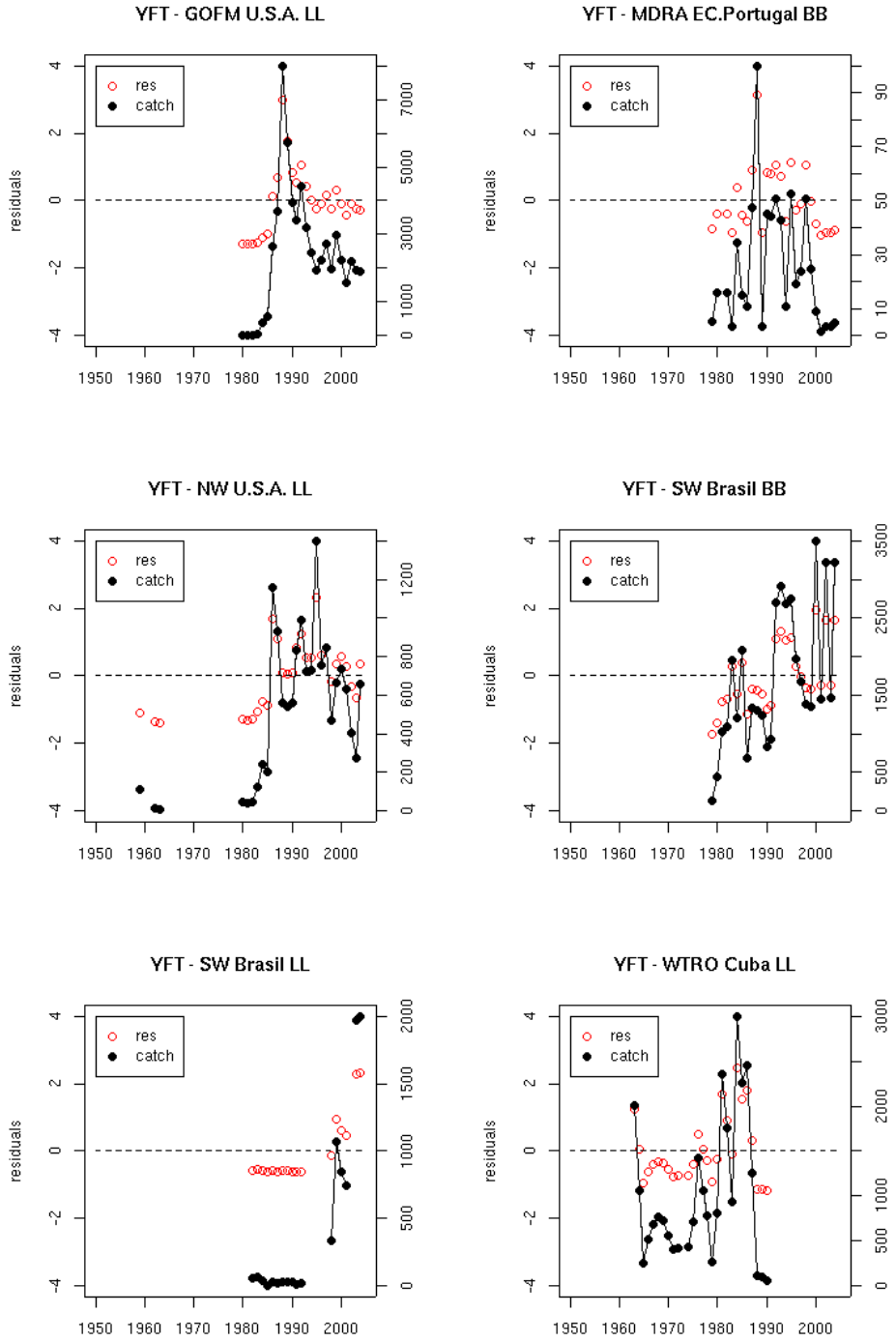

Figure 2 (continued). The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

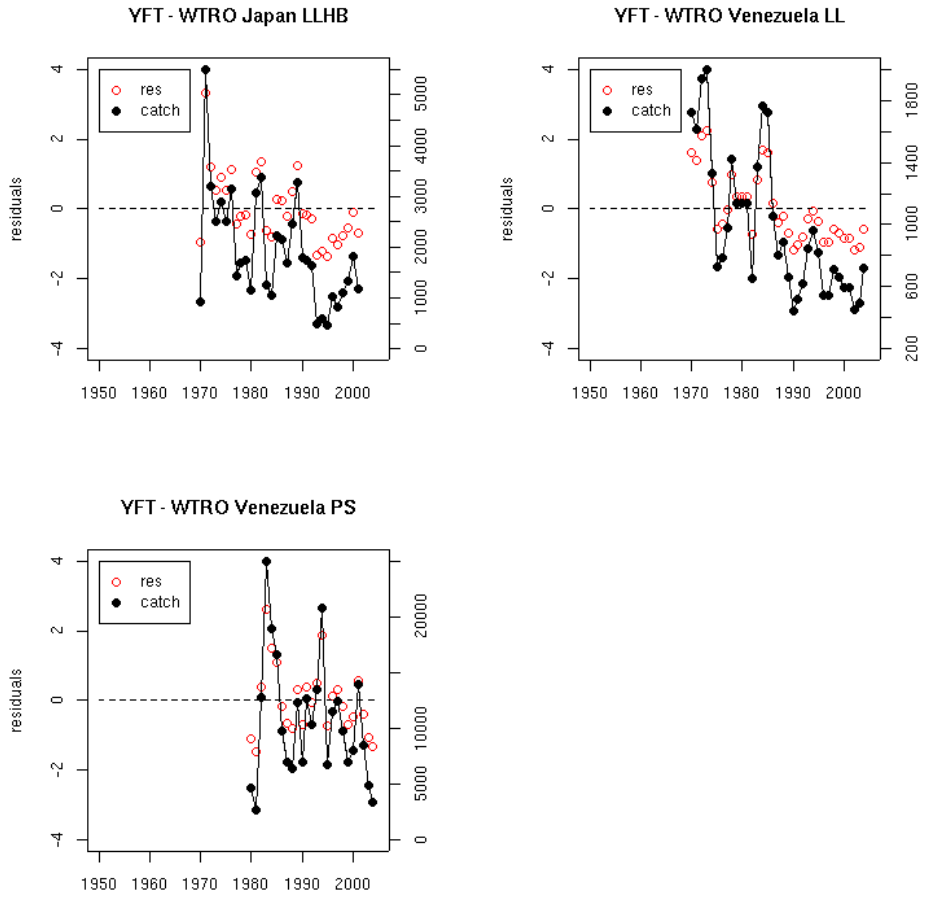

Figure 2 (continued). The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

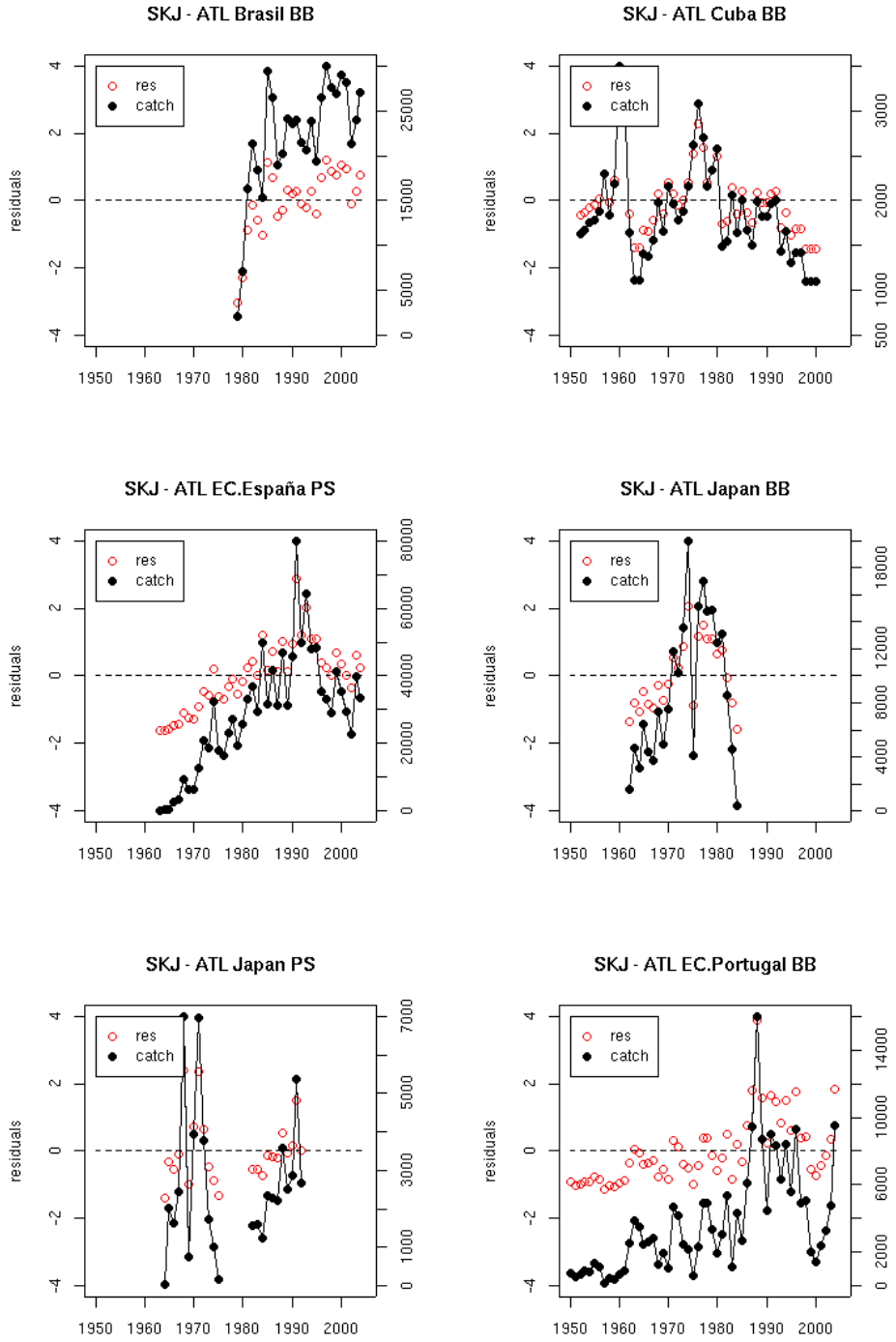

Figure 3. The annual catch (mt) and standardized residuals for skipjack tuna by region, flag and gear.

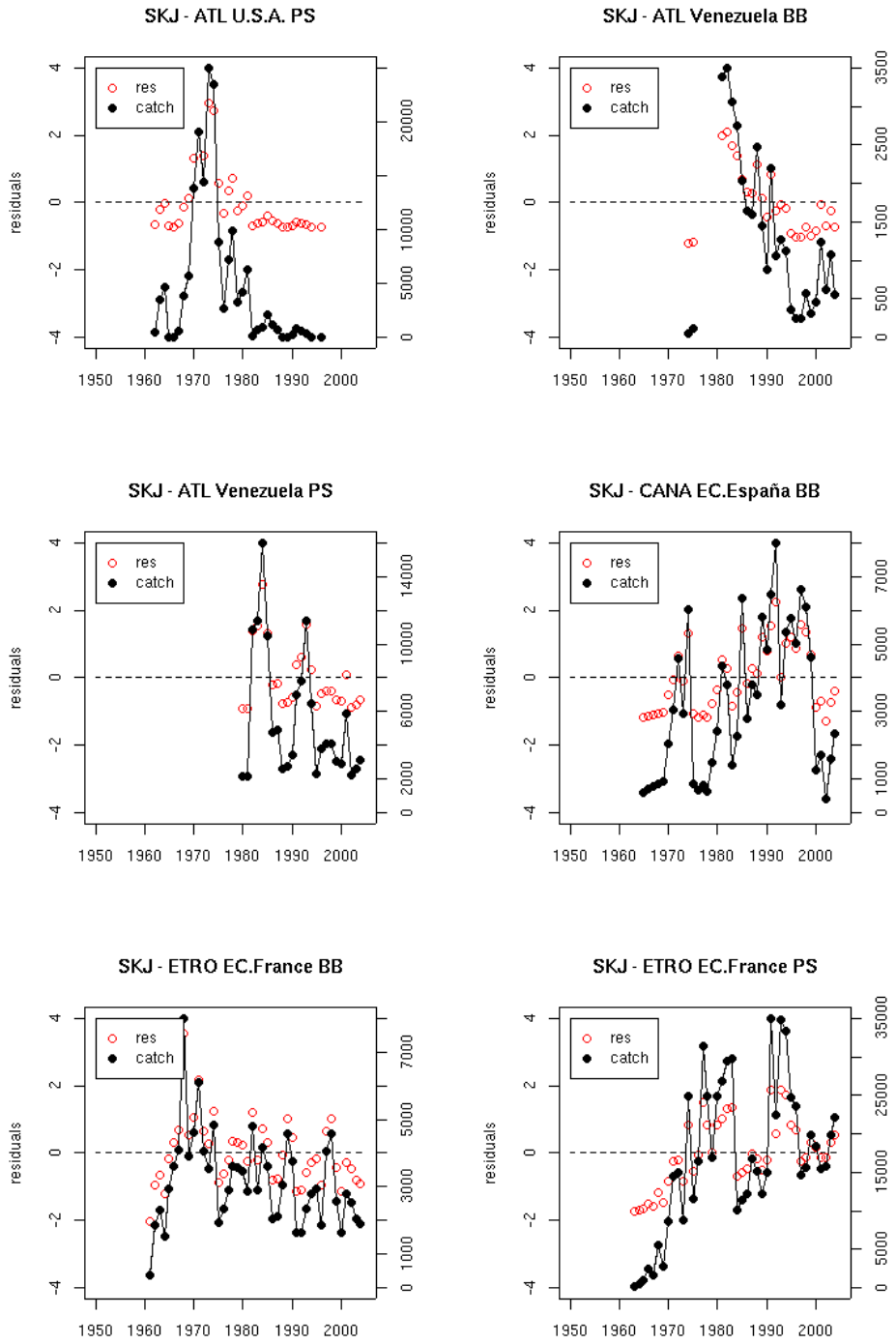

Figure 3 (continued). The annual catch (mt) and standardized residuals for skipjack tuna by region, flag and gear.

Table 1. Detailed TASK-I catches (t) of yellowfin tuna (YFT) between 1990 and 2004

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
AT.E	CP	Angola	AGO	BB	ETRO	292	509	441	208	137	215	77	68	106	170	34	34	34	34	34
				SU	ETRO				3											
				TP	ETRO		1				1	1	2			1				
				UN	ETRO									9						
		Cape Verde	CPV	BB	ETRO	502	660	224	191	167	419	159	422	273	478	457	298	1232	1379	1379
				HL	ETRO	1634	1272	1202	1344	1560	1362	1289	1299	1145	1185	1388	1374	253	284	284
				HS	ETRO				1											
				PS	ETRO										0	6	12	208	233	233
		China, P.R.	CHN	LL	EAST										1535	1652	586	262	1033	1030
					NE								60	68						
					SE								24	3						
		Côte D'Ivoire	CIV	GN	ETRO											673	213	99	302	565
				UN	ETRO								2							
		EC.España	EC.ESP	BB	ETRO	171														
				LL	NE	16	19	29	5	5	18	19	17	22	17	14	101	54	128	
					SE	2	0	22	5	16	11	12	20	18	20	16	66	155	47	
				PS	ETRO	66201														
			EC.ESP-ES-CANARY	BB	CANA	2213	2451	1493	1128	1330	801	2621	411	3259	524	146	15	88	172	213
			EC.ESP-ES-CORNHA	LL	NE															5
					SE															32
			EC.ESP-ES-ETRO	BB	ETRO		172	265	370	437	300	448	585	250	787	455	489	830	1207	1079
				PS	ETRO		50822	48093	38895	38824	37148	31779	23517	27788	18599	24050	30433	30343	23330	20086
		EC.Estonia	EC.EST	UN	ETRO		234													
		EC.France	EC.FRA	PS	ETRO												31527	31291	31672	
				TW	NE													18		
			EC.FRA-FR-ETRO	BB	ETRO	3783	4623	3103	2587	2533	1764	1658	887	319	1068	416	684	1444	757	585
				PS	ETRO	41901	30217	30861	33477	32935	27803	32161	29079	30420	30178	29373				23364
		EC.Ireland	EC.IRL	GN	NE												1			
				TW	NE												2			
		EC.Latvia	EC.LVA	TW	ETRO									97	25	36	72	334	334	334
				UN	ETRO		255	54	16		55	151	223							
		EC.Lithuania	EC.LTU	UN	ETRO		332													
		EC.Portugal	EC.PRT	BB	AZOR										9	0		2		
					MDRA	42	41	47	40	10	49	18	22	47	23	9	2	3		
					NE												2			
					SE	135	36	135	85	110	155	259	149	213	143	185				
				LL	MDRA		41	0												
					NE					1	14	8	3	4	1	0		1		
					SE						8									
				PS	NE					0	0		0	0	0		0			
				SU	NE	2	210	13	3	3	5	3	2	3	1	0	0	0		
				UN	NE					2										
			EC.PRT-PT-AZORES	BB	AZOR														0	1
					MDRA															0
				LL	AZOR														0	
			EC.PRT-PT-MADEIRA	BB	MDRA														3	4
			EC.PRT-PT-MAINLND	LL	NE														0	
				PS	NE														0	
				SU	NE														0	0
		Gabon	GAB	GN	ETRO				12	88										
				HL	ETRO							20								
				SU	ETRO											160	11			
				TR	ETRO											2				
				TW	ETRO							205					259	245	44	44
				UN	ETRO						218		225	295	225					

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Ghana	GHA	BB	ETRO	11808	9074	9223	13283	9984	9268	8079	10750	12355	14137	10438	17458	10187	9802	9944
				PS	ETRO							3641	5754	5452	14191	6572	13184	13312	9228	5193
				SU	ETRO	180	180	108												
		Guinea Ecuatorial	GNQ	LL	ETRO								1							
		Japan	JPN	LL	EAST													1510	1992	4372
					ETRO	4185	3020	2124	2627	4194	4770	4246	2733	4092	2101	2286	1550			
				PS	ETRO	1702	1447	837												
		Korea, Republic of	KOR	LL	ETRO	324	259	174	169	436	453	297	101	23	94					
					SE											142	3	8	209	984
		Libya	LBY	LL	NE												208			
		Maroc	MAR	UN	NE														108	95
		Namibia	NAM	BB	SE					2	14	72	69	3	15	7	83	13	6	8
				LL	SE										132	52	82	76	133	78
		Norway	NOR	PS	NE	1790														
		Panama	PAN	BB	ETRO		83		57	96					155	16				
				PS	ETRO		6623	7041	7781	8548	10854	5759	3137	1753	775	1087	574	1022		1887
		Philippines	PHL	LL	EAST											86				
					NE									34	37			43		25
					SE									92	136		0	8	9	44
		Russian Federation	RUS	PS	ETRO		3200	1862	2160	1503	2936	2696	4275	4931	4359	737				
		S. Tomé e Príncipe	STP	SU	ETRO	228	223	229	140			1	4	4	4	4				
		Senegal	SEN	BB	ETRO		79		13	6	20	41	208	251	834	252	295	447		668
				HL	ETRO	90	52	37	6											
				SU	ETRO		0													
				TR	ETRO	0	1	3												
				UN	ETRO															13
			SEN-SEN-DAKAR	BB	ETRO														279	
		South Africa	ZAF	BB	SE	614	44	63	262	473	183	139	102	192	264	129	230	77	256	139
				HL	SE															6
				LL	SE									48	28	22	94	65	30	10
				RR	SE														12	236
				SP	SE	10	8	6	4	13		18	14		28	40	18	10		
			ZAF-ISL	LL	SE															2
			ZAF-JPN	LL	SE															6
			ZAF-KOR	LL	SE															0
			ZAF-SYC	LL	SE															3
			ZAF-VCT	LL	SE															0
		U.S.S.R.	USR	LL	ETRO	190														
				PS	ETRO	3425														
		UK.Sta Helena	UK.SHN	BB	SE				171	150	181	151	109	181	116	136	70	9		
				LL	SE												2	0		
				RR	SE	92	100	166												
	NCC	Chinese Taipei	TAI	LL	EAST														4670	4874
					ETRO	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	3363		
			TAI.Re-Registration	LL	EAST														276	
		Netherlands Antilles	ANT	PS	ETRO							3183	6082	6110	3962	5441	4793	4035	6185	4161
	NCO	Benin	BEN	GN	ETRO												1			
				HS	ETRO	1	1	1	1	1	1	1	3	1	1	1				
		Cambodia	KHM	LL	SE										7					
		Congo	COG	PS	ETRO	22	17	18	17	14	13	12								
		Cuba	CUB	LL	ETRO	679							12							
				PS	ETRO	119														
				UN	ETRO		658	653	541	238	212	257	257							
		Faroe Islands	FRO	LL	EAST											1				
		Gambia	GMB	UN	ETRO	2	16	15												
		Georgia	GEO	UN	ETRO		25	22	10											
		NEI (ETRO)	NEI.001	PS	ETRO	12513														
			NEI.001-ANT	BB	ETRO										77	205	152	585	483	586

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
			NEI.001-BLZ	PS	ETRO									963		321	406			
			NEI.001-CPV	BB	ETRO			101	76	216	127	70	62	3						
			NEI.001-GHA	PS	ETRO								7	628	635	369	453	446	837	1400
			NEI.001-GIN	PS	ETRO						208	1956	820							
			NEI.001-GTM	PS	ETRO														2207	1588
			NEI.001-ITA	PS	ETRO			600												
			NEI.001-LBR	PS	ETRO					477	1377									
			NEI.001-MAR	PS	ETRO		1799	2653	2396	3017	2290	3430	1947	2276	2307	2441	3000	2032	1567	719
			NEI.001-MLT	PS	ETRO		1636	1759	388											
			NEI.001-MUS	PS	ETRO						470									
			NEI.001-MYS	PS	ETRO								148							
			NEI.001-NOR	PS	ETRO		43													
			NEI.001-SLV	PS	ETRO												933			
			NEI.001-SYC	PS	ETRO												1510	1345		
			NEI.001-VCT	BB	ETRO							12	129	28	255	126	75	189	56	
				PS	ETRO		510	4936	5391	2476	2142	2969	3017	3327	1916	1987	3640			
			NEI.001-VEN	PS	ETRO												36	3612	245	
			NEI.001-VUT	PS	ETRO		869	872	1624	2357	2357	1130	576		228					
		Seychelles	SYC	LL	SE													11		
		Seychelles (foreign obs.)	SYC.OB.SHN	LL	SE											6				
		St. Vincent and Grenadines	VCT	LL	EAST													1		
		Ukraine	UKR	TW	NE		215													
AT.E Total						157112	124239	121039	116788	116211	110902	113032	100327	110729	105172	95990	117818	109300	99549	86312
AT.W	CP	Barbados	BRB	LL	WEST														116	116
					WTRO								149	150	155	155	142	115		
				UN	WTRO	89	108	179	161	156	255	160								
		Brasil	BRA	BB	SW	861	1109	2531	3087	2744	2581	1912	1643	1229	1197	3093	1276	2843		
				GN	SW						12	8								
				HL	SW					60	18	69	156							
				LL	NW											1				
					SW	539	248	278	418	165	98	107	188	329	1053	835	732	909		
				PS	SW								57			297	8	6		
				SU	SW	144	87	320	526	281	66									
				UN	SW									271			71			
			BRA-BLZ	LL	SW										91			99		
			BRA-BOL	LL	SW													32	30	
			BRA-BOL-NATAL	LL	SW															11
			BRA-BRA-BELEM	LL	SW														6	
				SU	SW															31
			BRA-BRA-ITAIPAVA	SU	SW															1906
			BRA-BRA-ITAJAI	BB	SW														843	1217
				LL	SW														76	55
				PS	SW															32
			BRA-BRA-NATAL	HL	SW														233	
				LL	SW														633	654
				SU	SW															210
			BRA-BRA-RGRANDE	BB	SW														289	172
				LL	SW														24	
			BRA-BRA-RJANERO	BB	SW														157	1450
				HL	SW														39	
				LL	SW															0
			BRA-BRA-SANTOS	LL	SW														38	8
			BRA-BRB	LL	SW						3	7	45	1						
			BRA-CAN	LL	SW												58	51		
			BRA-CAN-NATAL	LL	SW														31	31
			BRA-ESP	LL	NW											8				
					SW							11	111	192	490	832	1200	734		
			BRA-ESP-CABDELO	LL	SW														372	47

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
			BRA-ESP-NATAL	LL	SW														62	209
			BRA-GNQ	LL	NW											11				
					SW										490	485	303			
			BRA-GUY	LL	SW													96		
			BRA-GUY-NATAL	LL	SW														28	
			BRA-HND	LL	SW		7	10	13	8	3	23	43	54	120	90	115	257		
			BRA-HND-CABDELO	LL	SW														56	2
			BRA-HND-ITAJAI	LL	SW															1
			BRA-HND-NATAL	LL	SW														65	29
			BRA-HND-SANTOS	LL	SW														36	
			BRA-ISL	LL	SW													33		
			BRA-ISL-NATAL	LL	SW														29	
			BRA-JPN	BB	SW	92	60	129												
				LL	SW	122	207	142	307	286	131									
			BRA-KOR	LL	SW					165	184									
			BRA-PAN	LL	NW											3				
					SW								76	29	71	18	55	313		
			BRA-PAN-CABDELO	LL	SW														51	
			BRA-PAN-NATAL	LL	SW														32	23
			BRA-PAN-RECIFE	LL	SW															845
			BRA-PRT	BB	SW						32	44								
				LL	SW									25	6	68		72		
			BRA-PRT-CABDELO	LL	SW														68	
			BRA-TAI	LL	NW											13				
					SW		120	818	780	460	893	579	381	342	437	177	612	48		
			BRA-URY	LL	NW											0				
					SW									26	50	28	47	6		
			BRA-URY-CABDELO	LL	SW														17	
			BRA-URY-ITAJAI	LL	SW														2	
			BRA-URY-NATAL	LL	SW															19
			BRA-USA	LL	SW							7	5	16	38	14	52	27		
			BRA-USA-NATAL	LL	SW														30	13
			BRA-VCT	LL	NW											2				
					SW										84	169	1709	581		
			BRA-VCT-NATAL	LL	SW														201	20
			BRA-VUT	LL	SW													68		
			BRA-VUT-NATAL	LL	SW														54	
		Canada	CAN	GN	NW								0							
				HP	NW															0
				LL	NW	7	28	25	71	52	170	154	100	57	20	105	125	69	72	302
				RR	NW										1	0	0	1	0	0
				TL	NW		1				4	1	0	0	1	0	0	0	0	1
		China, P.R.	CHN	LL	NW									571						
					SW									57						
					WEST										655	22	470	435	17	275
		EC.España	EC.ESP	LL	NW	1		0		0				23	4	46				
					SW	1	11	24	179	7	4	36	34	23	26	125				
				PS	WTRO		1451	1290	810											
		EC.Portugal	EC.PRT	LL	NWC												0			
					SW												0			
		Japan	JPN	LL	WEST													572	727	1085
					WTRO	1734	1698	1591	469	589	457	1004	806	1081	1304	1775	1141			
		Korea, Republic of	KOR	LL	WTRO	484	1	45	11			84	156							
		Mexico	MEX	LL	GOFM				165	646			826	788	1283	1390	1084	1133	1313	1208
				UN	WTRO	112	433	742	690	447	1126	771								
		Panama	PAN	LL	NW										1					
					SW										4					
		Philippines	PHL	LL	NW									7	103		2	49	58	222

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
					SW									29	3		10	30	86	77
					WEST											78				
		Trinidad and Tobago	TTO	LL	WEST													125		
					WTRO	303	540		4	120	79	183	223	213	163	112	122			
				RR	WEST													0		
				SP	WTRO	1	3	4								0				
			TTO-TRINIDAD	LL	WTRO														186	224
				RR	WTRO														0	
		U.S.A.	USA	GN	GOFM			0							0					
					NW	27	1	5	0	2	4	9	1	2	0	0	8	5	1	3
					WTRO		0	0					0			0	0	0	0	0
				HL	GOFM	2	7	24	50	64	22	50	56	61	13	29	43	100	40	19
					NW	20	83	67	14	33	69	32	34		192	236	242	137	149	208
					WTRO								1	4	14	19	14	7	11	7
				HP	NW			0		0								0		
				HS	NW		1	13												
					WTRO	0	0	0	1											
				LL	GOFM	3765	3275	4194	3059	2331	1847	2111	2571	1865	2821	2133	1505	2109	1836	1813
					NW	560	832	984	717	728	1393	751	839	465	661	734	632	400	275	654
					NWC	13	5	15	7	7	17	7	6	5	0	2	4	0	5	0
					SW							36	222	55	33	20	36	52	42	17
					WTRO	136	29	144	103	180	388	415	135	59	26	12	23	12	6	5
				PS	NW	52	996	376	208	25		7								
					WTRO	215														
				RR	GOFM	12	51	142	285	71	28	11	8	81	149	52	494	200	640	247
					NW	533	1367	815	1613	4452	4025	4021	3561	2846	3818	3809	3691	2624	4672	3434
					WTRO												0	63	16	79
				TP	NW				0	0			0	0	1	1	0	0	0	
					WTRO								0		0	0	0	0	0	0
				TR	GOFM	2	2	1	3	2										
					NW	298	209	104	115	228	290	293	218	177						
					WTRO	30	22	9	7	1			20							
				TW	NW	1	34	45	44	45	48	2	2	1	4	2	3	0	2	1
				UN	GOFM			0	56	124								0		
					NW			0	1	5					2	1	7		0	13
					WTRO	0			0								0			
		UK.Bermuda	UK.BMU	LL	NW											31				
				RR	WTRO	15	17	42	58	44	44	67	55	53	59					
				UN	NW													48	47	82
					WTRO												37			
		UK.Turks and Caicos	UK.TCA	SP	NW															0
			UK.TCA-USA	RR	WEST															0
		Uruguay	URY	LL	SW	18	62	74	20	59	53	171	53	88	45	45	90	91	95	204
		Venezuela	VEN	BB	WTRO	3765	4190	3616	3296	4350	2684	2604	2632	4267	4152	2556	4039	3166	2475	2030
				GN	WTRO		8	5	1	2	6	4	5	11	8		7	29	7	
				LL	WTRO	258	338	459	707	850	687	383	381	560	504	421	451	266	323	559
				PS	WTRO	6533	11967	9693	12659	19587	6338	10777	11653	9157	6523	7572	13064	7961	4607	3185
				SU	WTRO							4								
			VEN-FOR.FLTS	UN	NW												1091			
	NCC	Chinese Taipei	TAI	LL	WEST															950
					WTRO	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1436	
			TAI.Re-Registration	LL	WEST														104	
		Netherlands Antilles	ANT	UN	WTRO	170	150	160	170	155	140	130	130	130	130	130				
	NCO	Argentina	ARG	UN	SW	23	34	1												
		Colombia	COL	PS	WTRO				2404											
				UN	WTRO	237	92	95		3418	7172	238	46	46	46	46	46	46	46	46
		Cuba	CUB	BB	WTRO									15						
				LL	WEST													65	65	65

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
					WTRO	53														
				SP	WTRO										15					
				UN	WTRO		18	11	1	14	54	40	40							
		Dominica	DMA	TR	NW															81
				UN	NW														119	
					WTRO	18	12	23	30	31	9				80	78	120	169		
		Dominican Republic	DOM	SU	WTRO									89	220	226	226	226	226	226
		Grenada	GRD	LL	WTRO						409							593	749	460
				TR	WTRO						1									
				UN	WTRO	530	620	595	858	385		523	302	484	430	403	759			
		Jamaica	JAM	UN	WTRO							21	21							
		Seychelles	SYC	LL	NW											32				
		St. Vincent and Grenadines	VCT	LL	NW														543	4227
					WEST													871		
				TR	WTRO													13	25	24
				UN	NW	20	24													
					WTRO	20	24	22	65	16	43	37	35	48	38	33	24			
		Sta. Lucia	LCA	HL	WTRO									166		134	145			
				TR	WTRO														139	152
				UN	WTRO	58	49	58	92	130	144	110	110	110	123			94		
AT.W Total						27095	32640	32895	37230	46335	34047	30682	29609	28044	28980	30357	38154	29344	24779	29287
UNCL area	CP	China, P.R.	CHN	LL	ATL				139	156	200	124								
		Libya	LBY	LL	ATL													73	73	73
		Maroc	MAR	UN	ATL													79		
		Panama	PAN	LL	ATL	4149	3519	3594	3134	3422	2588	1954	1156	358	385					
	NCO	Flag related NEI's	NEI.007	LL	ATL												23			
			NEI.028	LL	ATL												72	118		
			NEI.040	LL	ATL	162	78	68	18	174	143	223	48	41		11	29			
			NEI.042	LL	ATL												4			
			NEI.071	LL	ATL	3938	4240	3768	2555	3626	2913	3970	4155	4057	3453	2646	332			
			NEI.079	LL	ATL											77	54			
			NEI.081	LL	ATL							20	393	1263	1396	951	762			
			NEI.094	LL	ATL							34	46	22						
			NEI.105	LL	ATL						284	400	59	62						
			NEI.111	LL	ATL										649					
			NEI.134	LL	ATL				98	604	862	1315	1399	2894	1911	1584	1471	22	578	
			NEI.144	LL	ATL												26	35		
			NEI.166	LL	ATL												110			
		St. Vincent and Grenadines	VCT	LL	ATL											1956	1341	280		
UNCL area Total						8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4224	607	651	73

Table 2. Detailed TASK-I catches (t) of bigeye tuna (BET) between 1990 and 2004

Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
CP	Barbados	BRB	LL	NORT														11	
				NW												6	11		
				WTRO								24	17	18	18				
	Brasil	BRA	BB	SW					5						6	126	0		
			LL	NW											1				
				SW	57	42	30	54	38	94	61	133	111	145	517	627	753		
			UN	SW									0						
		BRA-BLZ	LL	SW										84			36		
		BRA-BOL	LL	SW													33	18	
		BRA-BOL-NATAL	LL	SW															13
		BRA-BRA-BELEM	LL	SW														4	
			SU	SW															20
		BRA-BRA-ITAIPAVA	SU	SW															54
		BRA-BRA-ITAJAI	BB	SW														78	42
			LL	SW														33	24
		BRA-BRA-NATAL	LL	SW														874	764
		BRA-BRA-RGRANDE	LL	SW														7	
		BRA-BRA-RJANERO	BB	SW														3	
			LL	SW															0
		BRA-BRA-SANTOS	LL	SW														18	9
		BRA-BRB	LL	SW						3	6	20	0						
		BRA-CAN	LL	SW												49	52		
		BRA-CAN-NATAL	LL	SW														18	36
		BRA-ESP	LL	SW							3	33	42	145	219	474	302		
		BRA-ESP-CABDELO	LL	SW														712	71
		BRA-ESP-NATAL	LL	SW														37	244
		BRA-GNQ	LL	NW											147				
				SW										966	803	65			
		BRA-GUY	LL	SW													97		
		BRA-GUY-NATAL	LL	SW														17	
		BRA-HND	LL	SW		1	3	4	12	4	6	76	46	10	96	98	151		
		BRA-HND-CABDELO	LL	SW														108	6
		BRA-HND-ITAJAI	LL	SW															1
		BRA-HND-NATAL	LL	SW														38	34
		BRA-HND-SANTOS	LL	SW														30	
		BRA-ISL-NATAL	LL	SW														17	
		BRA-JPN	LL	SW	534	237	59	240	162	143									
		BRA-KOR	LL	SW					90	88									
		BRA-PAN	LL	NW											7				
				SW								1		10	28	47	128		
		BRA-PAN-CABDELO	LL	SW														97	
		BRA-PAN-NATAL	LL	SW														19	27
		BRA-PAN-RECIFE	LL	SW															87
		BRA-PRT	LL	SW													32		
		BRA-PRT-CABDELO	LL	SW														129	
		BRA-TAI	LL	NW											212				
				SW		70	698	958	294	1603	1629	969	445	564	509	408	495		
		BRA-URY	LL	NW											1				
				SW										12	52	40	2		
		BRA-URY-CABDELO	LL	SW														32	
		BRA-URY-ITAJAI	LL	SW														0	
		BRA-URY-NATAL	LL	SW															22
		BRA-USA	LL	NW											6				
				SW							2	5		6	17	44	27		
		BRA-USA-NATAL	LL	SW														17	15

Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		BRA-VCT	LL	NW											41				
				SW										82	105	682	408		
		BRA-VCT-NATAL	LL	SW														118	24
		BRA-VUT	LL	SW													68		
		BRA-VUT-NATAL	LL	SW														32	
	Canada	CAN	HP	NW									0		0				0
			LL	NW	10	26	67	124	111	147	133	161	109	244	285	220	265	161	135
			RR	NW								1	2	5	10	12	12	16	2
			TL	NW						1	11	4	9	14	31	9	2	5	6
	Cape Verde	CPV	BB	NE	8	64	3		53	2		4							
			HL	NE	44	87	102	85	156	64	16	6	1	1	2		1	1	1
	China, P.R.	CHN	LL	ATL				70	428	476	520								
				ETRO								251							
				NE									136						
				NORT										2520	393	2897	3044	5503	1507
				NW									700						
				SE								176	520						
				SOUT										4827	6170	4313	2795	2387	5049
				SW									147						
	Côte D'Ivoire	CIV	GN	ETRO											2				
	EC.España	EC.ESP	BB	ETRO	299														
				NE									236	323	420	456			
			LL	MEDI									0	0					
				NE	44	20	12	11	12	16	77	52	44						
				NORT										58	112	150	149	427	
				NW	3	3	1	5	2	2	5	32	35						
				SE	247	170	167	134	130	145	140	61	123						
				SOUT										58	486	61	184		
				SW	187	258	167		9	13	11	123	183						
			PS	ETRO	6060														
			TR	NE									24	39	141	103			
			UN	NE													379		
		EC.ESP-ES-CANARY	BB	CANA	3515	5129	5267	4376	9325	7271	5253	5559	1034	6191	2167	2543	1863	3191	2463
		EC.ESP-ES-CORNHA	LL	NORT															149
				SOUT															267
		EC.ESP-ES-ETRO	BB	ETRO		355	251	525	523	802	995	701	900	2049	1497	898	912	835	1315
			PS	ETRO		8770	8791	11731	12095	9600	8912	5985	4535	5021	6427	5923	7038	6372	3943
		EC.ESP-ES-FTRBIA	UN	NE														144	114
	EC.France	EC.FRA	GN	NE											0				
			PS	ETRO												3355	3463	3182	
			TW	NE											15		44		
			UN	NE										28					
		EC.FRA-FR-ETRO	BB	ETRO	2739	2263	1892	2018	2187	2000	2357	1746	1942	1998	1921	1593	786	758	587
			PS	ETRO	2284	3318	4996	10701	10076	6363	6814	4234	3682	3503	4013				2339
	EC.Ireland	EC.IRL	TW	NE												10			0
	EC.Portugal	EC.PRT	BB	AZOR	3447	3014	2478	4063	1902	4964	1771	2590	3923	1917	821	425	294		
				MDRA	2455	2475	2891	1200	881	4412	3723	2767	1956	1107	384	276	759		
				NE									323	128	147	216	383		
				SE	257	109	270	230	253	253	316	80	132	161	146	689	985		
			LL	AZOR													143		
				MDRA	23	38	53	6		11									
				NE		12		5							1		3		
				NWC													24		
				SE						22									
			PS	NE	3	1	1	1	2										
			SU	NE	48	69	103	111	61	0									
		EC.PRT-PT-AZORES	BB	AZOR														213	1127
				MDRA														188	807

Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
				SE														288	
			LL	AZOR														37	
		EC.PRT-PT-MADEIRA	BB	MDRA														883	1227
			LL	EAST															1
		EC.PRT-PT-MAINLND	LL	NE														0	1
				NW															11
				SE														45	15
				SW															13
			SU	NE														0	
	FR.St Pierre et Miquelon	FR.SPM	LL	NW														0	
			UN	NW													21	28	
	Gabon	GAB	GN	ETRO				1	87					61	47				
				SE												68			
			SU	ETRO										123	102				
				SE												15			
			TR	ETRO											1				
			TW	SE												38			
			UN	ETRO						10									
	Ghana	GHA	BB	ETRO												6573	4378	1566	4983
				SE	5031	4090	2866	3577	4738	5517	4182	4568	9769	5115	2105				
			PS	ETRO												7522	1516	3250	1961
				SE							1623	2863	3483	6345	3481				
	Guinea Ecuatorial	GNQ	LL	ETRO								4							
	Iceland	ISL	LL	NE										1					
	Japan	JPN	LL	MEDI		2						1							
				NORT	9035	7846	11922	8339	12296	13993	16089	12486	14438	12581	14204	10378	7035	6164	9102
				SOUT	25989	21640	22206	26714	26207	21484	17082	14003	9892	9252	10401	7709	8438	12891	6101
			PS	SE	207	868	594												
	Korea, Republic of	KOR	LL	NORT	1851	31	508	54	26	171	721	512							
				SE											43	1	87	143	629
				SOUT	839	771	358	323	360	252	529	284	163	124					
	Libya	LBY	LL	ATL													593	593	
				NE			308	785	400	400	400	400	400	400	400	31			
			PS	NE			200	300	100										
	Maroc	MAR	SU	NE										700	770	857			
			UN	ATL													913		
				NE														889	929
	Mexico	MEX	LL	GOFM				1	4			6	8	6	2	2	7	4	5
	Namibia	NAM	BB	SE					7	29	7	43	16	137	107	359	77	65	44
			LL	SE								3		286	482	280	196	150	133
	Panama	PAN	BB	ETRO		113		28	147					261	90				
			LL	ATL	5258	6320	7474	5998	7709	5623	2843	1667	1077						
				NW											49				
				SW											435				
			PS	ETRO		1013	2517	4113	5378	4304	1934	431	175	319	378	89	63		1521
	Philippines	PHL	LL	NE									317	327			51		232
				NORT											260				
				NW									21	442		34	638	267	820
				SE									721	1300		29	8	47	290
				SOUT											715				
				SW									95	44		314	141	541	513
	Russian Federation	RUS	PS	ETRO							13	38	4	8	91				
	S. Tomé e Príncipe	STP	UN	ETRO								5							
	Senegal	SEN	BB	ETRO		10		5	11	60	84	204	676	1473	1131	1308	565	407	548
			HL	ETRO		3	5												
			UN	ETRO		2		4	115	177	54	54	54						
	South Africa	ZAF	BB	SE	296	72	43	88	76	27	7	10		18	48	104	22	8	49
			LL	SE									53	37	201	135	319	105	97

Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
			RR	SE															0
		ZAF-ISL	LL	SE															19
		ZAF-JPN	LL	SE															28
		ZAF-KOR	LL	SE															0
		ZAF-NAM	LL	SE														0	
		ZAF-SYC	LL	SE															57
		ZAF-VCT	LL	SE															21
	Trinidad and Tobago	TTO	LL	NORT												11	30		
				NW				3	29	27	37	36	24	19	5				
				WTRO	57	263													
		TTO-TRINIDAD	LL	NW														6	5
	U.S.A.	USA	GN	NW	6	0	1	8	1	4	3	0	0	0		0		0	
			HL	GOFM	0	0	0	0	0			0	0	0	0	1	1	0	0
				NW	4	21	18	3	5		15	3		12	4	33	14	6	3
				WTRO										0	1				
			HP	NW		1	0												
			HS	NW		2	31												
			LL	GOFM	39	60	36	52	26	69	29	34	26	55	44	15	41	26	20
				NW	428	618	377	600	782	660	384	476	544	738	333	506	329	169	265
				NWC	37	149	121	149	77	130	129	92	48	36	63	61	45	37	5
				SW							33	143	29	78	77	68	91	45	14
				WTRO	55	28	30	35	58	123	138	50	49	23	14	32	30	7	3
			RR	GOFM				50						2					6
				NW	47	74	104	99	263	20	147	334	228	316	34	366	50	189	95
				WTRO														4	0
			TP	NW											0				0
			TR	GOFM	0	0	0	0	0										
				NW	7	6	16	9	34	8	4	4	4						
			TW	NW	0	15	79	84	156	195	0	1	0	1	2	0	1	0	0
			UN	GOFM													0		
				NW					0			0		1		2			1
	U.S.S.R.	USR	LL	NE	95														
	UK.Bermuda	UK.BMU	LL	NW											0				
			UN	NW												0	0	0	1
	UK.Sta Helena	UK.SHN	BB	SE					6	10	10	12	17	6	8	4	5		
			LL	SE												1			
			RR	SE	3	3	10	6											
	Uruguay	URY	LL	SW	38	20	56	48	37	80	124	69	59	28	25	51	67	59	40
	Venezuela	VEN	BB	NW	59	56	87	123			1	12	4	4	7	131	153	91	171
			GN	WTRO		0	0												
			LL	NW	49	99	14	355	317	317	57	57	4	61	38	17	33	66	278
			PS	NW	53	321	169	326	140	140	131	205	214	75	181	513	444	359	611
			SU	NW				5											
		VEN-FOR.FLTS	UN	NW												47			
NCC	Chinese Taipei	TAI	GN	SOUT	11														
			LL	NORT	2765	7282	6182	5457	7104	1488	5432	3511	2494	3965	1659	3450	3572	3636	4455
				SOUT	2979	6568	5364	7969	12576	16535	16418	15731	13820	12872	15136	12979	14911	13224	13262
		TAI.Re-Registration	LL	NORT														448	
				SOUT														1374	
	Netherlands Antilles	ANT	PS	ETRO							1893	2890	2919	3428	2359	2803	1879	2758	1822
NCO	Argentina	ARG	UN	SW	78	22													
	Benin	BEN	GN	ETRO	4	4	3	3											
			HS	ETRO	6	6	4	5											
			UN	ETRO					9	9	9	30	13	11					
	Cambodia	KHM	LL	SE										32					
	Combined NEI	NEI.UK.OT	LL	ATL					36										
	Congo	COG	PS	ETRO	15	12	12	14	9	9	8								
	Cuba	CUB	LL	NORT	12														

Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
				NW													16	16	
				SOUT	50														
			PS	ETRO				36	7	7	5								
			UN	NORT		7	11												
				SOUT		27	45												
	Dominica	DMA	TR	NW															0
			UN	NW												5			
	Faroe Islands	FRO	LL	EAST										11	8				
	Flag related NEI's	NEI.028	LL	ATL												473	148		
		NEI.040	LL	ATL	182	194	234	42	100	222	210	97	44			39			
		NEI.066	LL	NE								4							
		NEI.071	LL	ATL	5674	8787	5911	4143	8244	8601	7827	9970	11474	9471	6134	1880			
		NEI.079	LL	ATL												18			
		NEI.081	LL	ATL						7	210	1690	4412	4561	4481	1652			
		NEI.094	LL	ATL							21	43	36						
		NEI.104	PS	ETRO			5												
		NEI.105	LL	ATL						403	468	42	196	194	27				
		NEI.111	LL	ATL									1412	1870					
		NEI.112	LL	ATL		1	1	38	13	6	1	2							
		NEI.134	LL	ATL				155	607	1458	3077	4721	7322	7964	4450	3658			
		NEI.144	LL	ATL												140	383		
		NEI.147	LL	ATL												5			
		NEI.157	LL	ATL							48								
		NEI.166	LL	ATL												515			
		NEI.172	LL	ATL												90			
	Grenada	GRD	LL	NW						0							0		
			TR	NW						10									
			UN	NW		65	25	20	10			1	0	0	0	0			
	Liberia	LBR	UN	ETRO				65	53	57	57	57	57	57	57	57	57	57	
				NE	16	13	42												
	NEI (ETRO)	NEI.001	PS	ETRO	785														
		NEI.001-ANT	BB	ETRO										588	740	955	342	445	183
		NEI.001-BLZ	PS	ETRO									195		87	96			
		NEI.001-CPV	BB	ETRO			200	234	176	205	182	218	139	8					
		NEI.001-GHA	PS	ETRO								9	492	1288	363	650	869	415	144
		NEI.001-GIN	PS	ETRO						334	2394	885							
		NEI.001-GTM	PS	ETRO														736	831
		NEI.001-ITA	PS	ETRO			19												
		NEI.001-LBR	PS	ETRO					356	398									
		NEI.001-MAR	PS	ETRO		206	81	774	977	553	654	255	336	744	390	324	241	510	216
		NEI.001-MLT	PS	ETRO		357	345	42											
		NEI.001-MUS	PS	ETRO						518									
		NEI.001-MYS	PS	ETRO								7							
		NEI.001-NOR	PS	ETRO		35													
		NEI.001-SEN	BB	ETRO														67	13
		NEI.001-SLV	PS	ETRO												3			
		NEI.001-SYC	PS	ETRO												362	68		
		NEI.001-VCT	BB	ETRO							71	125	196	876	566	215	116		
			PS	ETRO		154	817	1737	812	519	521	418	327	193	139	422			
		NEI.001-VEN	PS	ETRO													612	331	
		NEI.001-VUT	PS	ETRO		470	676	1807	2713	2610	2016	828		314					
	Seychelles	SYC	LL	NW											58				
				SE													162		
	Sierra Leone	SLE	LL	NE											6	2			
	St. Vincent and Grenadines	VCT	LL	ATL											1215	506	0		
				NORT													13		
				NW														103	18
				SOUT													1		

Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
			UN	NW	0		1	3	0		4	2	2	1	1				
				WTRO												0			
	Sta. Lucia	LCA	HL	NW					0	0		0				1			
			TR	NW														2	
				WTRO															0
			UN	NW			1							0			2		
	Togo	TGO	UN	ETRO									33						
				SE	12	6	2	86	23	6	33	33							
					84337	95264	98434	11156 8	13222 5	12628 4	12113 1	10647 6	10989 0	12149 8	10263 5	95821	75910	79406	73119

Table 3. Detailed TASK-I catches (t) of skipjack tuna (SKJ) between 1990 and 2004

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
AT.E	CP	Algerie	DZA	UN	MEDI									171	43	89	77			
		Angola	AGO	BB	ETRO	69	66	41	13	7	3	15	52	2	32	12	12	14	14	
				TP	ETRO											2	2			
		Cape Verde	CPV	BB	ETRO	767	1309	727	625	804	1215	313	517	609	945	770	444	46	57	57
				HL	ETRO	25	14	26	74	203	99	149	56	54	16	19	50	247	307	307
				HS	ETRO				161											
				PS	ETRO							8	18	21	1		300	5	7	7
				SU	ETRO	14	10	111												
		China, P.R.	CHN	LL	SE									4						
		Côte D'Ivoire	CIV	GN	ETRO											1173	259	292	143	559
		EC.España	EC.ESP	BB	ETRO	323														
				LL	MEDI													3		
					NE						0	0	0	0	0			2		
					SE					0			0	0	0	1		22	5	
				PS	ETRO	43189														
					MEDI													1		
				SU	MEDI													6		
				TP	MEDI													0		
					NE									1						
			EC.ESP-ES-CANARY	BB	CANA	4322	5764	7128	2839	4772	5143	4472	5884	5441	4119	1120	1538	366	1417	2093
			EC.ESP-ES-CORNHA	LL	NE															0
					SE															4
			EC.ESP-ES-ETRO	BB	ETRO		143	67	378	498	617	572	1191	3152	1488	2660	1618	3471	5757	5114
				PS	ETRO		74001	46124	60443	45268	45834	33494	31438	27414	38912	33445	27798	21595	37658	31514
			EC.ESP-ES-MALAGA	LL	MEDI															2
				SU	MEDI															25
		EC.Estonia	EC.EST	UN	ETRO		102													
		EC.France	EC.FRA	GN	NE													6		
				PS	ETRO												14043	14298	18021	
				TW	NE													6		
				UN	MEDI													22		
			EC.FRA-FR-ETRO	BB	ETRO	3455	1490	1507	2153	2546	2697	1698	3701	4179	2343	1497	2550	2305	1878	1752
				PS	ETRO	13644	31781	20383	31582	30233	22491	21409	13322	14203	18001	16686				20127
		EC.Germany	EC.DEU	UN	ETRO							3								
		EC.Greece	EC.GRC	PS	MEDI														102	99
		EC.Ireland	EC.IRL	TW	NE															14
		EC.Italy	EC.ITA	LL	MEDI														17	19
				UN	MEDI													4	12	15
		EC.Latvia	EC.LVA	UN	ETRO		92													
		EC.Lithuania	EC.LTU	UN	ETRO		221													
		EC.Portugal	EC.PRT	BB	AZOR	2252	2497	2544	2262	3366	603	6250	3592	3656	1427	1006	1335	2147		
					MDRA	1666	5475	4862	3336	4136	4357	2000	797	849	345	262	495	557		
					NE									10	28	17	244	221		
					SE	36	15	6		8	26	26	6	4		1	61	15		
				LL	NE					0	0	2	0	8	2	7	28	7		
				PS	NE		1			0	0	7		0	0	1	0			
				SU	NE	33	71	65	53	18	10	12	3	14	8	9	4	11		
				TP	NE								1	3		1	0	1		
				UN	NE					0										
			EC.PRT-PT-AZORES	BB	AZOR														3586	5984
					MDRA														102	880
				LL	AZOR														24	
			EC.PRT-PT-MADEIRA	BB	MDRA														587	1595
			EC.PRT-PT-MAINLND	LL	NE														11	
				PS	EAST															0

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
				SU	EAST															16
					NE														5	
				TP	NE															2
		Gabon	GAB	GN	ETRO				1	11						21				
					SE												101			
				HL	ETRO							26								
				SU	ETRO										76					
				UN	ETRO						51			59						
		Ghana	GHA	BB	ETRO	23663	24464	18379	19637	21258	18607	16290	21624	21123	27775	19564	32213	11286	16235	24632
				PS	ETRO							3312	6043	13027	15685	10386	11128	20602	16531	8968
				SU	ETRO	588	588	588	588											
		Japan	JPN	LL	ETRO												1			
				PS	ETRO	2566	4792	2378												
		Korea, Republic of	KOR	LL	ETRO			0												
		Maroc	MAR	GN	MEDI									1						
					NE	43	50	282	13	76	103	122	60	620	126	1018	169	154	113	82
				HL	NE															14
				LL	NE															269
				PS	MEDI													1	1	2
					NE	1154	204	277	297	172	4878	553	4449	1861	715	180	99	125	409	440
				SU	MEDI						43	9	4							
				TP	MEDI				2					4	10	1				
					NE										7			1	1	2
		Namibia	NAM	BB	SE					2	15	0	1	0	0	0	8			
		Panama	PAN	BB	ETRO		64		88	133					191	186				
				PS	ETRO		8247	8719	12939	12845	14853	5855	1300	572	1117	1374	281	342		7126
		Russian Federation	RUS	PS	ETRO		1175	1110	540	1471	1450	381	1146	2086	1426	374				
		S. Tomé e Príncipe	STP	SU	ETRO	25	24	25	15				7							
		Senegal	SEN	BB	ETRO		309		42	59	18	163	455	1679	1479	1506	1271	1046	733	1261
				HL	ETRO	1	42	50												
				PS	ETRO									284	152					
				SU	ETRO		282	187	53											
				TR	ETRO	133	19	23												
				UN	ETRO															10
		South Africa	ZAF	BB	SE	16	15	6	5	3	4	1	6	2	1		1		2	2
				LL	SE														0	
				RR	SE															0
				SP	SE	1		1	1	1										
		U.S.S.R.	USR	PS	ETRO	3635														
		UK.Sta Helena	UK.SHN	BB	ETRO															63
					SE					55	115	86	294	298	13	64	205	63	63	
				SU	SE	171	24	16	65											
	NCC	Chinese Taipei	TAI	LL	EAST														26	29
					ETRO		5	3	2	10	3	5	47	73	39	41	24	23		
		Netherlands Antilles	ANT	PS	ETRO							7096	8444	8553	9932	10008	13370	5427	10092	8708
	NCO	Benin	BEN	HS	ETRO	2	2	2	2	2	2	2	7	3	2	2				
		Congo	COG	PS	ETRO	12	9	9	10	7	7	6								
		Cuba	CUB	PS	ETRO	86			7											
		NEI (ETRO)	NEI.001	PS	ETRO	10516														
			NEI.001-ANT	BB	ETRO										114	1048	2080	1819	1992	1517
			NEI.001-BLZ	PS	ETRO									720		229	278			
			NEI.001-CPV	BB	ETRO			393	278	169	271	111	267	561	78					
			NEI.001-GHA	PS	ETRO								16	1772	2064	1537	2065	2624	1458	1716
			NEI.001-GIN	PS	ETRO						975	6432	2408							
			NEI.001-GTM	PS	ETRO														2120	4808
			NEI.001-ITA	PS	ETRO			91												
			NEI.001-LBR	PS	ETRO					744	1191									
			NEI.001-MAR	PS	ETRO		1541	321	3340	3424	1862	2175	1019	2255	3318	2892	1469	1022	2879	3034

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
			NEI.001-MLT	PS	ETRO		2682	1739	133											
			NEI.001-MUS	PS	ETRO						1612									
			NEI.001-MYS	PS	ETRO								27							
			NEI.001-NOR	PS	ETRO		370													
			NEI.001-SEN	BB	ETRO														7	62
			NEI.001-SYC	PS	ETRO												760	148		
			NEI.001-VCT	BB	ETRO							50	236	447	1025	835	363	523	42	
				PS	ETRO		1460	4397	5731	2184	1847	1451	955	994	1102	587	1072			
			NEI.001-VEN	PS	ETRO												35	2407	1197	
			NEI.001-VUT	PS	ETRO		5281	5468	10808	10896	8477	5992	1233		1192					
		Rumania	ROU	UN	ETRO	142	349	73												
		St. Vincent and Grenadines	VCT	UN	EAST														1	
AT.E Total						112549	175052	128128	158517	145382	139480	120548	110626	116789	135349	110628	117851	93288	123604	132928
AT.W	CP	Barbados	BRB	LL	WTRO								5	10	3	3				
				UN	WTRO	11	14	5	6	6	6	5								
		Brasil	BRA	BB	SW	13291	14477	13775	17557	20372	15675	21564	25573	23567	22948	24691	24038	18185		
				GN	SW							2								
				HL	SW							0								
				LL	SW		0	0				3						38		
				PS	SW								743	219		473	108	116		
				SU	SW	104	124	260	205	210			248							
				UN	SW									3						
			BRA-BRA-ITAJAI	BB	SW														12874	14676
			BRA-BRA-RGRANDE	BB	SW														3813	4710
			BRA-BRA-RJANERO	BB	SW														3729	3650
			BRA-ESP	PS	SW										240					
			BRA-ESP-CABDELO	LL	SW															1
			BRA-JPN	BB	SW	6735	5947	4498												
			BRA-PRT	BB	SW						855	953								
			BRA-TAI	LL	SW			2	9	6	30	6								
		Canada	CAN	TL	NW															0
		EC.España	EC.ESP	LL	NW						0		0		0					
					SW										1	1				
				PS	WTRO		1592	1120	397											
		EC.Portugal	EC.PRT	LL	NWC											4	1	0		
			EC.PRT-PT-MAINLND	LL	NW															26
					SW														3	3
		Mexico	MEX	LL	GOFM				0	1			3	6	51	13	54	71	75	9
				UN	WTRO	4	9	8	1			2								
		Trinidad and Tobago	TTO	SU	WTRO						3		0							
		U.S.A.	USA	GN	GOFM		0	0												
					NW	2	13	9	1	5			9	17	26	2	4	0	1	16
					WTRO	0	0	0					0		0	1	2	1	0	0
				HL	GOFM	1	0	0	0	0					0	1			0	0
					NW	0	2	1	1	4		0	0		0	0	0	0	0	1
					WTRO										6	9	10	13	13	10
				HS	WTRO	0	0		0											
				LL	GOFM	1	0	1		1		0	1	1	0	0	0	0	0	0
					NW	0	0		0	0		0	1	1	0		0	0	1	0
					SW								0							
					WTRO	0	1	0	1	0			1		1	2	4	3	0	0
				PS	NW		749	496	274	20		1								
					WTRO	227														
				RR	GOFM	35	10	11	42	4		35	22	37	35	17	16	13	11	6
					NW	31	76	38	39	62	21	47	42	49	64	13	33	23	34	27
					WTRO													33	16	40
				TP	NW	0	0	0	4	1					17		0	0	2	0
					WTRO	0			0	0			0		0	0	0	1	0	0

Stock	Status	Flag	Fleet	GearGrp	Area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
				TR	GOFM	0	0	0	0	0										
					NW	0	0	0	1	0		1	1	0						
					WTRO	6	5	3	1	1			7							
				TW	NW	0	0		0	0				0	1	0	0	0	1	0
				UN	GOFM											0				
					NW		0	0	3		60								0	0
		UK.Bermuda	UK.BMU	LL	NW											0				
				UN	NW													0	0	1
					WTRO												0			
		Venezuela	VEN	BB	NW												1104			
					WTRO	777	1952	941	1123	1005	328	224	224	506	282	413		552	950	501
				GN	WTRO		8	0				2	6	1	3			1		
				LL	WTRO	22														
				PS	NW												5189			
					WTRO	3014	6186	6893	10049	5692	2059	3348	3604	3607	2696	2590		2000	2296	2769
			VEN-FOR.FLTS	UN	NW												577			
	NCC	Chinese Taipei	TAI	LL	WEST														14	14
					WTRO		32	26	9	7	2	10	1	2	1		1	16		
		Netherlands Antilles	ANT	UN	WTRO	40	40	40	45	40	35	30	30	30	30	30				
	NCO	Argentina	ARG	UN	SW	106	272	123	50	1										
		Colombia	COL	PS	WTRO				2074											
				UN	WTRO					789	1583									
		Cuba	CUB	BB	WTRO	1443	1596	1638	1017	1268	886	1000	1000	651	651	651				
		Dominica	DMA	TR	NW															30
				UN	NW														51	
					WTRO	60	38	41	24	43	33	33	33	33	85	86	45	55		
		Dominican Republic	DOM	SU	WTRO	110	156	135	143	257	146	146								
		Grenada	GRD	LL	NW						1									
					WTRO													14		
				TR	NW						9									
					WTRO														16	21
				UN	NW						2									
					WTRO	23	25	30	25	11		11	15	23	23	23	15			
		Jamaica	JAM	UN	WTRO							62								
		St. Vincent and Grenadines	VCT	LL	NW														2	166
				TR	WTRO													58	90	85
				UN	NW	29	27	20	66	56	53	37	42	57	37					
					WEST													206		
					WTRO											68	97			
		Sta. Lucia	LCA	HL	WTRO									163		216	151			
				TR	WTRO														132	137
				UN	WTRO	37	51	39	53	86	72	38	100	100	153			106		
AT.W Total						26110	33404	30155	33221	29949	21859	27561	31712	29085	27356	29306	31451	21507	24125	26900
UNCL area	NCO	St. Vincent and Grenadines	VCT	UN	ATL													93		
UNCL area Total																		93		

Table 4. Task 1 declared by countries (shade rows) and estimated from EU monitored NEI catches. Baitboat (a) and Purse seine (b).

a)

YFT

Flag	Fleet	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Cape Verde	CPV	502	660	224	191	167	419	159	422	273	478	457	298	1232	1379	1379
NEI (ETRO)	Netherland Antilles										77	205	152	585	483	586
	Cap-Vert			101	76	216	127	70	62	3						
	St-Vincent							12	129	28	255	126	75	189	56	

BET

Flag	Fleet	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Cape Verde		8	64	3		53	2		4							
Senegal			10		5	11	60	84	204	676	1473	1131	1308	565	407	548
NEI (ETRO)	Netherlands Antilles										588	740	955	342	445	183
	Cap-Vert			200	234	176	205	182	218	139	8					
	Senegal														67	13
	St-Vincent							71	125	196	876	566	215	116		

SKJ

Flag	Fleet	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Cape Verde		767	1309	727	625	804	1215	313	517	609	945	770	444	46	57	57
Senegal			309		42	59	18	163	455	1679	1479	1506	1271	1046	733	1261
NEI (ETRO)	Netherlands Antilles										114	1048	2080	1819	1992	1517
	Cap-Vert			393	278	169	271	111	267	561	78					
	Senegal													7		62
	St-Vincent							50	236	447	1025	835	363	523	42	

b)

PS

YFT

Flag	Fleet	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
Ghana		223	2975	4191	2738	3491	3677	3611	1003									3641	5754	5452	14191	6572	13184	13312	9228	5193
Maroc		3243	4817	4540	2331	614	2270	2266	1529																	
Norway								813	418	493	1787	1790														
NEI (ETRO)	NEI.001			3121	5388	1104			2077	3140	5436	12513														
	Belize																			963		321	406			
	Ghana																		7	628	635	369	453	446	837	1400
	G. Conakry																208	1956	820							
	Guatemala																								2207	1588
	Italy													600												
	Liberia															477	1377									
	Maroc												1799	2653	2396	3017	2290	3430	1947	2276	2307	2441	3000	2032	1567	719
	Malta												1636	1759	388											
	Maurice																470									
	Malaysia																		148							
	Norway												43													
	Salvador																						933			
	Seychelles																						1510	1345		
	St-Vincent												510	4936	5391	2476	2142	2969	3017	3327	1916	1987	3640			
	Venezuela																						36	3612	245	
	Vanuatu												869	872	1624	2357	2357	1130	576		228					

BET

Flag	Fleet	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
Ghana		21	307	359	187	817	480	276	3									1623	2863	3483	6345	3481	7522	1516	3250	1961
Maroc		387	622	625	552	120	30		8																	
Norway										60																
NEI (ETRO)	NEI.001			338	1141	157			85	20	93	785														
	Belize																			195		87	96			
	Ghana																		9	492	1288	363	650	869	415	144
	G-Conakry																334	2394	885							
	Guatemala																								736	831
	Italy													19												
	liberia															356	398									
	Maroc												206	81	774	977	553	654	255	336	744	390	324	241	510	216
	Malta												357	345	42											
	Maurice																518									
	Malaysia																		7							
	Norway												35													
	Salvador																						3			
	Seychelles																						362	68		
	St-vincent												154	817	1737	812	519	521	418	327	193	139	422			
	Venezuela																							612	331	
	Vanuatu												470	676	1807	2713	2610	2016	828		314					

SKJ

Flag	Fleet	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
Ghana		317	2682	3915	2807	3674	2869	1677	768									3312	6043	13027	15685	10386	11128	20602	16531	8968
Maroc		5001	3017	3956	2348	862	1002	1220	928			1154	204	277	297	172	4878	553	4449	1861	715	180	99	126	410	442
Norway									581	738																
NEI (ETRO)	NEI.001			1560	3383	927	590	540	791	2994	2263	10516														
	Belize																			720		229	278			
	Ghana																		16	1772	2064	1537	2065	2624	1458	1716
	G.Conakry																975	6432	2408							
	Guatemala																								2120	4808
	Italy													91												
	Liberia															744	1191									
	Maroc												1541	321	3340	3424	1862	2175	1019	2255	3318	2892	1469	1022	2879	3034
	Malta												2682	1739	133											
	Maurice																1612									
	Malaysia																		27							
	Norway												370													
	Seychelles																						760	148		
	St-Vincent												1460	4397	5731	2184	1847	1451	955	994	1102	587	1072			
	Venezuela																						35	2407	1197	
	Vanuatu												5281	5468	10808	10896	8477	5992	1233		1192					

Table 5. Task 1 and Task 2 YFT catalogue.

Flag	Gear	data	K.data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Angola	BB	T1	w	292	509	441	208	137	215	77	68	106	170	34	34	34	34	34
		CE	w	292			208	137	215	77	68	106	170					
		SZ	w							3	0							
	SU	T1	w				3											
		CE																
		SZ																
	TP	T1	w		1				1	1	2			1				
		CE																
		SZ																
	UN	T1	w									9						
		CE																
		SZ																
Argentina	UN	T1	w	23	34	1												
		CE																
		SZ																
Barbados	LL	T1	w								149	150	155	155	142	115	116	116
		CE																
		SZ	w											1				
	UN	T1	w	89	108	179	161	156	255	160								
		CE																
		SZ																
Belize (fore	LL	T1																
		CE	w						1		3			5				
		SZ																
Benin	GN	T1	w												1			
		CE																
		SZ																
	HS	T1	w	1	1	1	1	1	1	1	3	1	1	1				
		CE	w	1														
		SZ																
Brasil	BB	T1	w	953	1169	2660	3087	2744	2613	1956	1643	1229	1197	3093	1276	2843	1289	2838
		CE	w	191	618	1091	490	593	154	115	408	856	45		900	903	843	626
		SZ	w	3	3	7	10	3										
	GN	T1	w						12	8								
		CE																
		SZ																
	HL	T1	w					60	18	69	156						272	
		CE																
		SZ	w					10										
	LL	T1	w	661	582	1248	1518	1084	1312	734	849	1014	2930	2754	4883	3323	1941	1968
		CE	w	219	331	491	524	408	942	529	332	959	2570	2058	2626	942	382	1313
			n			6375	5687	4791	3891			4864						
		SZ	w		82	1		16					27				40	
	PS	T1	w								57			297	8	6		32
		CE																
		SZ																
	SU	T1	w	144	87	320	526	281	66									2147
		CE																
		SZ																
	UN	T1	w									271			71			
		CE																
		SZ																
Cambodia	LL	T1	w										7					
		CE																
		SZ																
Canada	GN	T1	w								0							
		CE																
		SZ																
	HP	T1	w															0
		CE	w												2			0
		SZ	w												2			0
	LL	T1	w	7	28	25	71	52	170	154	100	57	20	105	125	69	72	302
		CE	w			26	71	52	170	153	100	57	27	19	246	69	72	302
		SZ	w	4										94	121	73	60	300
	RR	T1	w										1	0	0	1	0	0
		CE	w											0	0	1	0	0
		SZ																
	TL	T1	w		1				4	1	0	0	1	0	0	0	0	1
		CE	w						4	1	0	0	1		0	0	0	1
		SZ																
	TR	T1																
		CE	w												0			
		SZ	w												0	0	0	0
Cape Verde	BB	T1	w	502	660	224	191	167	419	159	422	273	478	457	298	1232	1379	1379

Table 6. Task 1 and Task 2 SKJ catalogue.

Flag	Gear	data	K.Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Algerie	UN	T1										171	43	89	77			
		CE																
		SZ																
Angola	BB	T1		69	66	41	13	7	3	15	52	2	32	12	12	14	14	
		CE	w	69			13	7	3	15	52	2	32					
		SZ	w							1	0							
	TP	T1	w											2	2			
		CE																
		SZ																
Argentina	UN	T1	w	106	272	123	50	1										
		CE																
		SZ																
Barbados	LL	T1									5	10	3	3				
		CE																
		SZ																
	UN	T1	w	11	14	5	6	6	6	5								
		CE																
		SZ																
Benin	HS	T1		2	2	2	2	2	2	2	7	3	2	2				
		CE	w	2														
		SZ																
Brasil	BB	T1	w	20026	20424	18273	17557	20372	16530	22517	25573	23567	22948	24691	24038	18185	20416	23036
		CE	w	7875	7721	9842	6001	9102	3614	4444	14553	14644	1657		12645	14890	12874	7411
		SZ	w	17	30	41	1	23	14		50						447	
	GN	T1								2								
		CE																
		SZ																
	HL	T1								0								
		CE																
		SZ																
	LL	T1			0	2	9	6	30	9						38		1
		CE	w		0												297	4
			n				69											
		SZ	w			9												
	PS	T1									743	219	240	473	108	116		
		CE	w										241					
		SZ																
	SU	T1		104	124	260	205	210			248							
		CE																
		SZ																
	UN	T1										3						
		CE																
		SZ																
Canada	TL	T1																0
		CE	w															0
		SZ																
Cape Verde	BB	T1		767	1309	727	625	804	1215	313	517	609	945	770	444	46	57	57
		CE	w	767	1308		130	132	1215	94		609	944	770				
		SZ	w							94		1		3	6		1	
	HL	T1		25	14	26	74	203	99	149	56	54	16	19	50	247	307	307
		CE	w	39			235	197	99	462	555	53	16	19	521			
		SZ	w	0					4	1	3		2					
	HS	T1					161											
		CE																
		SZ																
	PS	T1								8	18	21	1		300	5	7	7
		CE	w				161			8	18	21	1		273			
		SZ	w															2
	SU	T1	w	14	10	111												
		CE																
		SZ																
China P.R.	LL	T1										4						
		CE																
		SZ																
		CS																
Chinese Taipei	LL	T1			37	29	11	17	5	15	48	75	40	41	25	39	40	43
		CE	w	2	1		104	18	2199	690	19	50	90	78	37	134	48	26
			n	22	101		1368	2087						6028				
		SZ																
Colombia	PS	T1					2074											
		CE																
		SZ																
	UN	T1						789	1583									

Table 7. Task 1 and Task 2 BET catalogue.

Flag	Gear	data	k.data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Argentina	UN	T1	w	78	22													
		CE																
		SZ																
Barbados	LL	T1	w								24	17	18	18	6	11	11	
		CE																
		SZ																
Belize (fore	LL	T1																
		CE	w						10		5			47				
		SZ																
Benin	GN	T1	w	4	4	3	3											
		CE	w	4														
		SZ																
	HS	T1	w	6	6	4	5											
		CE	w	6														
		SZ																
	UN	T1	w					9	9	9	30	13	11					
		CE																
		SZ																
Brasil	BB	T1	w					5						6	126	0	81	42
		CE	w					30				132			89	0	78	7
		SZ																
	LL	T1	w	591	350	790	1256	596	1935	1707	1237	644	2024	2762	2534	2582	2374	1379
		CE	w	569	307	417	665	263	1635	1413	854	869	2466	2361	1310	858	267	692
			n			844	1368	1127	3731	1750		3647						
		SZ	w	47	20	20	40	139	139				44				26	
	SU	T1	w															75
		CE																
		SZ																
	UN	T1	w									0						
		CE																
		SZ																
Cambodia	LL	T1	w										32					
		CE																
		SZ																
Canada	HP	T1	w									0		0				0
		CE	w									0		0	3			0
		SZ	w												6		0	0
	LL	T1	w	10	26	67	124	111	147	133	161	109	244	285	220	265	161	135
		CE	w			67	124	110	147	133	161	109	244	35	436	265	161	135
		SZ	w	5											435	253	139	139
	RR	T1	w								1	2	5	10	12	12	16	2
		CE	w								1	2		10	12	12	16	2
		SZ																
	TL	T1	w						1	11	4	9	14	31	9	2	5	6
		CE	w			1			1	11	4	9	14	31	9	2	5	6
		SZ																
	TR	T1																
		CE	w												3			
		SZ	w												7	7	8	7
Cape Verde	BB	T1	w	8	64	3		53	2		4							
		CE	w	3	64			150	2	100		1						
		SZ								92								
	HL	T1	w	44	87	102	85	156	64	16	6	1	1	2		1	1	1
		CE	w	44			85	156	63	16	10		1	2				
		SZ	w	7			3		6	1	1							
China P.R.	LL	T1	w				70	428	476	520	427	1503	7347	6564	7210	5840	7890	6555
		CE	w									775	4161	6313	7210	5840	7890	6555
		SZ	w					35	120	92					32	39		
Chinese Tai	GN	T1	w	11														
		CE																
		SZ																
	LL	T1	w	5744	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	18483	18682	17717
		CE	w	7426	15854	15291	12293	17572	17859	23151	20109	21084	16726	18804	17938	21834	21687	17790
		SZ	w	376	124	365	692	1260	3758	3616	1772	2101	1727	1148	1576	6398	5617	2016
Chinese Tai	LL	T1																
		CE	w			25			208		490			133	133			
		SZ																
Combined N	LL	T1	w					36										
		CE																
		SZ																
Congo	PS	T1	w	15	12	12	14	9	9	8								
		CE																
		SZ																
Côte D'Ivoi	GN	T1	w											2				

Table 8. Number of fish measures (yellowfin, skipjack and bigeye) in Ghanaian ports of the fleets based in Tema.

	BB													PS										
YEAR	MONTH												TOTAL	MONTH										TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7	8	9	10	11	12	
1972					99	313	100	100	1099	198	709	100	2718					97				792				889
1973	483				695	1292	1001	1403	1049	300	149		6372	100									420	99		619
1974	149	50	202	150		100	100		150	300	100	100	1401													
1975	100				50			300	150	300	100		1000													
1976		100	100	50	100			50	50		130	349	929													
1977	450	247	400	500	299	198	200	349	250	500	100	49	3542													
1978	49	48			50				146		100		393													
1979	400	250			399	300	296	100		30			1775													
1980	249				50	100			50	449	200	99	1197										150	100		250
1981	999	400		100	400	200	400	500	1482	700	560	420	6161	200					150				257		193	800
1982	340	200	535	201	730	209	200	560	300	850	940	469	5534	180	100	206	100	50		30		260	80	99	100	1205
1983	730	800	577	697	282	485	970	450	800	555	777	622	7745	193			40		58							291
1984							535	2095	697	1206	2369	2632	9534													
1985	1646	1207	1066	2426	2125	673	2800	3012	1728			1313	17996													
1986	1274	442	1361	387	929	966	1129	3078	3609	3081	1422	384	18062													
1987	1096	612	527	372	2217	4163	2153	3961	4830	5204	3542	1216	29893													
1988	3826	2911	2942	4725	6234	5775	6033	5661	6336	5871	8208	5888	64410													
1989	7622	4412	5035	6699	7799	6079	3745	4375	3987	6063	10278	4236	70330													
1991	4543	3722	4085	3336	4453	3924	2982	4554	2827	2677	2151	2309	41563													
1992	3176	2044	3267	2301	2342	1693	2062	2395	2353	2183	1945	1534	27295													
1993	3294	1928	2023	1961	1712	2260	1917	2252	2068	1862	2487	2936	26700													
1994	2098	2039	2641	2307	3130	1457	2137	2440	2296	2440	1903	1535	26423													
1995	1970	2397	2588	1578	869	2593	1480	1994	2308	2434	2205	1795	24211													
1996	3229	2643	1946	1484	1983	1361	888	1420	1938	2133	4440	1518	24983		316	168		178	152			557	175	290	161	1997
1997	2948	2498	1377	3060	1880	2843	2429	2087	2629	3566	2266	3833	31416		339	581	304	174	710	673	1139	1074	736	881	1033	7644
1998	3032	2231	1405	1528	1453	1758	1661	1216	1216	1894	1349	1240	19983	1732	1139	1104	1170	1729	1648	674	913	754	1392	959	307	13521
1999	1621	2309	2753	2052	1475	1303	621	572	610	839	153	120	14428	431	588	1022	210	937	563	436	312	441			107	5047
2000	528	806	548	675	695	680		594	589	880	819	1055	7869	255	151	692	353	155	326		159	312	498	624	532	4057
2001	541	540	320	354	239	165	200	156	182	199	189	85	3170	491	141	307	240	150	177	108	107	119	110	75	134	2159
2002	688	823	294	589	527	793	618		741	856	895		6824	140	437	277	402	313	748	388		464	151	156		3476
2003	1565	1633	979	240	818	1171	495	1817	1408	1420		344	11890	1678	206	215	409		537	366	454	712	828	233	231	5869
2004	954	200	402	597	799	601	797	760	377	797	898	599	7781		200	228	403			201	194	370	201	241	167	2205

Table 9. Number of fish measures (yellowfin, skipjack and bigeye) in the port of Abidjan of the fleets based in Tema.

	BB												PS										
YEAR	MONTH											TOTAL	MONTH										TOTAL
	1	2	3	4	5	6	7	8	10	11	12		3	4	6	7	8	9	10	11	12		
2000	0	0	0	0	0	0	292	0	311	721	884	2208	0	0	0	0	0	0	0	0	904		904
2001	300	0	0	0	1776	0	1908	1875	1494	1452	772	9577	0	0	0	0	0	877	0	0	979		1856
2002	5447	6873	6117	2035	5467	4030	1942	0	1445	0	0	33356	3060	0	2050	0	400	0	2450	0	0		7960
2003	0	0	0	0	6079	0	1019	0	0	2216	2463	11777	1656	0	3034	2040	4385	2413	9608	623	4306		28065
2004	0	0	0	0	0	5787	0	0	0	0	0	5787	1373	2904	2986	6086	0	8687	8736	1918	5361		41946

Table 10. Number of fish measures (yellowfin, skipjack and bigeye) and counted (skipjack) from landings of the European and associated fleets.

Year	PS			BB		
	Fish measures	Fish measures	Catch	Fish measures	Fish measures	Catch
1991	134826	0	230377	7605	0	9194.00
1992	129915	0	197665	5331	0	7579.00
1993	149103	0	231893	5868	0	8763.99
1994	145166	0	210669	6291	0	9514.80
1995	253556	0	192944	6113	0	8782.52
1996	253531	0	182280		0	8223.32
1997	172340	0	141632	13829	0	9848.76
1998	30056	31381	142429	8674	7688	12115.90
1999	78428	78870	147315	10498	10223	13361.03
2000	162837	149398	145988	6174	6670	12257.48
2001	163180	145466	151881	11151	15296	11669.99
2002	156765	146893	129399	24277	39097	13320.30
2003	144929	218427	154010	38080	58791	14210.48
2004	134781	205042	141293	45361	59029	15239.03
2005	144280	222312		25386	43542	

Table 11. Abundance (CPUE) indices used in previous stock assessments. These analyses should be updated through most recent year (2005, if possible) and provided for the Fall 2006 meeting of the SCRS Tropical Tunas Species Group. In many cases, it may be appropriate to apply the existing standardization models to the updated data. These indices are considered critical to the preparation of Executive Summary Reports to ICCAT Commission.

SPECIES	INDEX	RESPONSIBLE PARTIES
YFT	Japan LL	Japanese scientists
	United States LL	U.S. scientists
	Gulf of Mexico LL	U.S. and Mexican scientists
	Venezuela LL	Venezuelan scientists
	Brazil LL	Brazilian scientists
	Chinese Taipei LL	Chinese Taipei scientists
	European Community PS	E.C. scientists
	Venezuela PS	Venezuelan scientists
	Brazil BB	Brazilian scientists
	Dakar BB	E.C. scientists
	United States RR	U.S. scientists
BET	Japan LL (central area, weight, lognormal)	Japanese scientists
	Japan LL (Atlantic, numbers)	Japanese scientists
	United States LL	U.S. scientists
	Chinese Taipei LL	Chinese Taipei scientists
	Canary I., Azores & Madeira	Spanish & Portuguese scientists
SKJ	PS (overall and by local area)	E.C. scientists
	Venezuela PS	Venezuelan and/or E.C. scientists
	Brazil BB	Brazilian scientists
	Dakar based BB	EU & Senegalese scientists

Table 12. Other fishery indicators which may provide information regarding stock status.

INDICATOR	RESPONSIBLE PARTIES
Trends in average weight of caught fish from the 1950s to the present * (calculated overall and by gear group from available catch-at-size data)	ICCAT Secretariat
Purse seine index for larger YFT** (calculated using catches on free schools and effort associated with search time for free schools)	E.C. scientists
Plots of spatial-temporal distribution of catch and effort by species/gear group for each time period**	E.C. scientists
Analyses of catch and effort trends for fisheries along the fringes of species distribution** (examples may include Azores, Madeira, Canary Island, and Dakar BB)	Scientists from various contracting parties, depending upon relevant data bases
Calculation of the annual percentages of free school vs. FAD purse seine sets**	E.C. scientists
Comparison of the size frequency distribution, by species and gear group, for the most recent year relative to the average distribution from the previous 5 years**	ICCAT Secretariat
Analysis of changes in average distance traveled by vessels**	E.C. scientists

Table 13. Definition of fisheries in the MULTIFAN bigeye model structure.

Fishery	Gear	Nation	Region	Years covered
1	PS	France, Spain and others	2	1965 - 1985
2	PS	France, Spain and others	2	1986 - 1990
3	PS	France, Spain and others	2	1991 - 2000
4	BB	Ghana	2	1973 - 2000
5	BB	Other tropical nations	2	1962 - 2000
6	BB	France, Senegal (Dakar-based)	2	1965 - 1979
7	BB	France, Senegal (Dakar-based)	2	1980 - 2000
8	BB	Portugal, Spain (North Islands)	1	1965 - 2000
9	LL	Japan	1	1961 - 2000
10	LL	Japan	2	1961 - 2000
11	LL	Japan	3	1961 - 2000
12	LL+Uncl	Others (US, Chinese Taipei, etc)	1	1968 - 2000
13	LL+Uncl	Others (US, Chinese Taipei, etc)	2	1966 - 2000
14	LL+Uncl	Others (US, Chinese Taipei, etc)	3	1966 - 2000

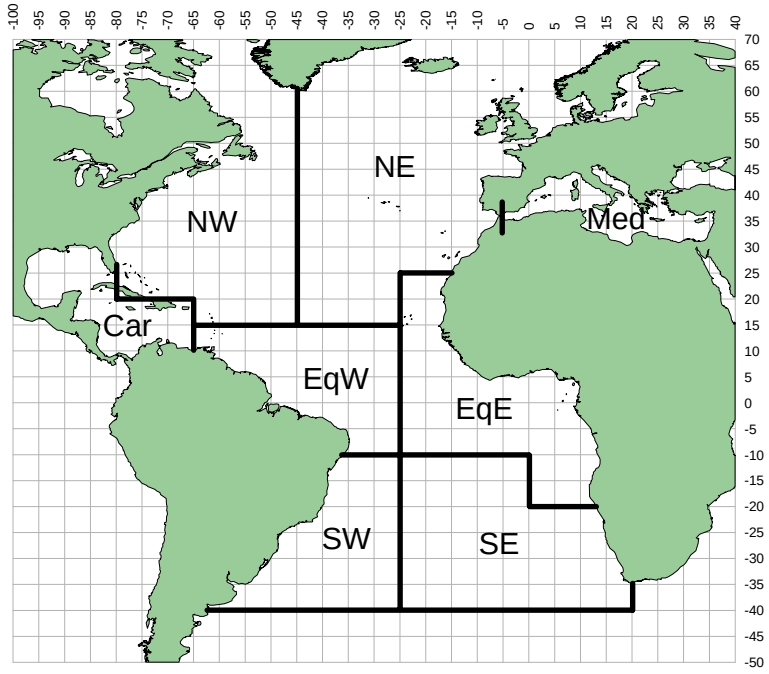

Figure 1. Areas considered in the longline catch distribution analysis.

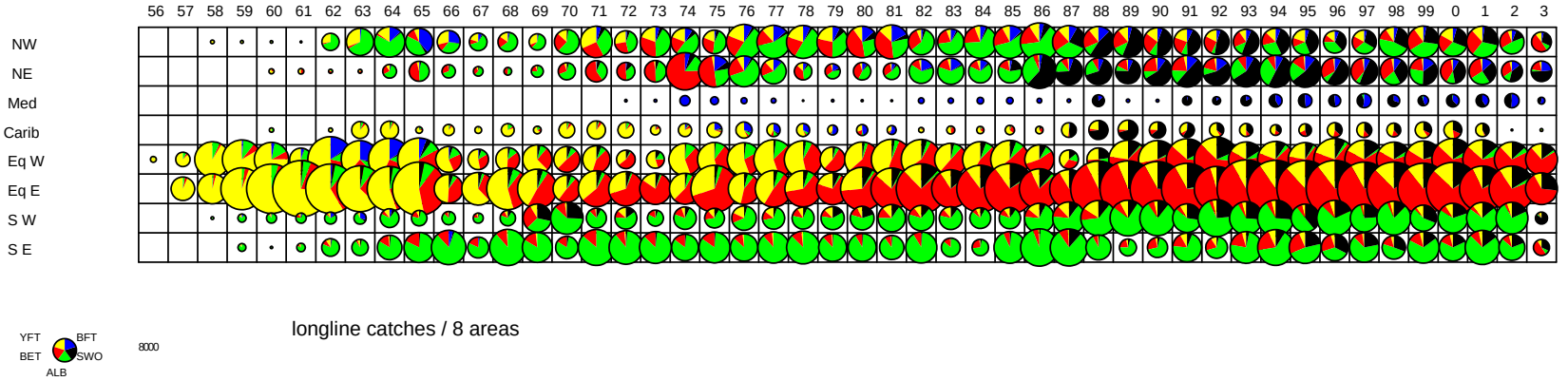

Figure 2. Distribution of longline catches by species area and month for the period

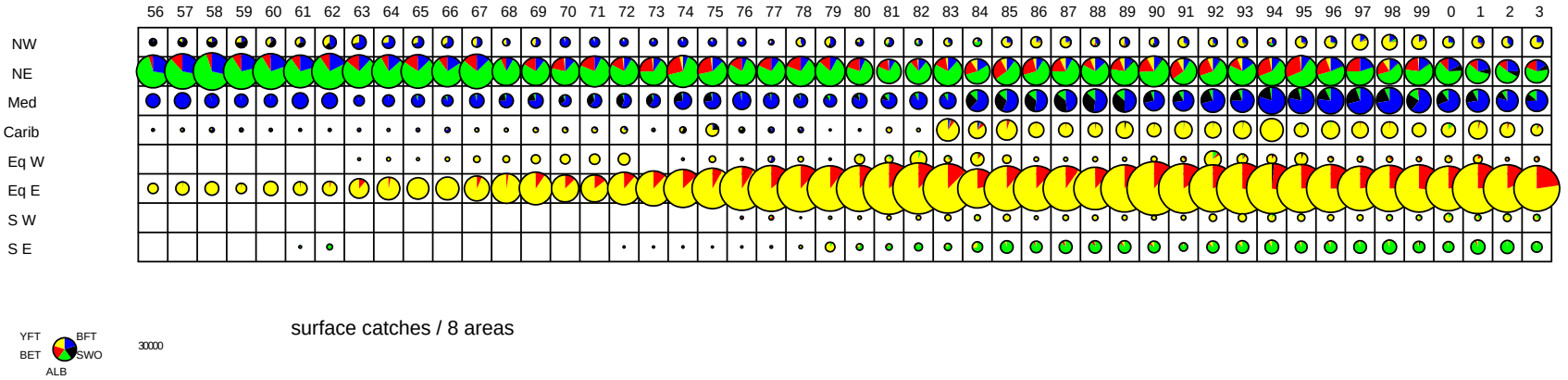

Figure 2. Distribution of longline catches by species area and month for the period

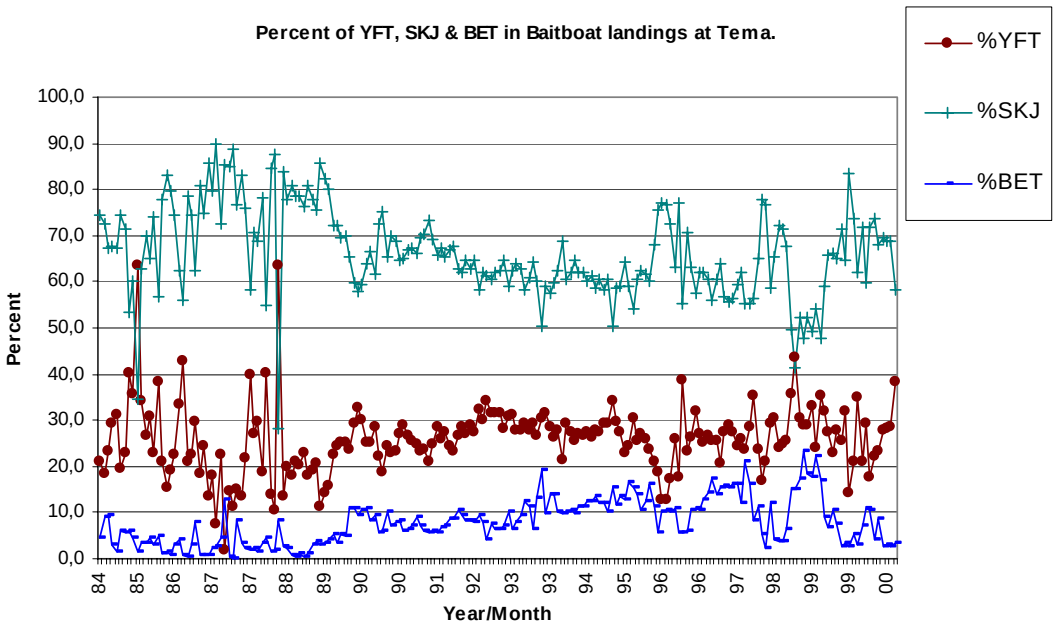

Figure 4. Proportions of yellowfin (YFT), Skipjack (SKJ) and bigeye (BET) in number in the monthly samplings of Ghana baitboats, 1985-2000.

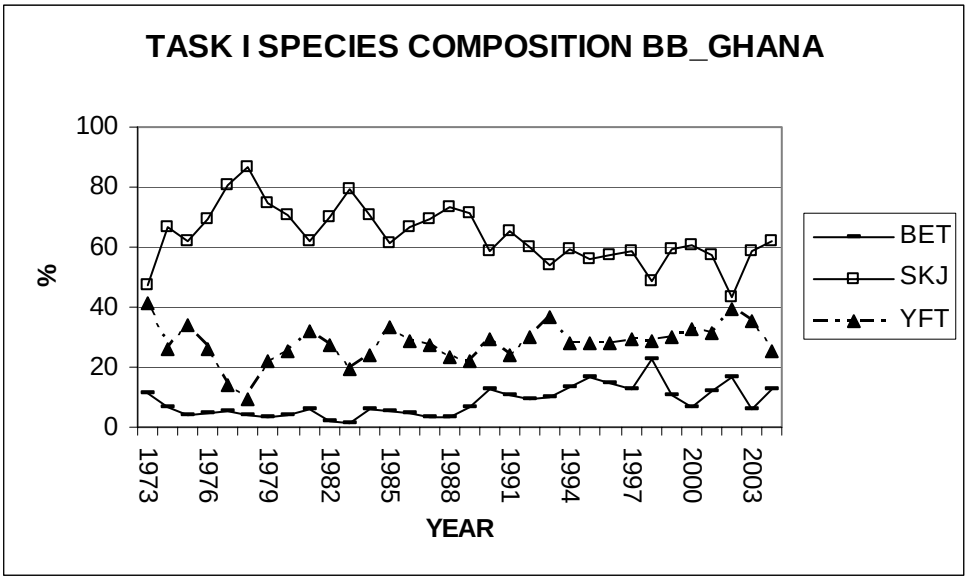

Figure 5. Species composition of the Task I corresponding to the Ghanaian baitboats.

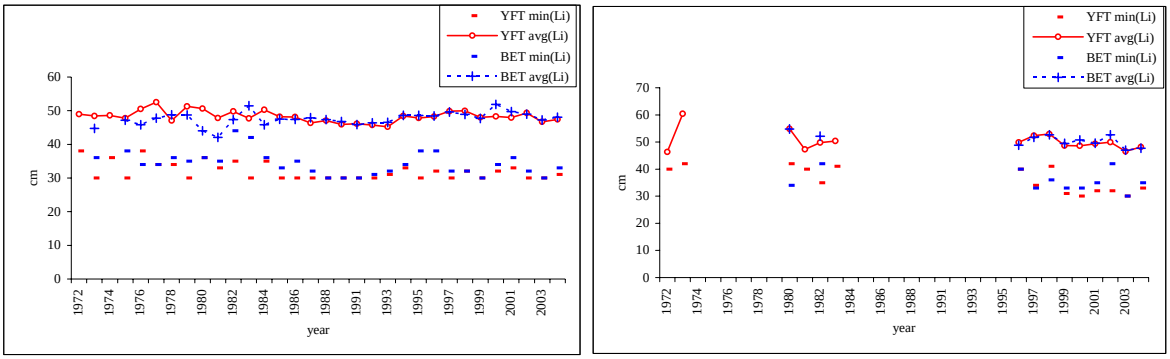

Figure 6. Average yellofin and bigeye size and percentage of fishes less than 65 cm. in the Ghanaian baitboat and purse seine samples.

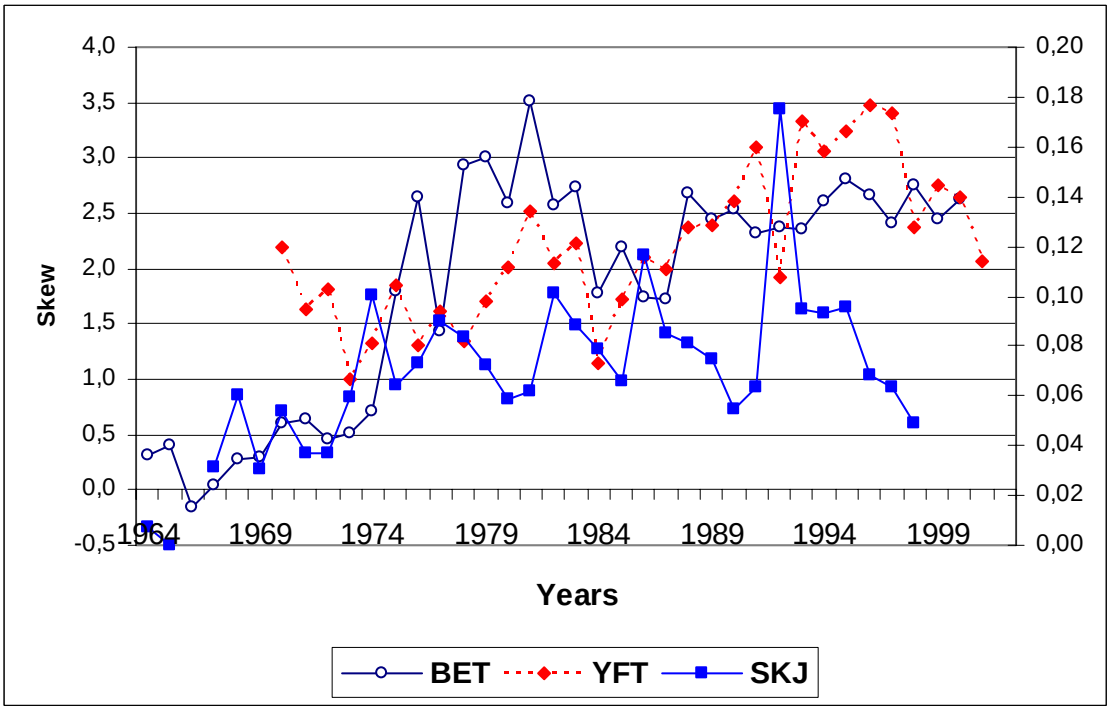

Figure 7. Trends in a "demographic indicator" ("Skew") analyzed during the meeting for yellowfin, skipjack and bigeye. This indicator is assumed to reflect an overall increase in fishing mortality.

Appendix 1

AGENDA

1. Opening, adoption of agenda and meeting arrangements
2. Update of basic information
   2.1 Task I (catches)
   2.2 Task II (catch-effort and size samples)
   2.3 Ghana statistics
   2.4 Review of Enhanced Data Collection Activities Pertinent to Tropical Species
   2.5 Shifting Baselines?
3. Review of fishery indicators
4. Review of biological parameters
5. Review of time/area disaggregated models (e.g., MULTIFAN)
6. Evaluation of alternative management measures
7. Uncertainties related to the multi-specific nature of surface fisheries
8. Recommendations
9. Other matters
10. Report adoption and closure

Appendix 2

LIST OF PARTICIPANTS

CONTRACTING PARTIES

European Community

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Pallarés, Pilar
Palma, Carlos

Appendix 3

LIST OF DOCUMENTS

SCRS/2006/044 Note upon the period used to run the SCRS Sequential Population Analysis on tropical tunas. FONTENEAU, A.

SCRS/2006/045 Note upon the historical standardised fishing efforts in the FIS and French purse seiners task2 statistics that have been routinely submitted to ICCAT secretariat during the 1969-1997 period. FONTENEAU, A.

Appendix 4

PRELIMINARY ANALYSIS OF TASK 1 CATCH DATA FOR TROPICAL TUNAS

1. Methods

The standardized residuals were calculated using equation 1,

$$\text{Std Residual} = \frac{(X - \mu)}{SD} \qquad (1)$$

where X is the annual catch (metric tons), μ is the average catch and SD is the standard deviation of the annual catch series. Annual catch values equal to zero were excluded from the calculation because zeros can indicate a catch equal to zero, or unreported catch.

Series were chosen for further review if the any annual standardized residual exceeded ±3.0 (indicating a value 3 times greater/less than the mean) and the maximum annual catch was greater than 500 metric tons.

23. Results and Discussion

3.12.1 BIGEYE TUNA

To examine trends and identify potential reporting problems in the TASK 1 catch data, the working group reviewed plots of annual catch series and their standardized residuals. Task 1 catch series of bigeye tuna were initially examined by FLAG, FLEET, AREA and GEARCODE. After the initial results were examined, the group recommended that some catch series be combined due to discontinuous codes used to designate fleet, gear or fishing area. This initial examination led to the following recommendationsThe following combinations were recommended by the working group:

1) Combine the catch series of Brazil SW LL and Brazil SW LLHB
2) Combine the all northern Atlantic catches from the Chinese Taipei LLFB fleet.
3) Combine southern Atlantic catches from the EC-España LLHB fleets.

4) Combine the ETRO and SE regions for the Ghana baitboat fleet. Also, combine BB and BBF designations because this fleet code was not used consistently throughout the time period. .
5) Combine northern and southern Atlantic catches for the Panama LLFB fleet.
6) Combine all north Atlantic catches for the Libyan longline fleet.

After these recommendations were implemented, 36 catch series included annual standardized deviations residuals more extreme than ±3.0. These are summarized in Figure 1. In most cases, the working group attributed these deviations to natural variability, or rapid changes in the actual reported catches. Yet the working group felt that some catches series were unusual or problematic, and recommended verification of the catch levels. The comments and recommendations of the group are summarized below.

Specific recommendations are highlighted with a gray background.

1) **SW Brasil LL + LLHB:** verify the anomalous high 2003 and 2004 catches.

2) **SW Brasil SURF:** the catches were much higher than average during the initial years. However, the total catches are modest. No recommendations were made regarding this catch series.
3)
4) **N Chinese Taipei LLFB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
5) **SE Chinese Taipei LLFB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
6) **NORT Cuba LL:** the group was not able to comment on this catch series due to a lack of information regarding the fishery.
7) **ETRO EC.España BB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
8) **ETRO EC.España PS:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
9) **CANA EC.España BB:** the high catch (>9000 mt) reported in 1994 was examined and found to be accurate.

10) **NE EC.España BB:** the group recommends that unreported catches during 1987-1997 be investigated. It is likely that they were reported using a different region code (i.e. Canary Islands or NE).

11) **NE EC.España LLHB:** verify the high 1975-1977 catches.

12) **S EC.España LLHB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
13) **ETRO EC.France BB:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
14) **ETRO EC.France PS:** the group noted that the total landings of tropical tunas were higher than average during the mid-1990s, and that the proportion of BET was higher than usual during the same period. No recommendations were made regarding this catch series.
15) **AZOR EC.Portugal BB:** the group noted the high variability of the catch series, but felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
16) **MDRA EC.Portugal BB:** the group noted the high variability of the catch series, but felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
17) **SE EC.Portugal BB:** the group noted the high catch in 2003 but felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
18) **SE+ETRO Ghana BB+BBF:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
19) **SE Ghana PS:** the group noted the lack of reported data 1987-1997 and agreed that fishing may have been discontinuous. No recommendations were made.
20) **SE Japan BBF:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.
21) **SE Japan PSG:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.

22) **NORT Korea LLFB:** the group noted the discontinuity in the catch data, and felt that the catch trend was appropriate given the history of the fishery (no vessels during the discontinuity). Therefore, no recommendations were made.
23) **ATL-Korea-BBF:** the group noted that Korean vessels reported under the flag of Ghana after the mid-1980s. No recommendations were made regarding this catch series.

24) **ATL-Libya-LL:** verify catch series and determine whether the carry-over from 1994-2000 was appropriate.

25) **ETRO Panama PS:** verify rapid changes in reported catches.

26) **ATL-Panama-LLFB:** verify rapid changes in reported catches.

27) **SE-South Africa-BB:** ask Craig to verify unusually high catches during the late 1980s.

28) **SE U.S.A. PSG:** the group felt that the catch trend was appropriate given the history of the fishery. Therefore, no recommendations were made.

29) **NE-U.S.S.R-LLMB:** determine whether these catches actually occurred. Check corresponding FAO statistics. Decide whether these catches should be excluded for the purpose of stock assessment analysis.

30) **SE-U.S.S.R-LLMB:** determine whether these catches actually occurred. Check corresponding FAO statistics. Decide whether these catches should be excluded for the purpose of stock assessment analysis.

31) **SW Uruguay LLHB:** verify the high catches 1981-1984.

32) **NW-Venezuela-BB:** verify the unusually high reported catches during 1983-1985.

33) **NW-Venezuela-LL:** verify the high catches reported during 1981-1986.

34) **NW-Venezuela-PS:** verify the high catches reported during 1983-1984.
35) **ATL NEI LL:** the group noted the decrease in the catches attributed to N.E.I. This decrease is likely due to a decrease in IUU activity.
36) **ETRO NEI BB:** the group noted the decrease in the catches attributed to N.E.I. due to efforts by ICCAT to classify some NEI catches by flag..
37) **ETRO NEI PS:** the group noted the decrease in the catches attributed to N.E.I. due to efforts by ICCAT to classify some NEI catches by flag.

3.2 YELLOWFIN TUNA

To examine trends and identify potential reporting problems in the TASK 1 catch data for yellowfin tuna, the working group reviewed plots of annual catch series and their standardized residuals (Figure 2). Task I Ccatch series of yellowfin tuna were examined by FLAG, AREA and GEARCODE. (Figure 2). A number of comments relating to each of the plots presented were made by the group:

Specific recommendations are highlighted with a gray background.

1) **ATL NEI LL:** the group noted the decrease in the catches attributed to N.E.I. This decrease is likely due to a decrease in IUU activity.Activity of the NEI fleets has decreased in recent years, as some of those boats have been re-flagged under CP or member flags. Estimates of catch by the NEI fleets is likely to be underestimated.
2) **CANA EC.España BB:** The high variability appears to be quite common in this fishery and other similar ones located at the limit of distribution of the tropical species. Environmental variability seems to greatly affect the spatial distribution and abundance of yellowfin.

3) **ETRO Angola BBI:** This fleet has decreased greatly, although it is not clear whether and at which level is operating in the present day. Perhaps this could be verified.

4) **ETRO Cape Verde BB:** The high variability in catches appears to be partly related to operational difficulties of the fleet. Greater clarification of the catch data from Cape Verde, specially the increase observed on the last few years, is required.

5) **ETRO Chinese Taipei LLFB:** The recent increase in the catch could be related to changes in targeting by this ese fleet.
6) **ETRO EC.España BB:** Catches at the start of the series correspond to a period of exploratory fishing carried out by boats operating in the North Atlantic. Following a petiodperiod without BB activity, a new fleet was built, and thetherefore the increase yin the 1985-2004 period likely reflects the development of this fishery.
7) **ETRO EC.España PS:** The group considered this plot to reflect the known dynamics of the fishery. The initial build up of the fishery, followed by the development of the FAD fishery, has given way to a decrease in the overall effort deployed by this fleet.
8) **ETRO EC.France PS:** The drop and recovery of catches is related to the displacement of this fleet to other fishing areas (Indian Ocean), and their later retiurnreturn to the Atlantic.
9) **ETRO Ghana PS:** The initial years of this fishery were followed by a period of inactivity. Catches have increased steeply over the last few years, driving up the average of the whole series. The difference between the two periods of activity could be related with sampling in species composition.
10) **ETRO Japan BBF:** Some unusually high catches were recorded in the past, but this fleet is not operating anymore.
11) **ETRO Korea LLFB:** This fleet has moved out of the Atlantic in recent years.
12) **GOFM U.S.A. LL:** The initial increase in catches was related to the fleet and crews gaining experience in this area, while the later decrease was motivated by the movement to other fishing areas.
13) **MDRA EC.Portugal BB:** The high variability appears to be quite common in this fishery and other similar ones located at the limit of distribution of the tropical species. Environmental variability seems to greatly affect the spatial distribution and abundance of yellowfin.
14) Same as above for CANA EC.España BB.
15) **NW U.S.A. LL:** The pattern observed appears to be consistent with the development of a new fishery.

16) **SW Brasil BB:** The yearly changes in the later period for this fleet were considered by the group to deserve further investigation.

17) **SW Brasil LL:** The group would like further clarification on the actual catches and activity of this fleet. A complete time series would be most useful for understanding the very recent surge in catches.

18) **WTRO Cuba LL:** Recent activity of this fleet has not been reported to ICCAT. New information should be gathered.

19) **WTRO Japan LLHB:** The patterns are generally as expected, although some gear changes might be behind some sudden changes.

20) **WTRO Venezuela LL:** The high catches at the begginingbeginning of the fishery are likely to reflect the existnceexistence of a fishery previous to the first reported datapointsdata points. The group recommends that these high catches be verified.

21) **WTRO Venezuela PS:** Yearly fluctuations in this fleet seems to be related to chzngeschanges in targeting (SKJ to YFT) and overall variability in the area. The group recommends that these high catches be verified.

3.3 SKIPJACK TUNA

To examine trends and identify potential reporting problems in the TASK 1 catch data for skipjack tuna, the working group reviewed plots of annual catch series and their standardized residuals (Figure 3).

Specific recommendations are highlighted with a gray background.

1) Canary Islands Baitboat: The analysis of the skipjack catches (Figure 3) for the Canarian baitboats shows some large fluctuations over time (sometime larger than a factor 2). These fluctuations may reflect changes in accessibility of skipjack due to environmental factors, bearing in mind the location of these islands with respect to the central distribution of this species.
2) Spanish Purse Seine: The general pattern observed for the skipjack catches reported for the Spanish purse seiners depicts the increase in fishing effort until 1992 followed by a dramatic decrease in the last decade.

3) French Purse Seine: These The pattern of the catch by French patterns can also be observed for the French purse seiners is similar to the Spanish purse seiene, but in this case with a steady decrease in the mid-eighties. The variability of the catch between successive years is relatively large for the French baitboats operating from Dakar (Senegal). The series shows a decreasing trend since 1968 when the maximum of catch was reached.

4) Venezuelan Baitboat: The strange pattern observed for the Venezuelan bait boats (no intermediate catches between the beginning of the fishery and a maximum at about 3,000 t occurring in the first year) was discussed by the Working Group. It was suggested that the ICCAT secretariat check the data base in order to verify this point.

5) Venezuelan Purse Seine: In contrast the large fluctuations observed for the Venezuelan purse seiners can easily be explained by the history of this fishery and are specifically related with the partial reallocation of the fishing effort of this fleet in the eastern Pacific Ocean.

6) Brazilian Baitboat: In the absence of participation of Brazilian scientist in this working group it was not possible to provide more information on the trend and the variability of the catch reported by the Brazilian baitboats. Nevertheless no anomaly was detected for this time series.

7) Portuguese Baitboat: As seen for the Canarian baitboat fishery, the catches reported by the Portuguese baitboats show short-term fluctuations. Environmental factors and the northern location of this fishery may be an explanation of this pattern.

8) Other Catch Series: The general patterns observed for the Japanese, Cuban and USA fleets seem to be in agreement with the history of these fisheries.

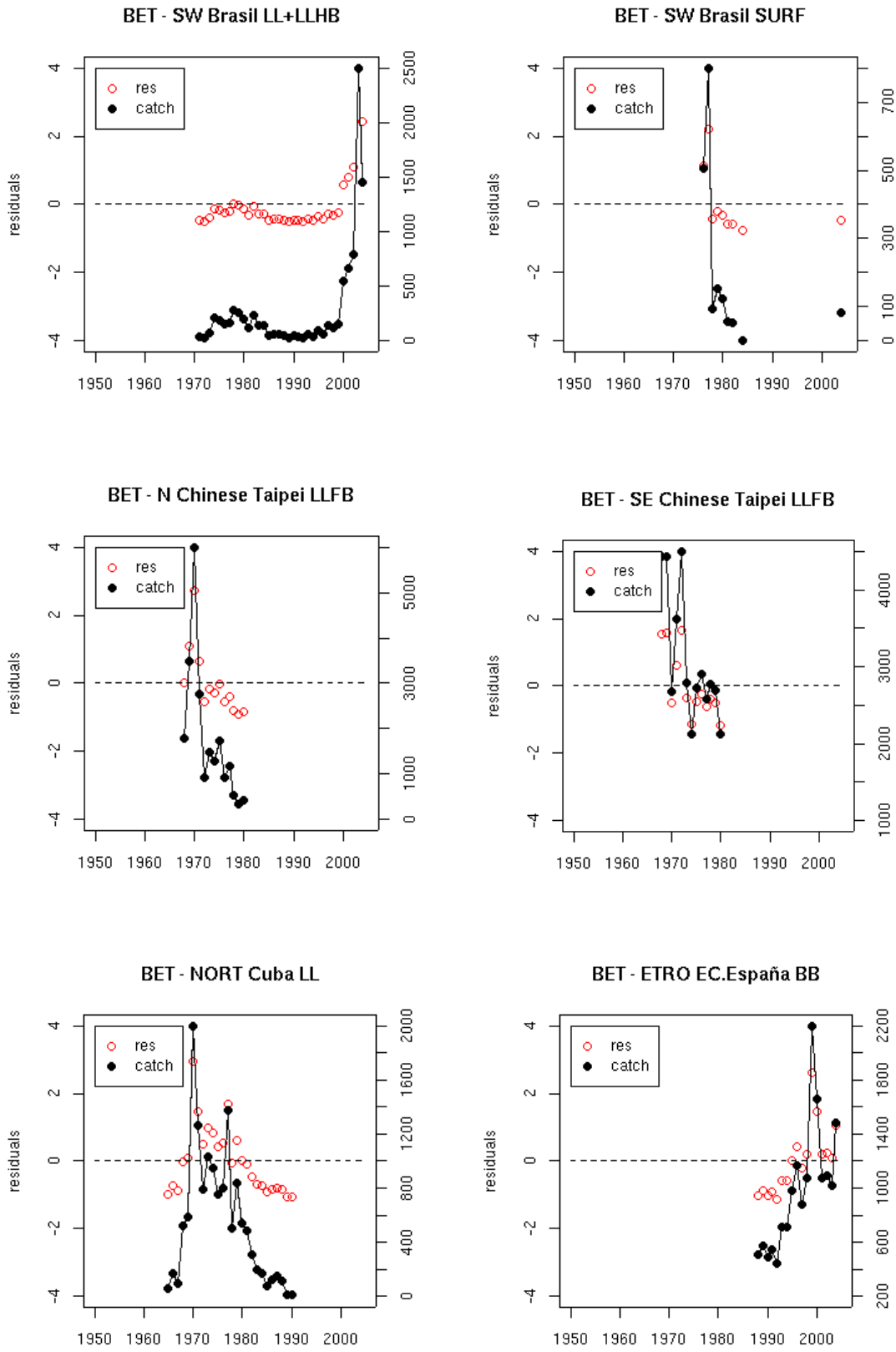

Figure 1. The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

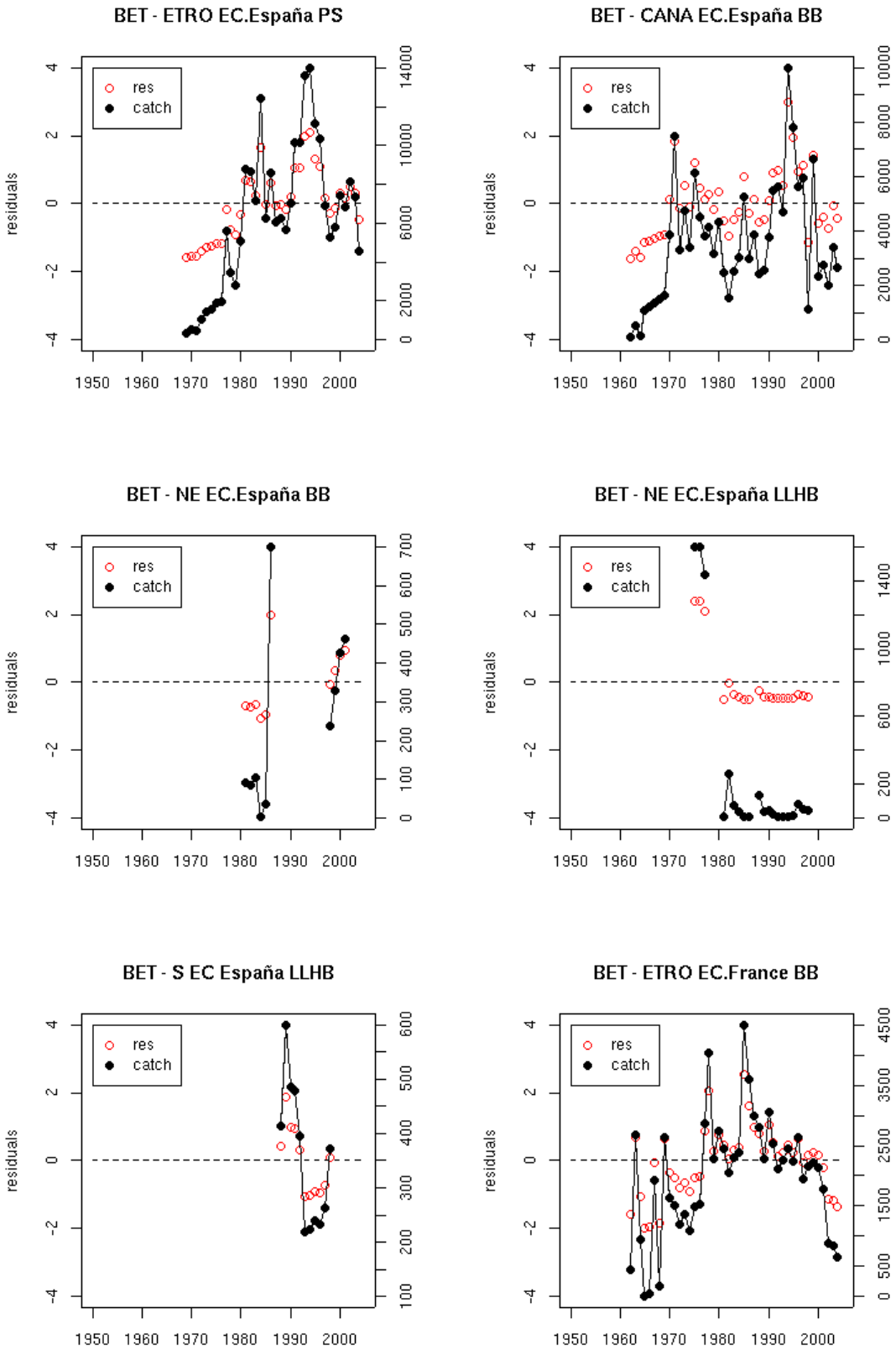

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

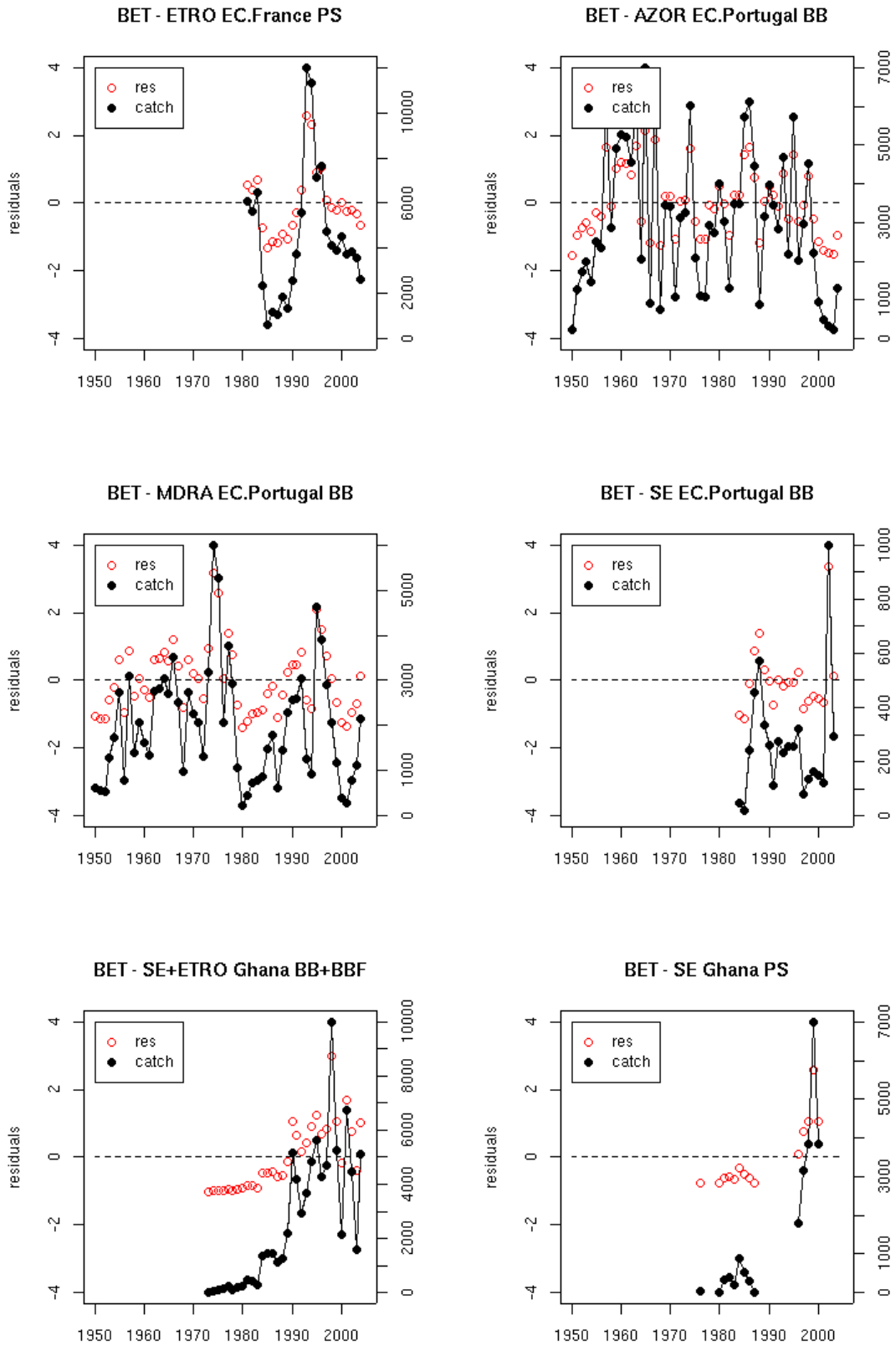

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

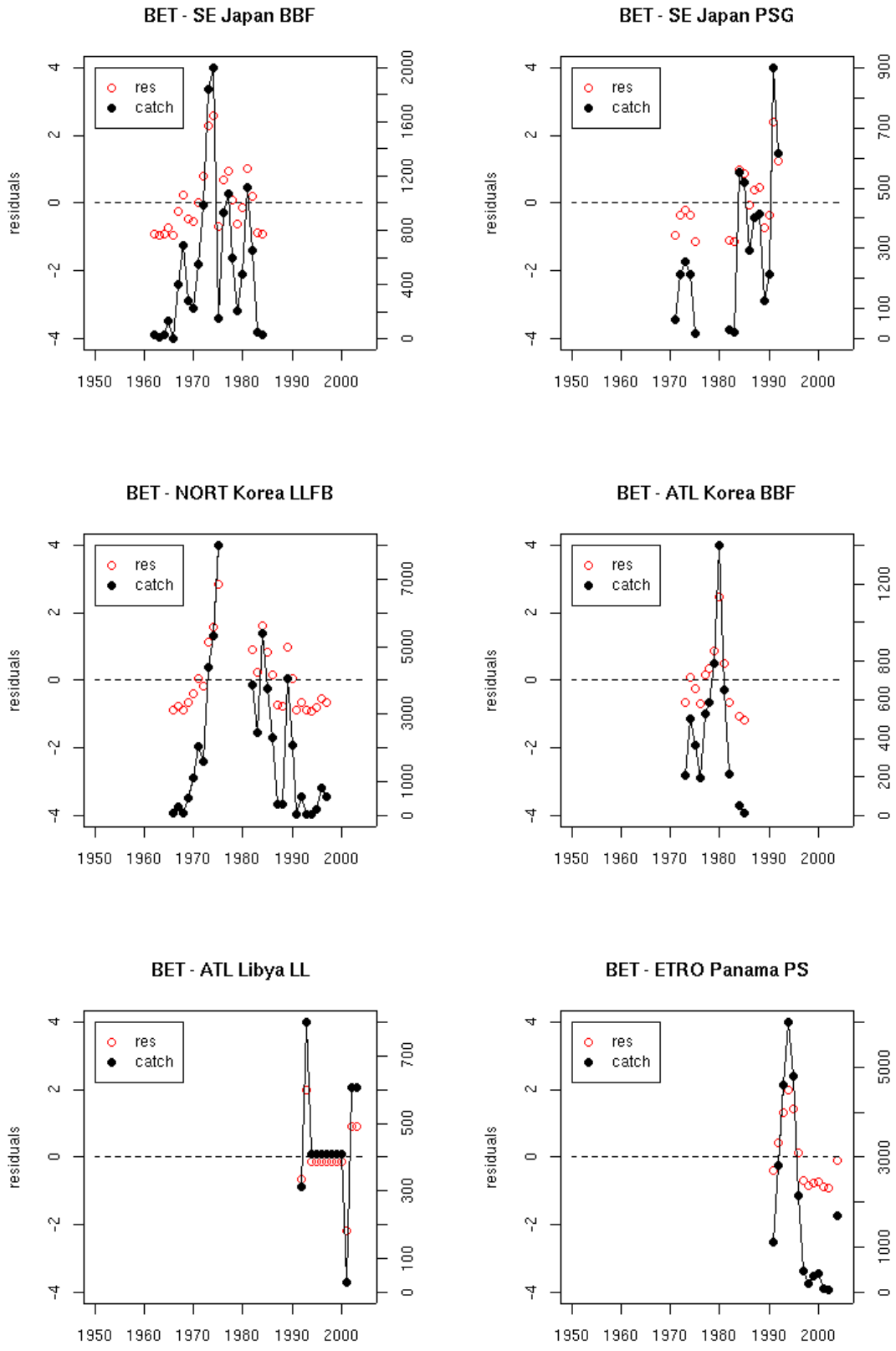

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

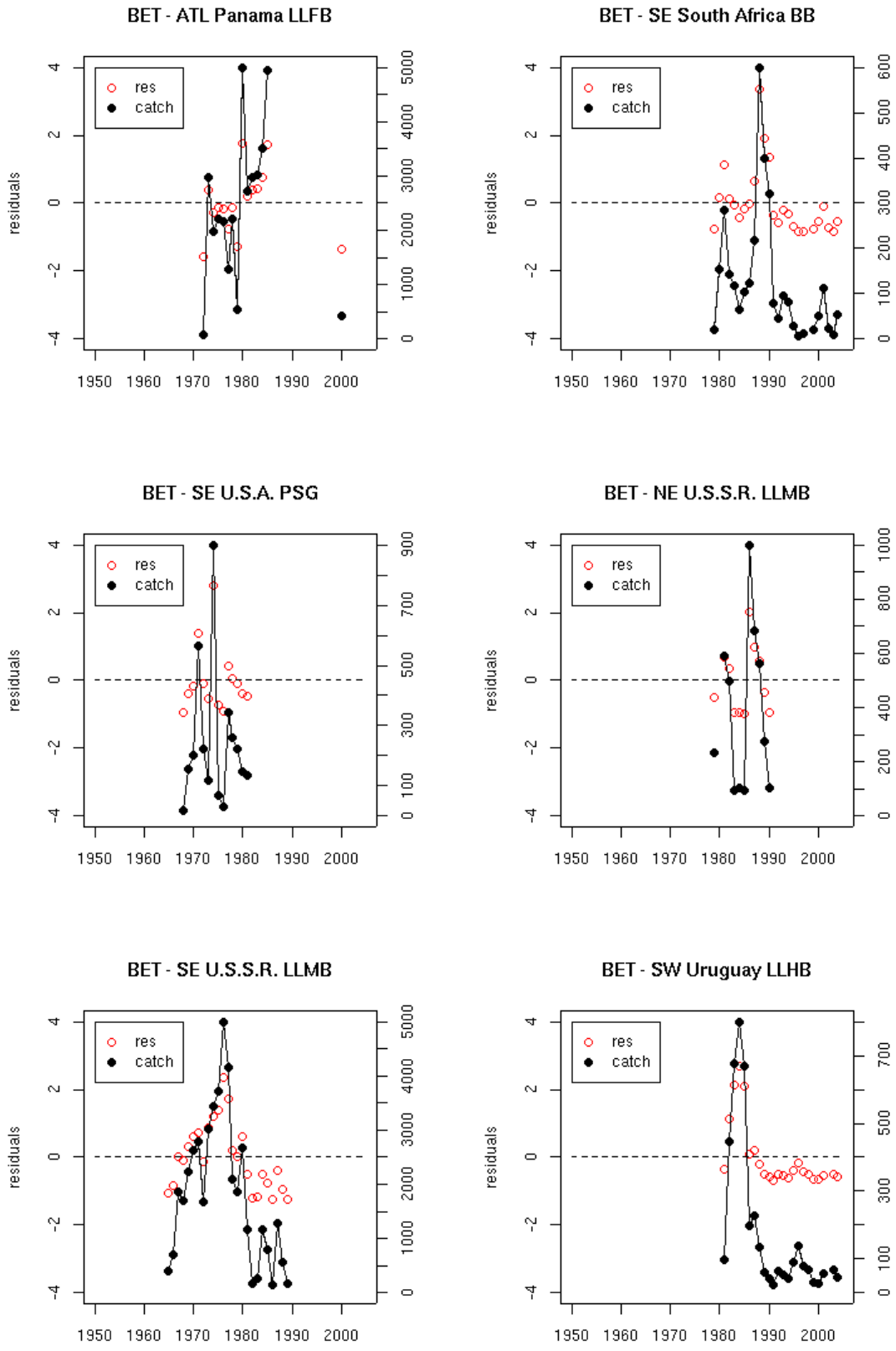

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

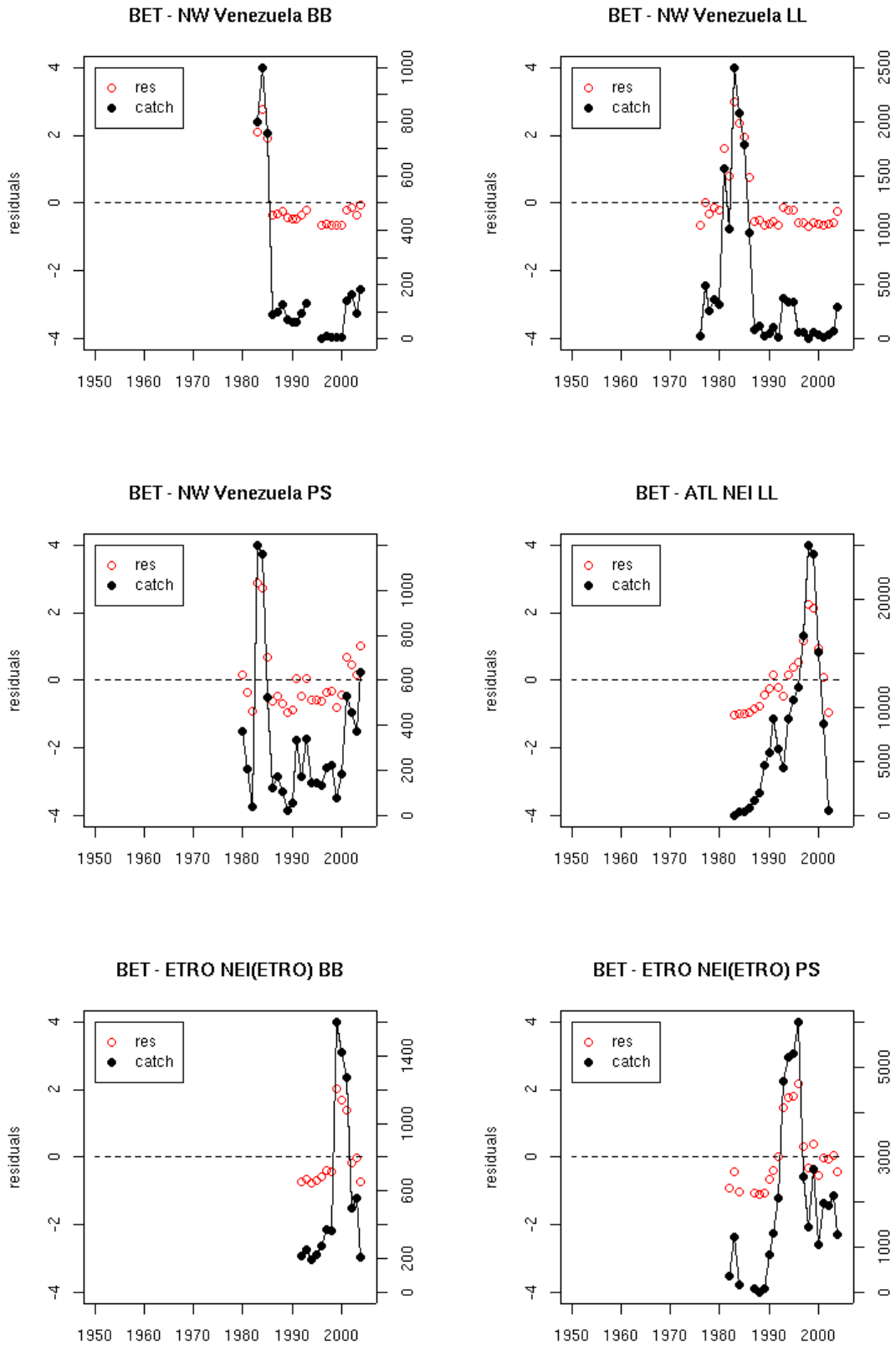

Figure 1 (continued) The annual catch (mt) and standardized residuals for bigeye tuna by region, flag, fleet and gear.

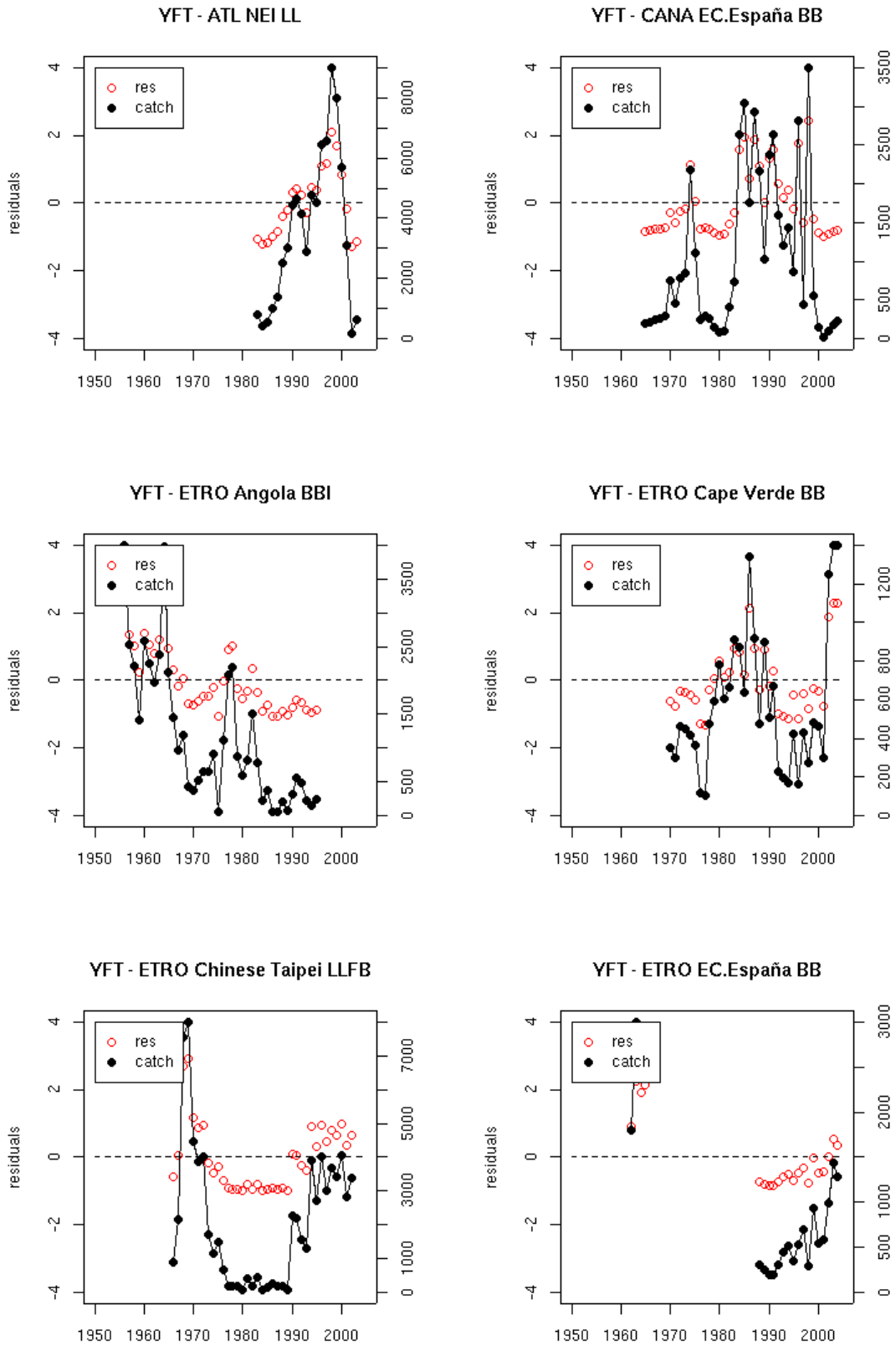

Figure 2. The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

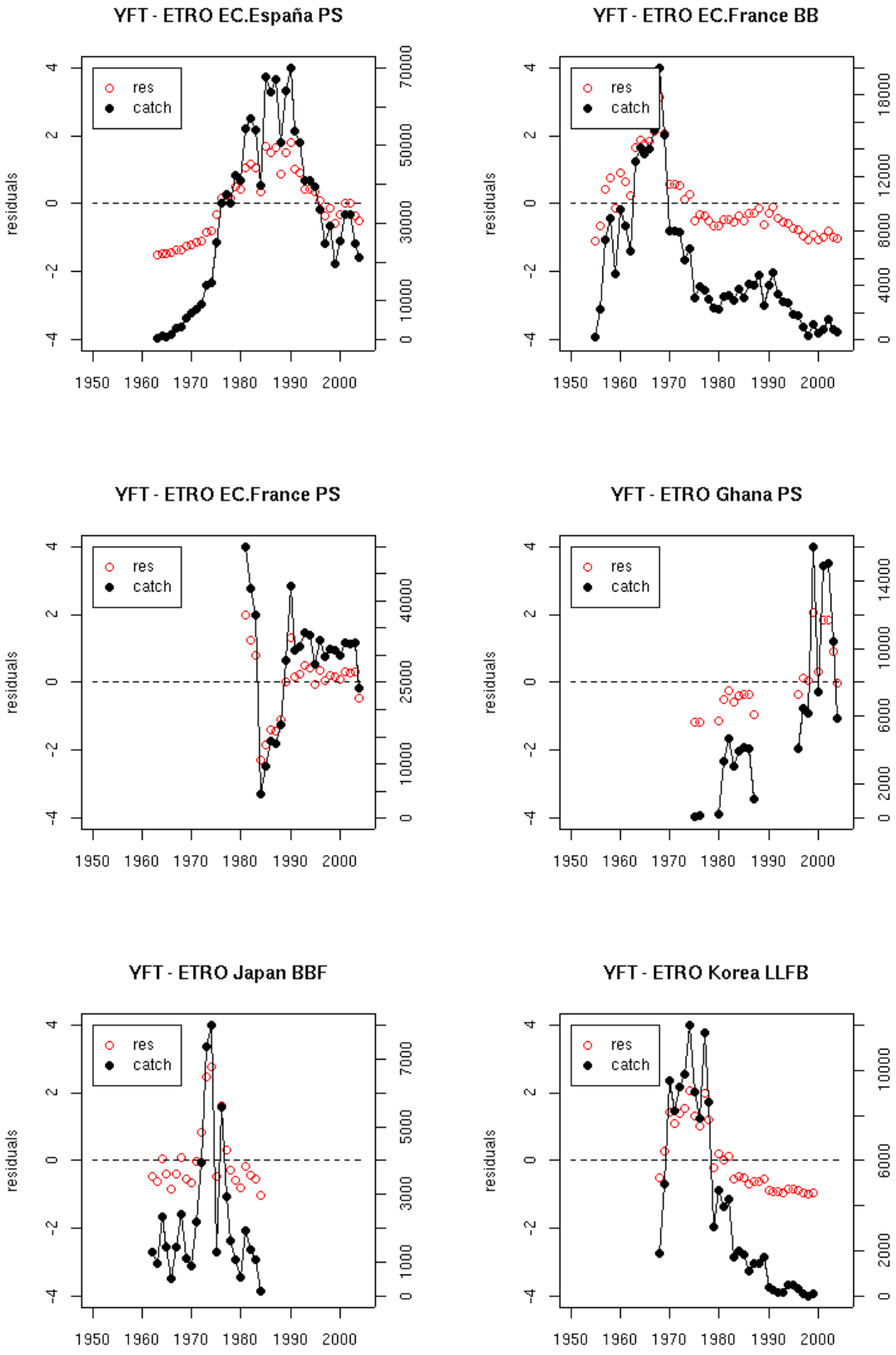

Figure 2 (continued). The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

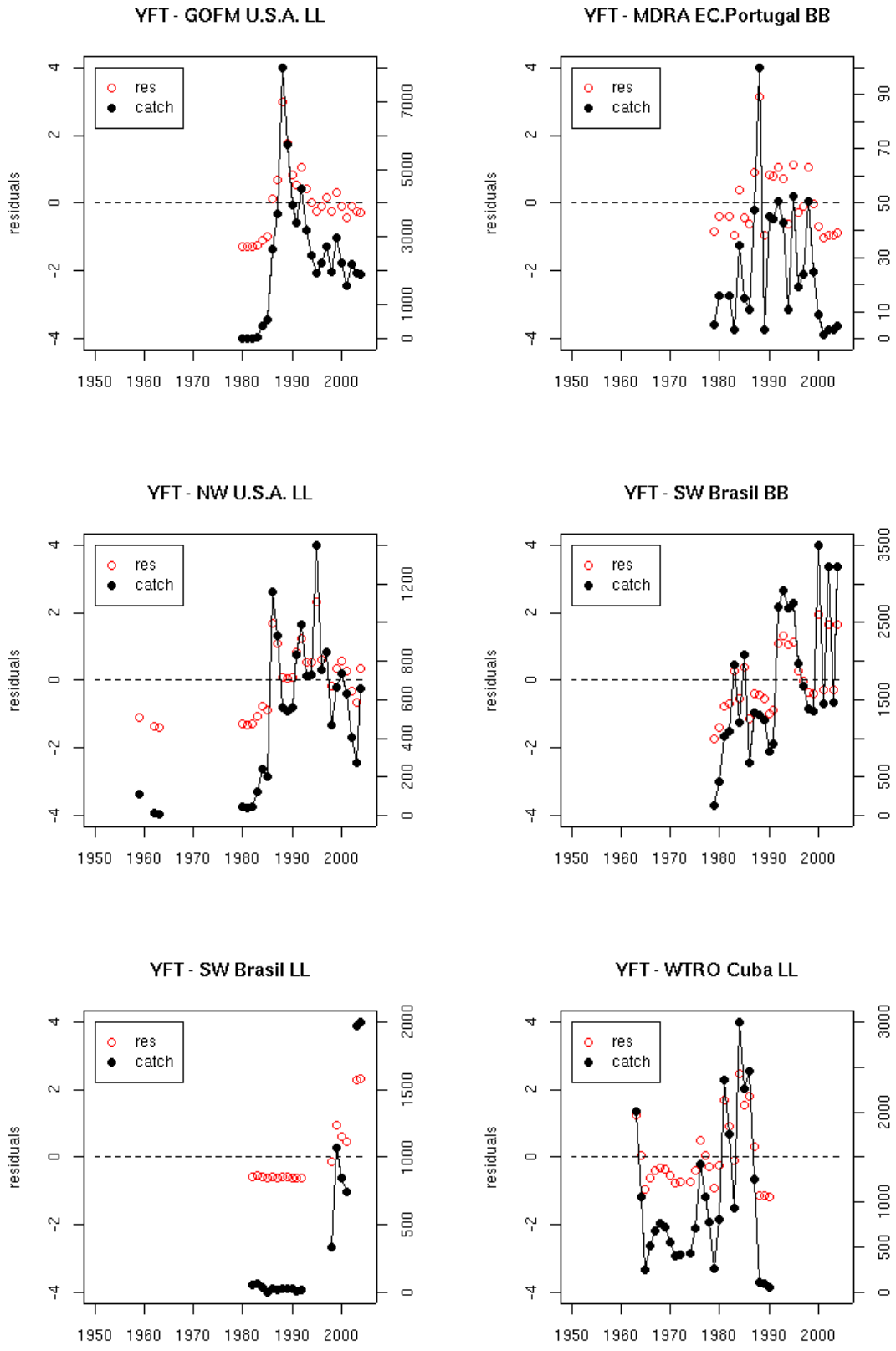

Figure 2 (continued). The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

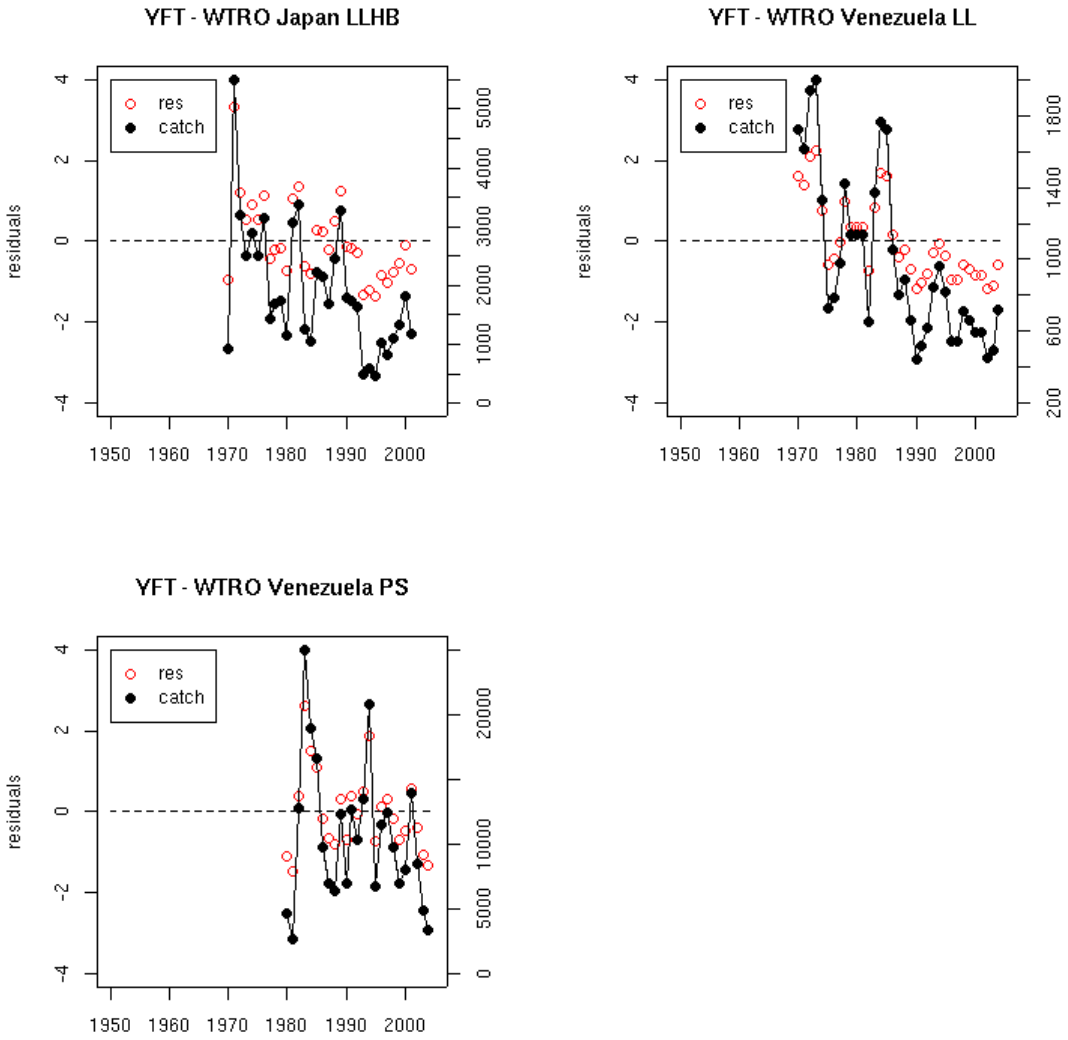

Figure 2 (continued). The annual catch (mt) and standardized residuals for yellowfin tuna by region, flag, fleet and gear.

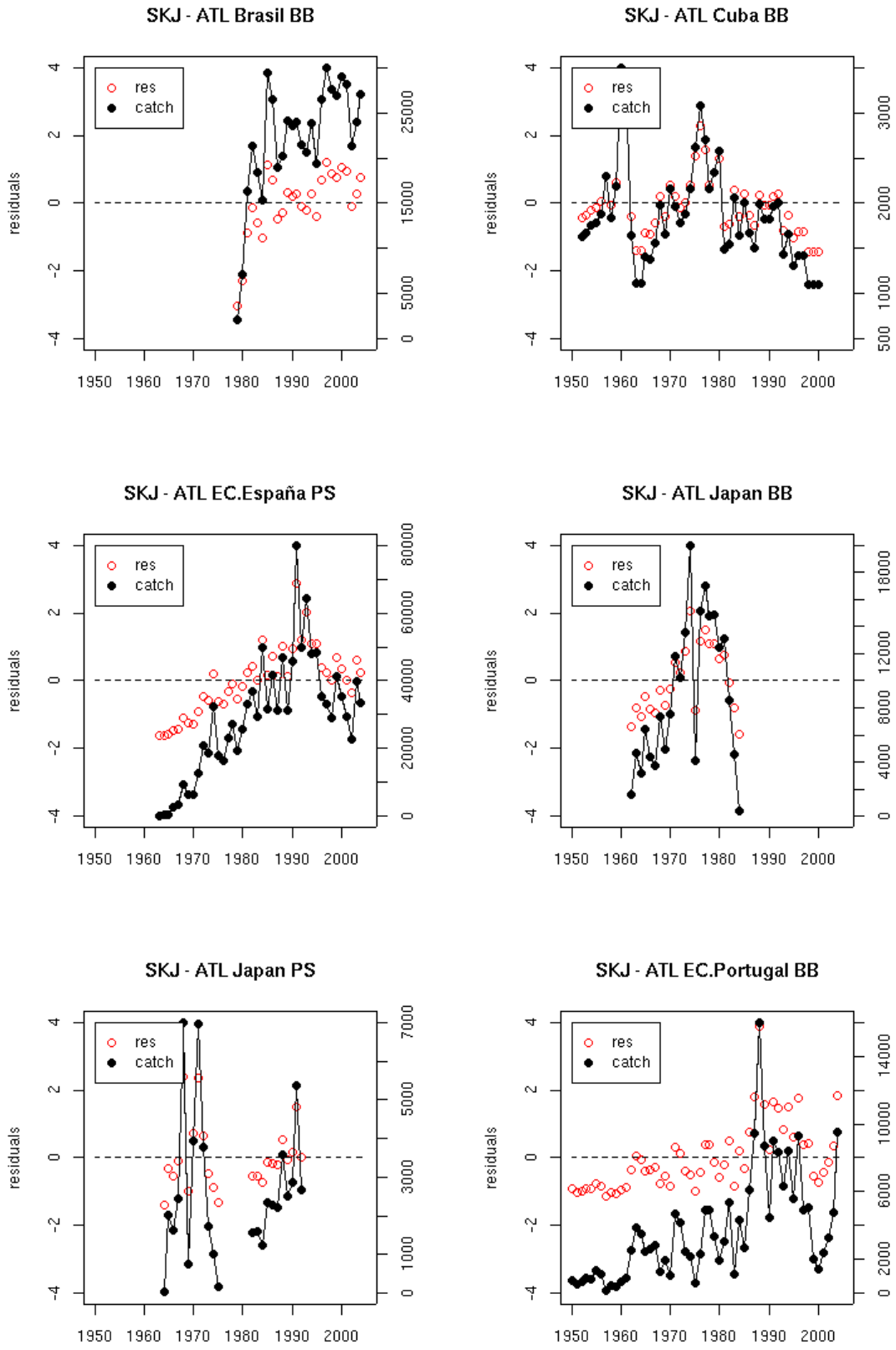

Figure 3. The annual catch (mt) and standardized residuals for skipjack tuna by region, flag and gear.

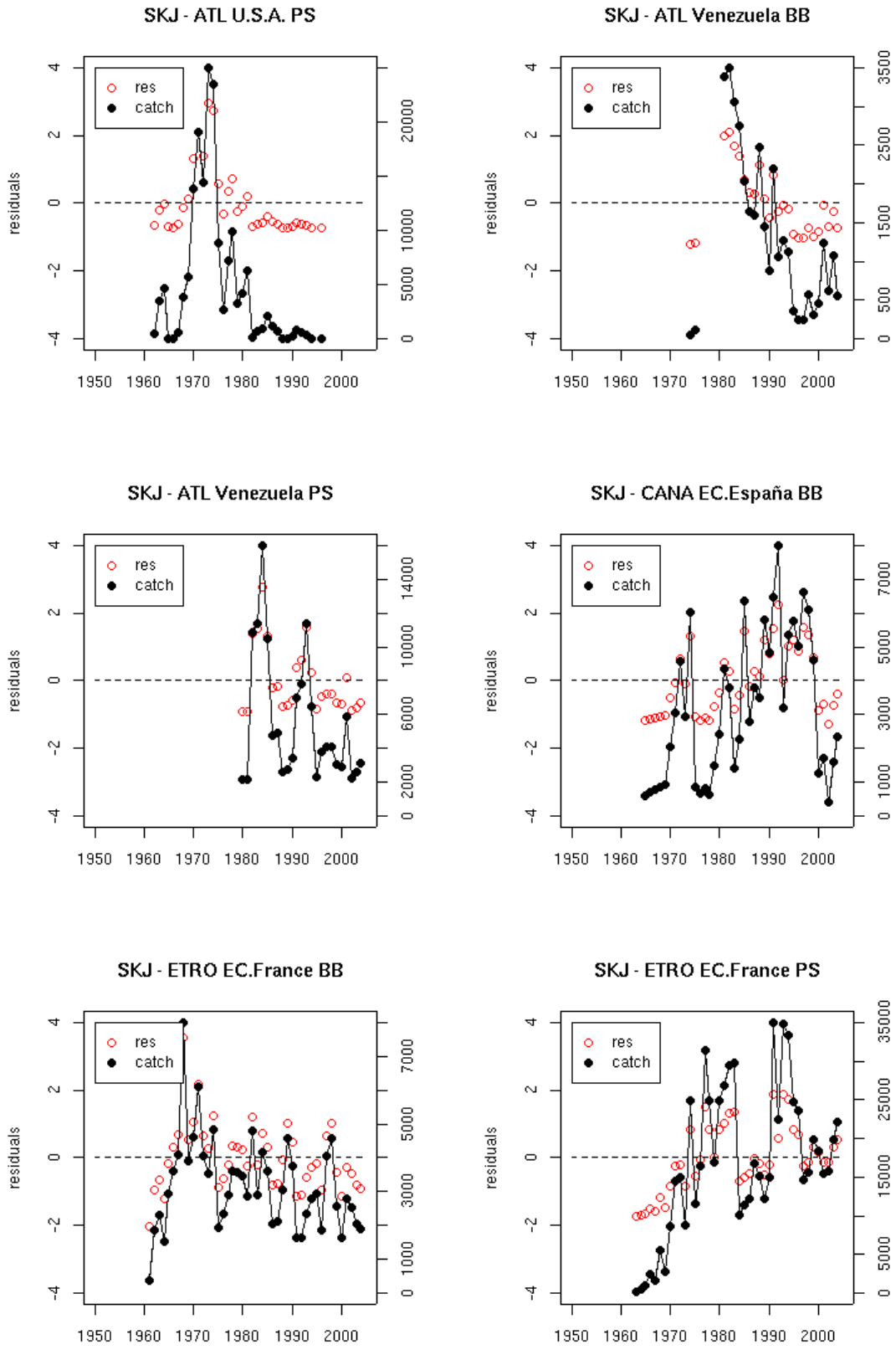

Figure 3 (continued). The annual catch (mt) and standardized residuals for skipjack tuna by region, flag and gear.