出國報告（出國類別：其他）

參加大西洋鮪類資源保育委員會(ICCAT) 2005 年研究暨統計常設委員會(SCRS) 魚種小組會議出國報告

服務機關：行政院農業委員會漁業署
姓名職稱：張水鍇 / 科長、王勝平 / 替代役
派赴國家：西班牙馬德里
出國期間：中華民國 94 年 9 月 24 日至 10 月 3 日
報告日期：中華民國 94 年 11 月 24 日

摘　要

一、　完整資料為資源評估之基礎，本次會議強調資料必須如期提供，但同意彈性上，若當年沒有資源評估會議，仍可延遲至會議一週前，若有，則最晚必須於會議兩週前提供。

二、　有關大西洋長鰭鮪資源，因為台灣、巴西與南非之大西洋長鰭鮪產量皆有減少，對資源之壓力減輕不少，因此本屆會議中對此魚種之管理建言相較過去而言軟化不少。

三、　有關劍旗魚資源，決議劍旗魚資源評估必須於 2006 年 9 月前完成。為此，各國資料依規定必須於明年 7 月 31 日前提送至 ICCAT，最晚必須在 2006 年 8 月 23 日前提送，任何於最後期限之後提送之資料將不會被採用於資源評估中。

四、　有關大會要求卸魚鯊魚鰭之比例不得超過 5%的問題，會中共識這個「比例」之定義相當含糊，會有以下之問題：不同種之比例差異大（我觀察員資料證實如此）、不同割鰭方式、不同乾燥程度、是相對於全魚重或處理後重（又處理型式如何）等等之魚鰭比例都會明顯不同，因此這些項目都必須請大會定義清楚，並希望各國能加強研究釐清。

目　次

壹、目的

大西洋鮪類資源保育委員會（ICCAT）為保護大西洋鮪類資源而於 1969 年成立之區域性國際組織,在該組織下設有秘書處、按海域魚種劃分成之四任務小組(Panel 1 至 Panel 4)、及研究暨統計常設委員會（Standing Committee on Research and Statistics，SCRS）、財政常設委員會（Standing Committee on Finance and Administration，STACFAD）、紀律委員會（Committee on Conservation and Management Measures, or Compliance Committee)、以及永續推動小組（Permanent Working Group for the Improvement of ICCAT Statistics and Conservation Measures，PWG）等小組委員會，共同推動會務。其中研究暨統計常設委員會（SCRS）負責漁獲統計及資源評估等事宜，其運作係由各魚種工作小組（熱帶鮪類（大目鮪、黃鰭鮪、正鰹)、長鰭鮪、旗魚類、劍旗魚、黑鮪等小組）之科學家進行資源評估，將評估結果提交全席會議討論作成管理建議後，再提交大會參考，俾作成最後之管理決議，供各會員國遵守，以落實大西洋區鮪類漁業資源之管理。

ICCAT 每年均邀請我國以觀察員身份參加相關會議。我國對該組織召開之會議均依其必要性分別派員參加，以在相關會議中維護我國漁業權益。本年度之研究暨統計常設委員會，我國乃洽請學者專家及本署人員參加。本報告為本署人員參加其中第一週之統計、劍旗魚、旗魚、混獲等工作小組之會議情況，及同期間其他小組之概略情況。

貳、會議時地、代表

本屆 SCRS 會議分為兩週（九月二十六日至十月七日）於西班牙馬德里召開，第一週為各魚種小組會議，由台大許建宗、葉顯樞教授、及漁業署遠洋漁業組資源評

估科張水鍇科長、王勝平博士代表參加。第二週為 SCRS 全席會議，由葉教授代表參加。漁業署代表僅參加第一週之數個魚種小組會議（九月二十六日至九月三十日），會議區分為統計、長鰭鮪、熱帶鮪類、劍旗魚、黑鮪、旗魚等小組進行討論。出席者包括我國、日本、美國、西班牙、葡萄牙、法國、南非、加拿大、義大利、塞內加爾等各國代表。

參、工作紀要

- 九月二十六日至九月二十七日

一、 統計小組會議

（一） 統計小組會議主席改由新到職之 ICCAT Publish Officer （原西班牙首席科學家、IOTC 熱帶鮪類小組主席）主持，共有 42 人參加此小組會議。

（二） 對於會議議程，我代表首先要求澄清疑點，通過後開始依議程由秘書處報告各國 TASK I&II 資料提報情形。其中討論最多者資料提供時程，今年有 19 個國家沒有交任何資料，因此秘書處及部分國家認為應延後提交時限（包括 TASK I），以求週全，但許多國家反對，以避免惰性。我方亦針對我國資料處理系統表達立場及建議彈性作法，美方同意各國統計系統不同，應具彈性，且提醒大部分資源評估都不急著使用前一年的資料。最後結論，仍維持現行資料提供時限，但若當年沒有資源評估會議，仍可延遲至會議一週前，若有，則最晚必須於會議兩週前提供。

（三） 在秘書處所作的表中，我國今年僅提供 2004 年的 TASK I 資料。此為我國在三大洋同樣會有的問題，但現其他組織都已要求我國提早送資料，因此我國統計系統需要作一些調整，以符合需求。

（四） 有關歷史資料修正，秘書處報告共有日、委、烏克蘭、南非等四國有修正，並要求說明。日本首先澄清 2002-2004 年（3 年）資料本來就可以修正，不需要說明，另其 2000-01 年資料修正只是小幅度（因發現作業報表有差距）。南非則專撰一文說明其修正 1997-03 年資料理由（主要係還原原先提報之處理後重量）。我方則另說明我國將會重送全系列大西洋南方黑鮪產量，以與 CCSBT 資料庫相符，主席表示理解並歡迎資料的改善。

（五） 秘書處接續說明曾正式去函各國，請驗證各國資料並提出結果，但只有法國（Alain）有回應，法國並列出多項資料錯誤之處，其中第一項為 ICCAT 資料庫中台灣 1968-1978 年資料重複。由於此為 ICCAT 資料庫管理者問題（歷史問題），且各國皆無意回應其所提出之問題，因此我方亦未回應。

（六） 接續議程討論鯊魚統計資料，秘書處表示資料非常少，美國混獲小組主席表示因各國很少有分種資料，因此不會這麼快有資料。日本則要求說明去年混獲小組會議決議檢視西班牙鉅量鯊量產量疑義之進度，美方表示尚未有進展，但已著手從香港鯊魚鰭市場量調查各國產量。會中討論到鯊魚全長、尾叉長、體長/體重還原之困難，我方表示目前有請觀察員蒐集一些資料，未來可以提供一些參考，主席表示歡迎。

（七） 接續討論產證提供問題，我方請求釐清報告附表中我國產證提供之疑義，日本表示該表僅表示進口國所發出之產證，因此雖然我國黑鮪產證很早即開始，但表中只呈現我方自 2003 年始進口並提供給 ICCAT，之前都是由日本提供。日方另強烈質疑歐盟進口相當大量的黑鮪，為何僅 2001 年提供產證。主席及法國表示不清楚，要去問布魯塞爾總部。

（八） 秘書處說明至今沒有國家依決議案提供混獲資料。美國建議 ICCAT 支持進行混獲資料蒐集之相關協調經費。日本表示應先決定那些物種要提報，按公約海鳥、海龜並不是「魚」，不在公約規範中。此項將由混獲小組決定。

（九） 到統計改善議程，主席表示歡迎各國在統計改善上的努力，並請我國先報告進展。我代表說明我國持續在加強資料品質的改善，今年特別是在 fishery-independent 資料的蒐集上，包括港口採樣（已出發至開普頓）、觀察員計畫（近兩年增加人數及觀察天數）、VMS（供估計作業天數）。

日本三宅博士首先提問很多船在海上轉載，我國如何取得報表及驗證資料；我方回應按目前系統，作業報表會透過運搬船運回港再寄回，另報表總量會再和該船卸魚紀錄比對驗證（日本首席科學家從旁說明這是可行的）。

主席詢問 VMS 涵蓋率及港口採樣港口。我方回應所有船都須安裝，及第一次港口採樣先到開普頓，另有其他小組到其他兩洋採樣，訪問船長、蒐集報表及量測體長。

日本科學家表示港口採樣相關困難，詢問我方將如何進行體長量測、及透過 VMS 傳送電子報表的進展。我方回應今年將先針對長鰭鮪，對於大目鮪，我們一直希望能在日本有港口採樣，現在也在試驗用照相的方式來解決直接量測的困難；日本對此表示有困難，希望我方能直接去日本港口看看及討論。另透過 VMS 傳送漁獲量問題，我方表示因船長仍有適應困難，所以有點停頓；日本表示瞭解並接續說明，台灣已在太平洋全面安裝 VMS，日本、韓國也將跟進，未來很可能全球化，雖然電子報告尚未實施，但各國應先測試以預備好。

（十） 接續由日本水產廳說明其 Japan Data-Improvement Project。為達 ICCAT 決議案 03-21 之目的，日本於去年底開始為期五年的計畫，希

望協助部分開發中國家改善統計系統，以有能力提供 ICCAT 要求的資料。今年已在巴西舉行統計會議及 CPUE 標準化訓練，迦納亦在統計系統及派員參加 ICCAT 會議上受惠。美國特別對此計畫表示感謝，並希望能傳達給大會。日本的這個計畫也支持 ICCAT 的 Field Manual 的委外製作，秘書處於會中說明此手冊現已接近完成階段。

（十一）為了未來資料提供的區域分界問題，會議有許多爭執。主要是 ICCAT 有太多種分區，很難整合。為方便彈性計算，法國提議未來 TASK I 要提供到 1 度方格，經爭論後放寬至 5 度方格，美國強烈支持提供季別、5 度方格的 TASK I（類似 WCPFC 今年之討論）。日方認為意義不大，我方說明將造成的誤解及困難，美方認為依現行規定前三年都是初估值，可以慢慢透過報表回收率的提高而改善。其實這問題關鍵在許多國家沒有報表系統。經多次來回討論後，主席認為沒有共識，美國認為至少可以向大會建議，由他們考慮要（1）要求提供更細的 TASK I，還是（2）要求加強 TASK II。

二、 混獲小組會議

（一） 27 日下午召開混獲小組會議，統計小組則進行會議紀錄的修改，職將統計會議紀錄擬修改之文字交予葉教授並先與主席說明後，便參加混獲小組會議。由於混獲小組原日籍主席升官至水產廳，因此改由美國首席科學家接任主席。

（二） 由於會議只有半天，且許多科學家要在下週全席會議時才到達，因此主席決定只討論鯊魚部分，ICCAT 關切之海鳥及海龜部分則等下週再討論，我方原先預備之海鳥海龜資料分析結果就無法提出。

（三） 有關鯊魚，日本提出其產量重估結果，我代表亦向其請教估計方式，以便未來重估我國之鯊魚產量。另，美國整理以往文獻，報告魚鰭 5%之合適性。依據其蒐集之市場資料，魚鰭平均佔處理後鯊魚重之 5.8%，佔全魚重 4.5%，但依美國另外獨立研究結果，魚鰭平均僅佔處

理後鯊魚的3.8%，全魚重的1.9%，比例相當低，但美方亦表示資料蒐集上之困難及可能誤差。我代表則簡要說明我國亦藉觀察員計畫蒐集實際資料，或可解決一些不確定性。美方對此表示歡迎，希望到時可以提供一些數據來討論。

（四） 會中亦討論到決議案中的 5%魚鰭比例問題，這個「比例」之定義相當含糊，會有以下之問題：不同種之比例差異大（我觀察員資料證實如此）、不同割鰭方式、不同乾燥程度、是相對於全魚重或處理後重(又處理型式如何）等等之魚鰭比例都會明顯不同，因此這些項目都必須請大會定義清楚，並希望各國能加強研究釐清。

（五） 有關灰鯖鮫資源狀況及管理建議，主席表示不希望此時引起太多爭論，日本表示雖然評估結果不樂觀，但評估所用資料太多是估計的，不確定性高。主席同意，最後結論：該資源可能有危險，因此降低漁獲死亡率（及 fishing capacity）對資源的恢復將有幫助。

➢ 九月二十八日至九月二十九日

一、 旗魚小組會議

（一） 本次會議共有 6 國 12 位參加。今年並未進行資源評估，會議先由主席簡單說明今年巴西資料準備會議之情況，報告中要求各國改善資料問題，希望各國儘快檢討排除。其中明列包括四項有關我國資料之疑問。

（二） 再由有準備研究報告者介紹成果，其中有兩篇報告發現日本常用以界定目標魚種之每筐鉤數資料，可能在不同年代有不同意義，因此建議在 CPUE 標準化時應再進一步考慮。

(三) 會中曾討論 artisanal fisheries 之定義，這議題巴西在統計小組會議時曾造成強烈爭議，因會牽涉到未來之船隊管理，本小組主席不希望再觸及，但從我方及日、巴之討論中，發現巴西所謂的 artisanal fisheries，實際上類似我國的小釣船，作業範圍很廣，甚至到遠洋。巴西之定義僅是在船噸大小（40 噸級為界），而不在作業距離。

(四) 會中發現西班牙大西洋觀察員有紀錄很多不該出現在大西洋的 striped marlin，與會者一致認為這些可能是 white marlin。另秘書處準備一份報告，比較 ICCAT 與 FAO 資料的不同，希望未來兩資料能一致。

(五) 日本提起我國尚未修正白皮旗魚案，其認為這些量可能是 white marlin（紅肉旗魚）。我代表表示，我們還不確定是誤判為那一魚種，但從分佈來看，較可能是黑皮旗魚，我方同意會在下次評估會議前提供修正值，另表示此問題以前日本也曾發生過。與會者較支持應為黑皮旗魚。

(六) 應主席要求，我代表與巴西代表合撰紅肉旗魚的摘要報告。由於今年沒有進行資源評估，因此紅肉旗魚和黑皮旗魚的資源狀況仍不清楚，原訂於明年進行全面評估，但從今年巴西資料準備會議結果，認為明年評估之意義不大。我代表會中亦說明我國情況，也不支持評估，因此小組決議向大會表示若要依去年大會要求在 2006 年要舉辦，意義將不大，若真要如期舉辦，也將不會進行全面評估。

(七) 至於管理建議，則維持去年之建議，但希望加強觀察員計畫及研究。

二、 長鰭鮪小組會議

本屆會議中與我國較為相關之會議重點乃在 2004 年我國之大西洋長鰭鮪產量顯著減少之原因。有關我國 2004 年大西洋長鰭鮪較 2003 年減產約 4,000 噸之原因，我方回應係因船隊規模縮減所致。也因為台灣、巴西與南非之大西洋長鰭鮪產量皆有減少，對資源之壓力減輕不少，因此本屆會議中對此魚

種之管理建言相較過去而言軟化不少。

三、 熱帶鮪類小組會議

會議中針對各國歷年大西洋海域各熱帶鮪類之TASK I歷年漁獲量資料進行修正。其中，日本修正 2000 年至 2004 年黃鰭鮪與大目鮪之漁獲量資料。塞內加爾修正 1991 年至 2004 年黃鰭鮪、大目鮪與正鰹之漁獲量資料。另外則為各國代表發表其新提之科學研究報告並進行討論。

四、 劍旗魚小組會議

(一) 主席首先指出劍旗魚資源評估必須於 2006 年 9 月前完成，暫訂為期 5 天。為此，各國資料依規定必須於明年 7 月 31 日前提送至 ICCAT，最晚必須在 2006 年 8 月 23 日前提送，任何於最後期限之後提送之資料將不會被採用於資源評估中。所需資料包括漁獲量資料、catch at size（主席特別強調）以及 CPUE。所有相關資料必須更新至 2005 年。

(二) 會議中共有 5 篇有關劍旗魚之生物性研究報告提出。此外，美國則發表應用性別與年齡資訊進行之 CPUE 標準化研究報告，其中引起較多討論的部份為漁獲物性別資料的建立以及專業劍旗魚漁業資料或混獲資料對分析結果之影響。

(三) 我國於本屆會議中並無新提之科學研究報告，因此由我代表依國家報告內容，說明我國近幾年漁獲量與漁船數量之變動。

(四) 針對 TASK I 資料，加拿大、葡萄牙與義大利等國皆有提出漁獲量修正，我國則依已提送 ICCAT 的資料為準，並未提出任何修正。有關丟棄量資料，會議中特別要求日本檢視近年之丟棄量資料（丟棄量為零），雖然我國近年之丟棄量也為零，但會議中並未對我國之資料提出疑問。

(五) 會中也討論 ICCAT 與 FAO 資料庫之差異，祕書處認為 ICCAT 資料庫的漁獲資料正確性較高，應以 ICCAT 的資料為準。從比較中，發現非洲國家之差異較大，因此主席認為必須主動取得有關這些國家的漁獲資

訊，以解決差異問題。

肆、心得與建議

一、 有關統計資料議題

（一） 我國今年僅提供 2004 年的 TASK I 資料，尚未提供 TASK II 資料。此為我國在三大洋同樣會有的問題，但現其他組織都已要求我國提早送資料，因此我國統計系統需要作一些調整，以符合需求。

（二） 有關鯊魚統計資料，會中討論到鯊魚全長、尾叉長、體長/體重還原之困難，我國目前有請觀察員蒐集一些資料，未來可以提供一些參考。

（三） 有關統計資料改善，我國持續在加強資料品質的改善，今年特別是在 fishery-independent 資料的蒐集上，包括港口採樣（已出發至開普頓）、觀察員計畫（近兩年增加人數及觀察天數）、VMS（供估計作業天數）。

二、 有關各魚種之管理建議

於本年度各魚種皆無進行資源評估工作，此外，各國之漁業也無明顯改變，因此針對各魚種之管理建議皆維持根據先前之評估結果所作成之管理措施，直至明年資源評估工完成後再重新討論。

三、 建議事項

（一） 有關我國計資料系統需要做適度的調整與改善，以符合未來各國際管理組織對於資料提報之要求。

（二） 有關鯊魚魚鰭比例之問題，應加強我國觀察員收集鯊魚魚鰭比例之資料，以配合各國際管理組織進行鯊魚統計資料的改善。

（三） 有關旗魚統計資料之問題，應儘快釐清各魚種統計資料之鑑別，以因應下次進行旗魚資源評估所需。

伍、會議報告

2005 年 ICCAT SCRS 各魚種小組會議結論之摘要報告（附件一）。

8. Executive Summaries on species

Until 2004, the main purpose of the Species Executive Summaries was to provide a succinct overview of each species to the Commission. These were summaries of the biology and fisheries affecting stocks of concern, the status and outlooks for these stocks, evaluations of effectiveness of management measures agreed by the Commission, and recommendations for additional management measures that the Committee felt would improve the odds of meeting the Commission's objective of attaining Maximum Sustainable Yield levels from the stocks.

At the 2004 Commission Meeting, the structure of the SCRS Report was discussed and it was suggested that too much time was being spent on stocks which were not scheduled for assessment. The SCRS Chairman explained to the Commission that the format of the Report could be changed if the Commission so wished, but stressed that it was important to review stocks even if no assessment was conducted in order to keep statistical information up-to-date and in order to monitor the status of fisheries and stocks. During the inter-sessional period, the SCRS Chairman developed a proposal for a revised, shorter, format which was distributed to Species Group Rapporteurs for comment.

The structure of the Executive Summaries that follow reflects a diversity of ways in which the different Species Groups have implemented changes intended to streamline the SCRS Report. For example, some members of the SCRS felt that the tradition of providing an overview of the biology of the stock should be retained, whereas others favored the approach of providing a brief overview of new knowledge only. The Committee considers that it would be useful to seek more consistent formats in the future, after the Commission provides further guidance on the contents and structure of the Report.

The Committee reiterates that, in order to obtain a more rigorous scientific understanding of these Executive Summaries, readers consult previous Executive Summaries as well as the corresponding Detailed Reports, which are published in the Collective Volume series.

The Committee also notes that the texts and tables in these summaries generally reflect the information that was available to ICCAT immediately before the plenary sessions of the SCRS, as they were drafted by the Species Group meetings. Therefore, catches reported to ICCAT during or after the SCRS meeting may not be included in the Summaries.

8.1 YFT – YELLOWFIN TUNA

The last assessment for yellowfin tuna was conducted in 2003, at which time catch and effort data through 2001 were available. This report includes the latest data available on catches and the fisheries and focuses on changes that may have taken place since the last assessment. Readers interested in a more complete summary of the state of knowledge on yellowfin tuna should consult the detailed report of the 2003 ICCAT Atlantic Yellowfin Tuna Stock Assessment Session (Col. Vol. Sci. Pap. ICCAT, 56(2): 443-527).

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

- Section 15.1 contains recommendations in relevant to yellowfin tuna.
- The Tropical Tunas Work Plan **(Appendix 13)** includes plans to address research and assessment needs for yellowfin tuna.
- Summary of the main findings and recommendations of the 2005 ICAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Section 9.4).
- Section 16.1 contains the response to the Commission on the effectiveness of the season/area closure [Rec. 04-01].

YFT-1. Biology

One document presented to the 2005 SCRS gave an overview of fishery trends and stock status for yellowfin tuna worldwide. It was noted that the natural mortality vector used by ICCAT in the Atlantic, while the same as that used by the IOTC for the Indian Ocean, is lower than is used by other scientific bodies for other oceans, particularly for the youngest ages. It was further noted that more recent information and methodologies may be available to potentially improve the estimates of natural mortality. Another document did consider the estimation of natural mortality from multi-species tagging data. Due to limitations in the data (such as unbalanced design and different size distributions of released fish) and potential fishing differences between fleets, conclusions were limited to ratios of total mortality between fishing periods rather than any direct statement about natural mortality. Considering the importance of natural mortality estimates in the assessment of the stock, the improvement of natural mortality estimates remains a high research priority. It was noted that future stock assessments should include an evaluation of the sensitivity of results to the uncertainty in natural mortality estimates. Differences were also noted for other biological parameters used by the various scientific bodies, such as growth and maturity vectors; the extent to which these differences reflect estimation methodology, data quality, or real differences between stocks warrants investigation.

YFT-2. Fishery indicators

In contrast to the increasing catches of yellowfin tuna in other oceans worldwide, there has been a steady decline in overall Atlantic catches since 2001. Atlantic surface fishery catches have shown a declining trend from 2001 to 2004, whereas longline catches have increased. In the eastern Atlantic, purse seine catches declined from 89,569 t in 2001 to 58,632 t in 2004, a 35% reduction **(YFT-Table 1; YFT-Figure 1)**. Baitboat catches declined by 23%, from 19,886 t to 15,277 t. This decrease is almost entirely due to reduced catches by Ghana baitboats, which resulted from a combination of reduced days fishing, a lower number of operational vessels, and the observance of the moratorium on fishing using floating objects. Catches by other baitboat fleets were generally increasing. In the western Atlantic, purse seine catches declined from 13,072 t to 3,217 t, a 75% reduction. Baitboat catches declined by 8% from 7,027 t to 6,735 t. For the same time period, longline catches were increasing. In the eastern Atlantic, longline catches increased from 5,311 t to 10,851 t, a 104% increase. In the western Atlantic, longline catches increased from 12,740 t to 15,008 t, an 18% increase. The most recent available catch distribution is given in **YFT-Figure 2**.

At the same time, the nominal effort in the purse seine fishery was declining. As an indicator, the number of purse seiners from the European and associated fleet operating in the Atlantic declined from 46 vessels in 2001 to 34 vessels in 2004. On the other hand, the European and associated baitboat fleet increased from 16 to 22 vessels during the same period.

Of the relevant scientific documents presented to the 2005 SCRS, most were descriptive of the catches by country fleets. Three papers discussed observer programs in Ghana, Uruguay, and Spain, and three papers analyzed catches in the context of the moratorium. No new standardized catch rate information has been

presented since the last assessment. However, examination of nominal catch rate trends from purse seine data suggest that catch-per-unit effort was stable or possibly declining since 2001 in the East Atlantic **(YFT-Figure 3a)**, and was clearly declining in the West Atlantic **(YFT-Figure 3b)**. Since effort efficiency was estimated to have continued to increase, adjustments for such efficiency change would be expected to result in a steeper decline. Also, the average weights in European purse seine catches have been declining since 1994 **(YFT-Figure 4)**, which is at least in part due to changes in selectivity associated with fishing on floating objects.

Recent signals in the fishery data could result in a substantially different evaluation of stock status than that which is summarized below. It is important that the next assessment take these and other indicators (such as age of vessels and any loss of regional yellowfin fisheries) into account.

YFT-3. State of the stock

A full assessment was conducted for yellowfin tuna in 2003 applying various age-structured and production models to the available catch data through 2001. The estimate of MSY based upon the equilibrium models ranged from 151,300 to 161,300 t; the estimates of F_{2001}/F_{MSY} ranged from 0.87 to 1.29. The point estimates of MSY based upon the non-equilibrium models ranged from 147,200-148,300 t. The point estimates for F_{2001}/F_{MSY} ranged from 1.02 to 1.46; the main differences in the results were related to the assumptions of each model. The estimate of MSY derived from age-structured virtual population analysis (VPA) was 148,200 t. In summary, these analyses implied that although the 2001 catches of 159,000 t were slightly higher than MSY levels, effective effort may have been either slightly below or above (up to 46%) the MSY level, depending on the assumptions. Yield-per-recruit analyses provided similar estimates of fishing mortality rates and further indicated that an increase in effort was likely to decrease the yield-per-recruit, while reductions in fishing mortality on fish less than 3.2 kg could result in substantial gains in yield-per-recruit and modest gains in spawning biomass-per-recruit.

Since the relatively high catch levels of 2001 (159,000 t), catches have declined each year to a level of 116,000 t, a reduction of 27%. A potential explanation for this decline is the reduction in purse seine effort, but until a full assessment is conducted it is not possible to confirm this, since declines in nominal catch rates could suggest decreases in abundance or availability.

YFT-4. Effects of current regulations

The 1972*Recommendation by ICCAT on a Yellowfin Size Limit* [Rec. 72-01] established a 3.2 kg minimum size with a 15% tolerance in numbers of fish landed. Based on the catch species composition and catch-at-size data available during the 2003 assessment, yearly catches in number ranged between 54% and 72% undersized yellowfin tuna by purse seiners, and from 63% to 82% undersized fish for baitboats over the period 1997-2001. Landings of undersized fish occur primarily in the equatorial fisheries. Compliance with this measure has never been effectively achieved, largely due to the characteristics of the purse seine gear and operations, which is the principal source of fishing effort on juveniles. Unfortunately, the use of minimum size limits as a means of reducing the mortality of juvenile tuna remains extremely problematic in this fishery for several reasons which are described in detail in “Report of the 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Madrid, July 4-8, 2005)”. In accordance with the Committee’s current recommendation, any minimum size limit (or lack thereof) should be consistent for all species in a multi-species fishery. It follows that, since the minimum size limit for bigeye tuna has been eliminated, the minimum size limit for yellowfin tuna should likewise be eliminated. Notwithstanding this, the protection of juvenile tunas may be important and alternative approaches to accomplish this should be studied.

In 1993, the Commission recommended "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992." As measured by fishing mortality estimates from the 2003 assessment, effective effort in 2001 appeared to be approaching or exceeding the 1992 levels. Catches have been declining since 2001, as has the nominal effort of the purse seiners, but the trend in effective effort is not clear.

An evaluation of the season/area closure to purse seine and baitboat fishing [Rec. 04-01] is detailed in “Report of the 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Madrid, July 4-8, 2005)”.

ATLANTIC YELLOWFIN TUNA SUMMARY

Maximum Sustainable Yield (MSY)[1]	~148,000 t
Current Yield [2]	
(2001)	159,000 t
(2004)	116,000 t
Replacement Yield (2001)	May be somewhat below the 2001 yield
Relative Biomass B_{2001}/ B_{MSY}[3]	0.73 - 1.10
Relative Fishing Mortality: F_{2001}/F_{MSY}[3]	0.87-1.46
F_{99-01}/F_{MSY}[4]	1.13 (80% confidence limits 0.94 to 1.38)
$F_{0.1}$[4]	0.55
F_{MSY}[4]	0.72

Management measures in effect:

- 3.2 kg minimum size [Rec. 72-01]
- Effective fishing effort not to exceed 1992 level [Rec. 93-04]
- Closed area/season for fishing on FADs [Rec. 99-01]

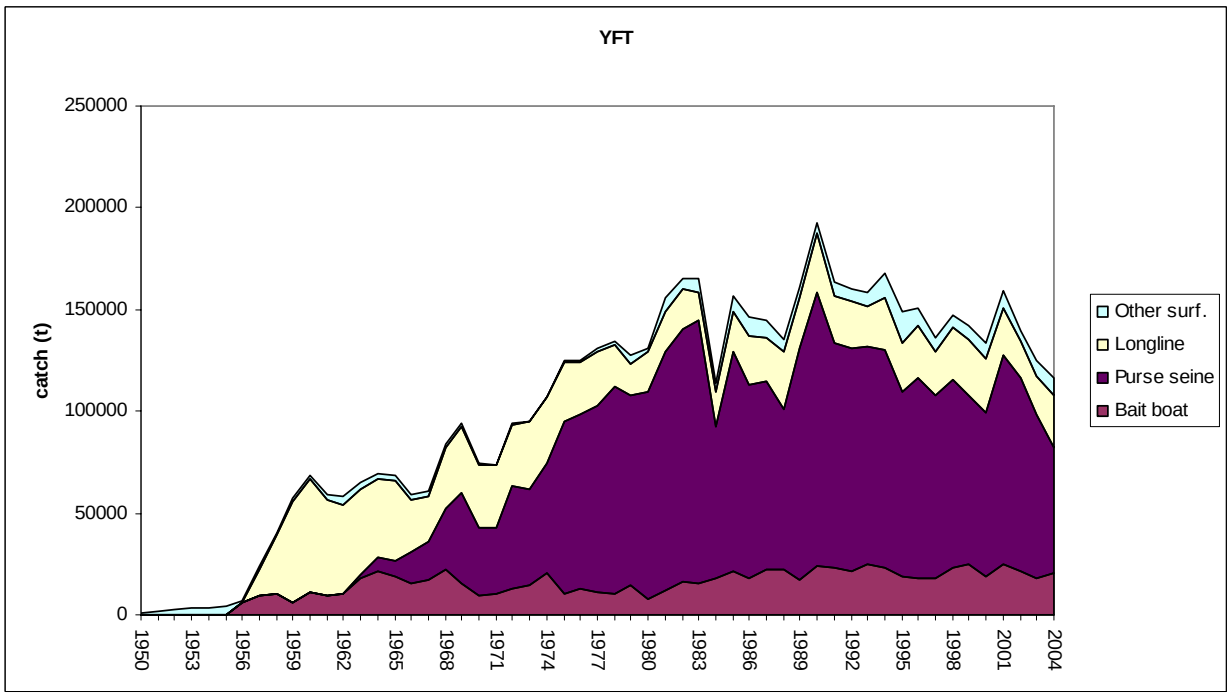
[1] MSY estimates based upon results of age-structured and non-equilibrium production models, and VPA. The complete range of results from all models is 147,200-161,300 t.
[2] The assessment was conducted using the available catch data through 2001. Reports for 2004 should be considered provisional.
[3] These are ranges of point estimates; no estimates of uncertainty were calculated around these point estimates during the assessment.
[4] Result exclusively from VPA and yield-per-recruit analyses.

YFT-Table 1. Estimated Catches (t) of Yellowfin tuna by major Area, Gear and Flag --Prises estimées (t) d'albacore par zone, engin et pavillon---Capturas estimadas de rabil por zona, arte y bandera

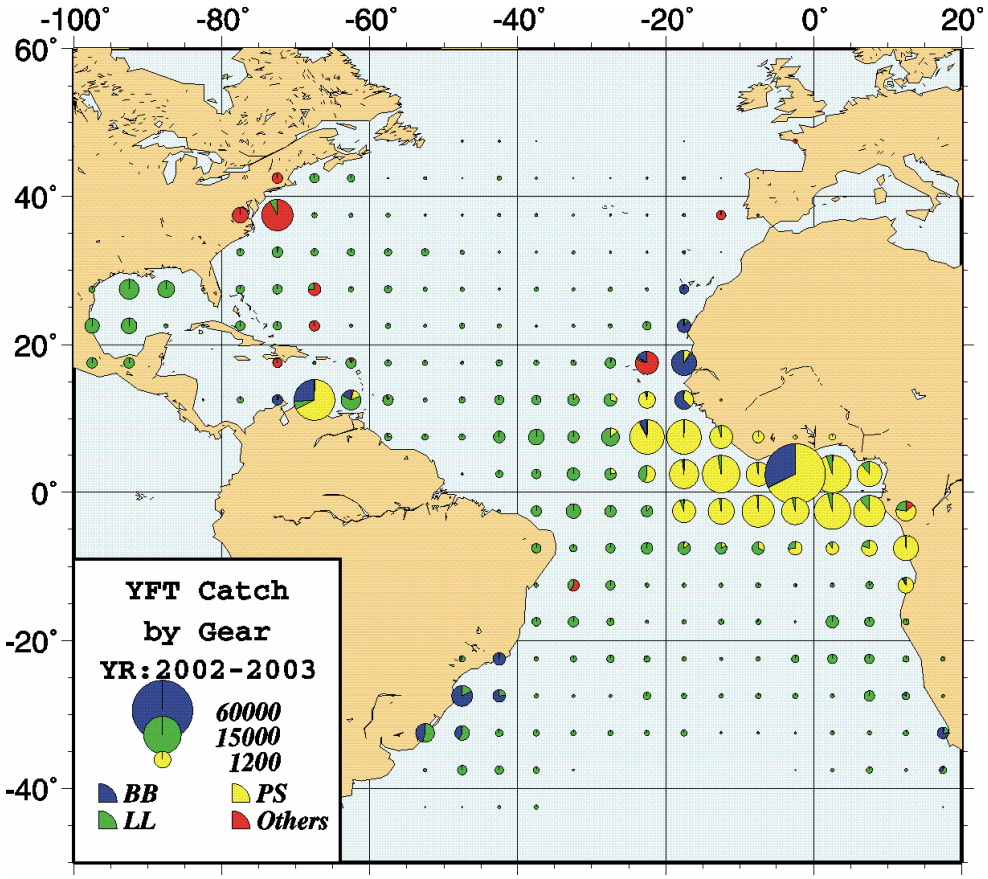
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL			130696	155818	165001	165373	113940	156547	146535	144428	135219	161322	192456	163848	160492	158338	168170	149112	150624	136469	147470	141718	133572	159264	139250	124980	116275
	AT.E		117798	138114	138711	124953	76053	113656	106606	110304	99180	123239	157112	123371	120167	115163	113854	108075	111903	99604	110729	104944	95990	116718	109091	99374	86337
	AT.W		12898	17704	26290	39666	37481	42365	31751	27680	30284	32807	27095	32640	32895	37230	46335	34047	30682	29609	28044	28980	30357	38154	29344	24779	29829
	UNCL area		0	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4392	816	826	110
Landings	AT.E	Longline	12508	7986	10456	6040	8092	9444	3684	4481	7511	6385	7640	5502	3903	4107	8503	7955	8567	5964	8047	7497	8292	5311	5347	8352	10851
		Purse seine	97026	114993	111820	103502	50860	86576	85325	86141	73117	102200	127673	96314	98660	90505	87794	84770	87586	77634	83647	76922	72383	89569	87647	75504	58632
		Bait boat	7690	9788	13211	11507	14694	16120	15301	16750	16020	12168	19560	17772	15095	18470	15652	13496	13804	13974	17480	19056	13009	19886	15138	14435	15277
		Other surf.	574	5347	3224	3904	2407	1516	2296	2932	2532	2485	2239	3783	2509	2081	1905	1854	1946	2031	1554	1469	2305	1951	960	1084	1577
	AT.W	Longline	6735	11323	9926	6969	8503	9743	12407	9990	14736	13033	13215	9410	11777	9925	9463	8833	8737	8823	8795	11596	11638	12740	11605	9996	15008
		Purse seine	4870	2822	12112	25749	23203	20994	9822	6665	6034	11647	6800	14414	11359	16081	19612	6338	10784	11710	9157	6523	7870	13072	7966	4607	3217
		Bait boat	392	1917	2970	3603	3698	5478	2421	5468	5822	4834	4718	5359	6276	6383	7094	5297	4560	4275	5511	5349	5649	5315	6009	3764	4868
		Other surf.	901	1642	1282	3345	2077	6150	7101	5557	3692	3293	2362	3457	3483	4842	10166	13580	6601	4801	4580	5345	5200	7027	3763	6413	6735
	UNCL area	Longline	0	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4392	737	826	109
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0	0
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	
	UNCL area	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landings	AT.E	Angola	558	959	1467	788	237	350	59	51	246	67	292	510	441	211	137	216	78	70	115	170	35	34	34	34	34
		Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Benin	95	100	113	49	65	60	19	3	2	7	1	1	1	1	1	1	1	3	1	1	1	1	0	0	
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	864	5281	3500	4341	2820	1901	3326	2675	2468	2870	2136	1932	1426	1536	1727	1781	1448	1721	1418	1663	1851	1684	1693	1896	1896
		Cayman Islands	602	1460	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	71	1535	1652	586	262	1033	1030
		Chinese Taipei	71	432	203	452	87	146	254	193	207	96	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	3363	4946	4298
		Congo	140	50	0	0	0	11	20	15	15	21	22	17	18	17	14	13	12	0	0	0	0	0	0	0	
		Cuba	5128	2945	2251	1916	1467	1585	1332	1295	1694	703	798	658	653	541	238	212	257	269	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	673	213	99	302	565
		EC.España	38759	51428	54164	51946	40049	66874	61878	66093	50167	61649	68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	30937	31260	24709	21378
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	54372	55085	45717	40470	7946	12304	17756	17491	21323	30807	45684	34840	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211	32753	32429	23949
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	255	54	16	0	55	151	223	97	25	36	72	334	334	334
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	332	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Poland	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	77	208	981	1333	1527	36	295	278	188	182	179	328	195	128	126	231	288	176	267	178	194	3	6	4	5
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	12	88	218	225	225	295	225	162	270	245	44	44
		Gambia	0	0	0	0	0	0	0	0	0	0	2	16	15	0	0	0	0	0	0	0	0	0	0	0	
		Georgia	0	0	0	0	0	0	0	0	0	0	0	25	22	10	0	0	0	0	0	0	0	0	0	0	
		Ghana	1974	5510	9797	7689	9039	12550	11821	10830	8555	7035	11988	9254	9331	13283	9984	9268	11720	16504	17807	28328	17010	30642	23499	19030	15137
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
		Japan	2217	2863	4815	3062	4344	5765	3634	4521	5808	5882	5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2286	1550	1510	1992	4372
		Korea, Republic of	5349	4288	4010	1629	1917	1668	965	1221	1248	1480	324	259	174	169	436	453	297	101	23	94	142	3	8	209	984
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208	0	0	
		Maroc	3243	4817	4540	2331	614	2270	2266	1529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	95
	*	NEI (ETRO)	0	0	3121	5388	1104	0	0	2077	3140	5436	12513	3988	10049	8251	6186	6143	8437	5981	7224	5190	5448	9273	8209	4913	10979
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	14	72	69	3	147	59	165	89	139	85
	*	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3183	6082	6110	3962	5441	4793	4035	6667	
		Norway	0	0	0	0	0	0	813	418	493	1787	1790	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	1661	341	1933	1568	1653	3100	0	0	0	0	0	6706	7041	7838	8644	10854	5759	3137	1753	930	1103	574	1022	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	173	86	0	50	9	68
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	3200	1862	2160	1503	2936	2696	4275	4931	4359	737	0	0	0	
		S. Tomé e Príncipe	31	97	193	194	177	180	180	178	184	198	228	223	229	140	0	0	1	4	4	4	4	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	2	90	132	40	19	6	20	41	208	251	834	252	295	447	279	681
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	
		Seychelles (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	
		South Africa	540	178	49	456	759	382	55	68	137	671	624	52	69	266	486	183	157	116	240	320	191	342	152	298	402
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
		U.S.A.	1614	1472	636	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	448	541	1004	1282	2168	3768	1851	1275	3207	4246	3615	0	0	0	0	0	0	0	0	0	0	0	0	0	

			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
		UK.Sta. Helena	55	59	97	59	80	72	82	93	98	100	92	100	166	171	150	181	151	109	181	116	136	72	9	0	
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	215	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	0	0	0	0	0	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Argentina	0	8	7	0	0	44	23	18	66	33	23	34	1	0	0	0	0	0	0	0	0	0	0	0	
		Barbados	40	30	36	51	90	57	39	57	236	62	89	108	179	161	156	255	160	149	150	155	155	142	115	116	116
		Brasil	1008	2084	1979	2844	2149	2947	1837	2266	2512	2533	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503	6985
		Canada	0	0	0	0	0	0	0	0	30	7	7	29	25	71	52	174	155	100	57	22	105	125	70	73	304
		Canada (Japan)	0	0	0	0	0	0	2	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	628	655	22	470	435	17	275
		Chinese Taipei	616	435	407	87	559	780	1156	709	1641	762	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1540	1527
		Colombia	0	0	3	29	0	180	211	258	206	136	237	92	95	2404	3418	7172	238	46	46	46	46	46	46	46	46
		Cuba	689	1997	1503	793	2538	1906	2081	1062	98	91	53	18	11	1	14	54	40	40	15	15	0	0	65	65	65
		Dominica	0	0	0	0	0	0	0	0	0	0	18	12	23	30	31	9	0	0	0	80	78	120	169	119	81
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	220	226	226	226	226	226
		EC.España	0	0	0	1957	3976	1000	0	0	1	3	2	1462	1314	989	7	4	36	34	46	30	171	0	0	0	
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
		Grenada	487	64	59	169	146	170	506	186	215	235	530	620	595	858	385	410	523	302	484	430	403	759	593	749	460
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0	0	0	0	0	0	
		Japan	1117	2983	3288	1218	1030	2169	2103	1647	2395	3178	1734	1698	1591	469	589	457	1004	806	1081	1304	1775	1141	572	727	1085
		Korea, Republic of	1933	3325	2249	1920	989	1655	853	236	120	1055	484	1	45	11	0	0	84	156	0	0	0	0	0	0	
		Mexico	16	42	128	612	1059	562	658	33	283	345	112	433	742	855	1093	1126	771	826	788	1283	1390	1084	1133	1313	1208
		Netherlands Antilles	173	173	173	173	173	150	150	160	170	170	170	150	160	170	155	140	130	130	130	130	130	0	0	0	
		Panama	807	262	675	62	246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	106	78	12	79	145	299
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	1	40	48	22	65	16	43	37	35	48	38	33	24	884	568	4251
		Sta. Lucia	27	25	26	23	56	79	125	76	97	70	58	49	58	92	130	144	110	110	276	123	134	145	94	139	152
		Trinidad and Tobago	0	0	0	232	31	0	0	0	1	11	304	543	4	4	120	79	183	223	213	163	112	122	125	186	224
		U.S.A.	553	1688	1095	2553	2180	9735	9938	9661	11064	8462	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5710	7695	6500
		UK.Bermuda	35	21	22	10	11	42	44	25	23	22	15	17	42	58	44	44	67	55	53	59	31	37	48	47	47
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Uruguay	0	67	214	357	368	354	270	109	177	64	18	62	74	20	59	53	171	53	88	45	45	90	91	95	204
		Venezuela	5397	4500	14426	26576	21879	20535	11755	11137	10949	15567	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	10549	18651	11421	7411	5774
	UNCL area	China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	139	156	200	124	0	0	0	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	209	175	36
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	73	73
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0	
		NEI.Other	0	0	0	754	406	526	956	1297	2324	2780	4100	4318	3836	2671	4404	4202	5962	6100	8339	7409	5269	2883	175	578	
		Panama	0	0	0	0	0	0	7222	5147	3431	2496	4149	3519	3594	3134	3422	2588	1954	1156	358	385	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1956	1341	280	0	
Discards	AT.W	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	
	UNCL area	UK.Turks and Caikos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

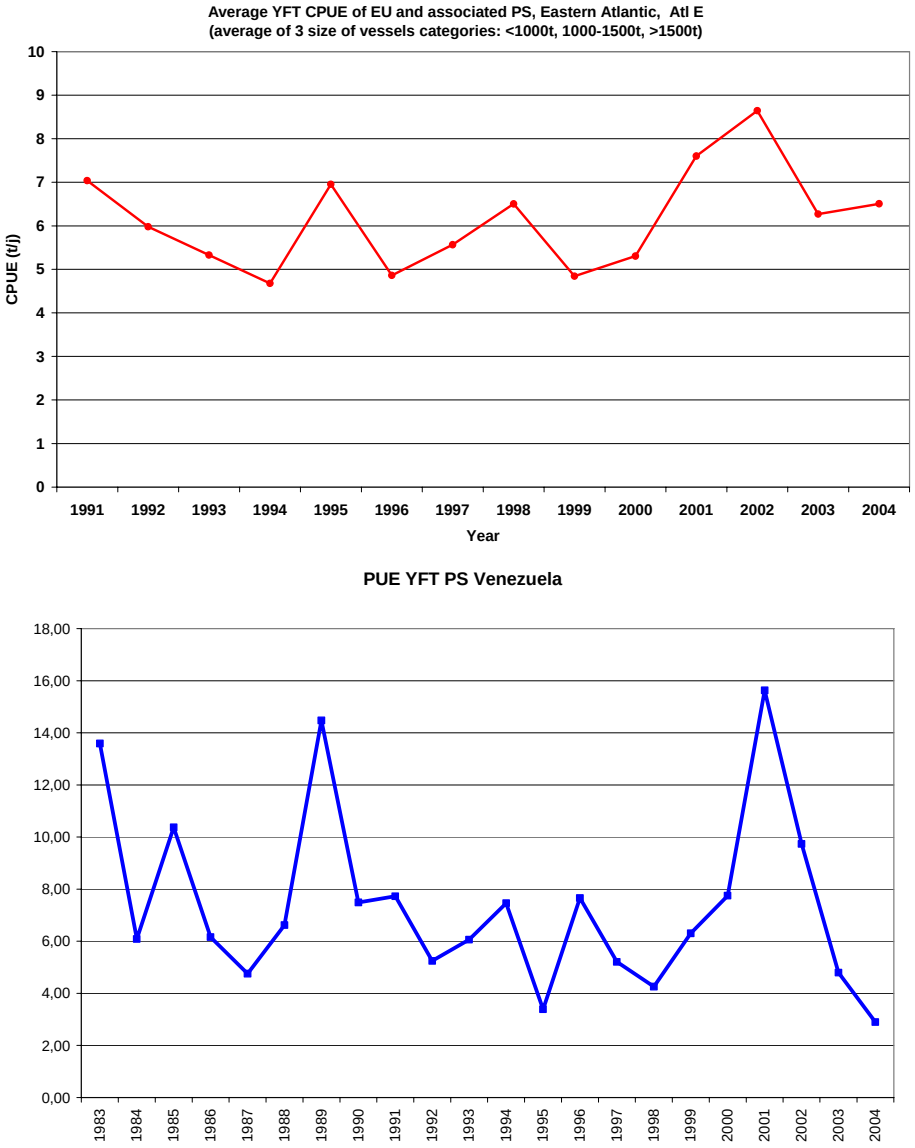
* Netherlands Antille's catch is included on NEI (ETRO) for 2004.
La capture de Antilles néerlandaises est incluse au NEI (ETRO) au titre de 2004.
La captura de Antillas Holandesas está incluida en NEI (ETRO) para 2004



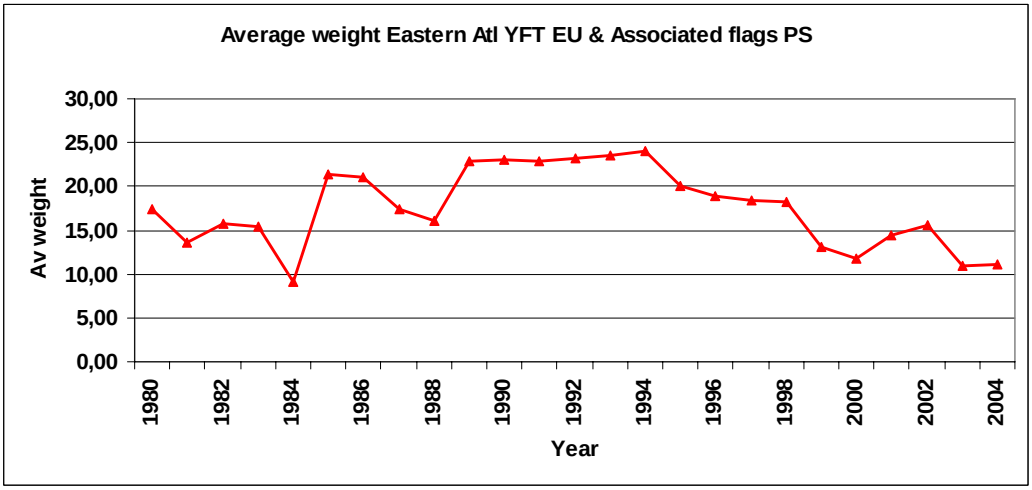
YFT-Figure 1. Estimated annual catch (t) of Atlantic yellowfin tuna by fishing gear, 1950-2004.



YFT-Figure 2. Geographical distribution of yellowfin tuna catches for most recent years (2002-2003) by major tuna fishery.



YFT-Figure 3. Nominal yellowfin tuna catch per unit effort trends for purse seine fleets from the eastern (top) and western (bottom) Atlantic. No adjustment has been made for estimated increases in fishing power.



YFT-Figure 4. Trend in yellowfin tuna average weight for the EU and associated purse seine fleet in theeastern Atlantic, across all set types (floating object and free school).

8.2 BET - BIGEYE TUNA

The last stock assessment for bigeye tuna was conducted in July 2004. Due to the early date of the meeting, the most recent catch information covered in the assessment was 2002. This document highlights on changes that may have taken since then; readers interested in a more complete summary of biology, fisheries and state of stock on Atlantic bigeye tuna should consult the report of the 2004 SCRS meeting.

Other information relevant to Atlantic bigeye tuna is available in this SCRS Report and other publications:

- Section 16.1 contains response to the Commissioner's request [Rec.04-01].
- Report of 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Section 9.4).
- 2004 ICCAT Bigeye Tuna Year Program Symposium (Col. Vol. Sci. Pap. ICCAT, 57(1)).
- Report of the Second World Meeting on Bigeye Tuna (Col. Vol. Sci. Pap. ICAT, 57(2)).

BET-1. Biology

Several documents were presented to the 2005 SCRS. Most of the topics provided were the statistics as well as fishery information monitored by the observer program. There are no documents that directly dealt with the biology of this species.

BET-2. Fisheries indicators

The most noteworthy trend in fisheries observed is the general declining trend in catches for all gears after a high peak (121,000 t) in 1999. After that, the total annual catch declined to 103,000 t, 96,000 t, 76,000 t, 85,000 t, and 72,000 t for 2000-2004 **(BET-Figure 1)**. The decline of longline catch is mostly attributable to the decrease of Japanese and estimated IUU catches while the other country/entity's catches are generally maintained. Other gears (purse seine and baitboat) also indicated a similar but more variable decline. The decline of the Japanese catch is related to the reduced fishing effort as well as the declined CPUE in the major fishing grounds in tropical waters.

Among the fisheries catching bigeye, two changes are noted. One is the recovery of catch in the northern Islands (Azores and Madeira) baitboat fisheries after 4 years of low catch for 2000-2003. Another change is also observed for the fishing area of Japanese longline fishery. Since around 2001, some of the fleet had operated in central north Atlantic between 25°N-35°N and 40°W-75°W. The most recent catch distribution is given in **BET-Figure 2**.

In addition to the above changes in fisheries, several countries increased their catch significantly in 2004, though the amount is not so large. Such increases are reported for Philippines (1,850 t), Venezuela (1,060 t) and Korea (630 t). The current reported catch of Chinese Taipei for 2003 is considered under-estimated. Chinese Taipei will re-estimate the bigeye catch for 2003 in near future. New estimate is expected to be higher than the current reported catch.

BET-3. State of the stock

The 2004 assessment indicated that the stock has declined due to the large catches made since around the mid-1990s to around or below the MSY level, and that fishing mortality exceeded F_{MSY} for several years during that time period. Projections indicate that catches of more than 100,000 t will result in continued stock decline. Given the high uncertainties in the catches, abundance indices and other parameters used in the assessments, catch levels of around 90,000 t or lower values for at least for the near future would promote the recovery of the stock **(BET-Figure 3)**.

BET-4. Effects of current regulations

The bigeye minimum size regulation of 3.2 kg [Rec. 79-01] was adopted in 1980 to reinforce the same regulation for yellowfin, and was in effect until 2004. The Committee did not evaluate this regulation at this time. However, as was the case while the measure was in effect, it is believed that a large quantity (around 50% in total number

of fish) of juvenile bigeye tuna smaller than 3.2 kg was caught in 2004 as well, because there are no substantial changes in the fisheries (the equatorial surface fleets) that account for most of the juvenile catch.

The Commission asked the Committee to examine the impact on stocks of the current minimum size regulation (BET Recommendation 04-01). At the same time, the Commission also asked to recommend the necessary modifications that would improve its effectiveness as well as to review possible modifications to be applied to the closure. Although the new regulation has not implemented yet, the Committee got together to provide a response to the Commission, as provided separately under Agenda Item 16.1 of the 2005 Committee Meeting.

The moratorium on FAD fishing by surface gears in the Gulf of Guinea were observed by all fishing sectors, including Ghanaian surface fleet during 2004/2005 season. However, available purse seine catch and effort data indicated significant fishing on FADs in the moratorium area.

Limiting the annual catch to the average catch in two years of 1991 and 1992 entered into force for the major fishing countries whose 1999 catch reported to the 2000 SCRS was larger than 2,100 t [Rec. 01-01]. The 2003 and 2004 total reported catch for the major countries and fishing entities to which the catch limit applies (EC-Spain, EC-France, EC-Portugal, Japan, Ghana, China and Chinese Taipei) were 67,000 t and 59,500 t, respectively. These were much lower than the total catch limit (84,200 t) for these counties/entities. As a whole, the total catch in 2003 and 2004 for all countries is about 12,000 t and 24,000 t lower than the average total catch of 1991 and 1992 (96,000 t).

ATLANTIC BIGEYE TUNA SUMMARY

Maximum Sustainable Yield (likely range[1])	93,000 t - 114,000 t
Current (2004) Yield [2]	72,000 t
Replacement Yield 2003 [1]	89,000 - 103,000 t
Relative Biomass (B_{2003}/B_{MSY}) [1]	0.85 - 1.07
Relative Fishing Mortality (F_{2002}/F_{MSY}) [1]	0.73 - 1.01
Conservation & management measures in effect:	- 3.2 kg minimum size [Rec. 79-01]. - Limits on numbers of vessels [Recs. 98-03, 02-01, 03-01]. - Catch limits for those who reported 1999 catch in 2000 was larger than 2,100 t [Rec. 02-01]. - Moratorium on FAD fishing for all surface fleets, Nov 1 to Jan 31, in eastern tropical area. Observers on board are required during the moratorium [Rec. 99-01]. - No purse seine and baitboat fishing during November in the area encompassed by 0°-5°N and 10°W-20°W. [Rec. 04-01]. This recommendation will replace [79-01 and 99-01] after June, 2005.

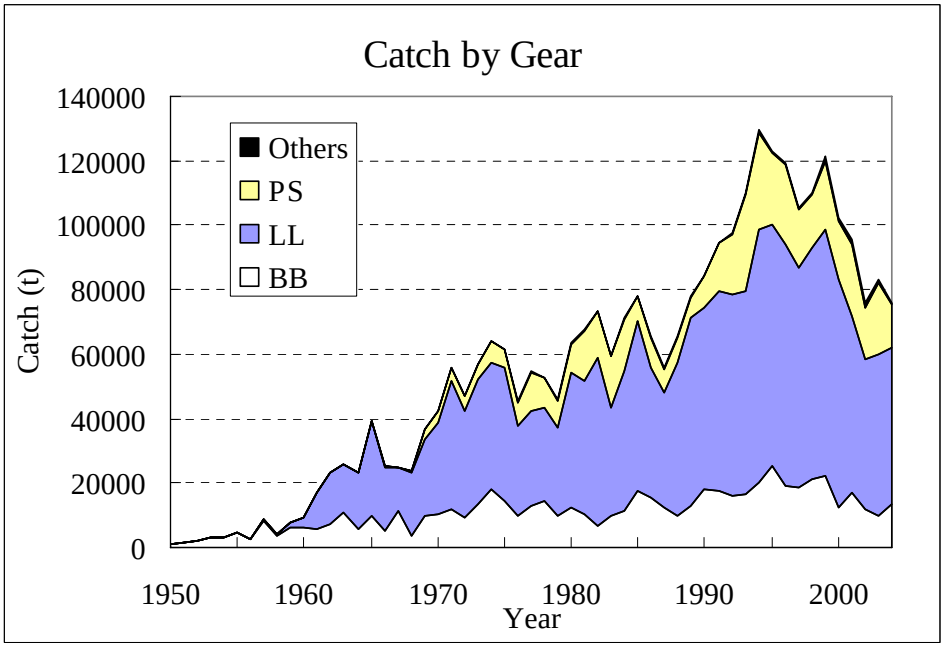
[1] Range based on point estimates from various production models and including a delay-difference model. Other models applied during the assessment resulted in estimates outside this range.
[2] Provisional figure, subject to change in the future.

BET-Table 1. Estimated Catches (t) of Bigeye tuna by major Area, Gear and Flag --Prises estimées (t) de thon obése par zone, engin et pavillon--Capturas estimadas (t) de patudo por zona, arte y bandera

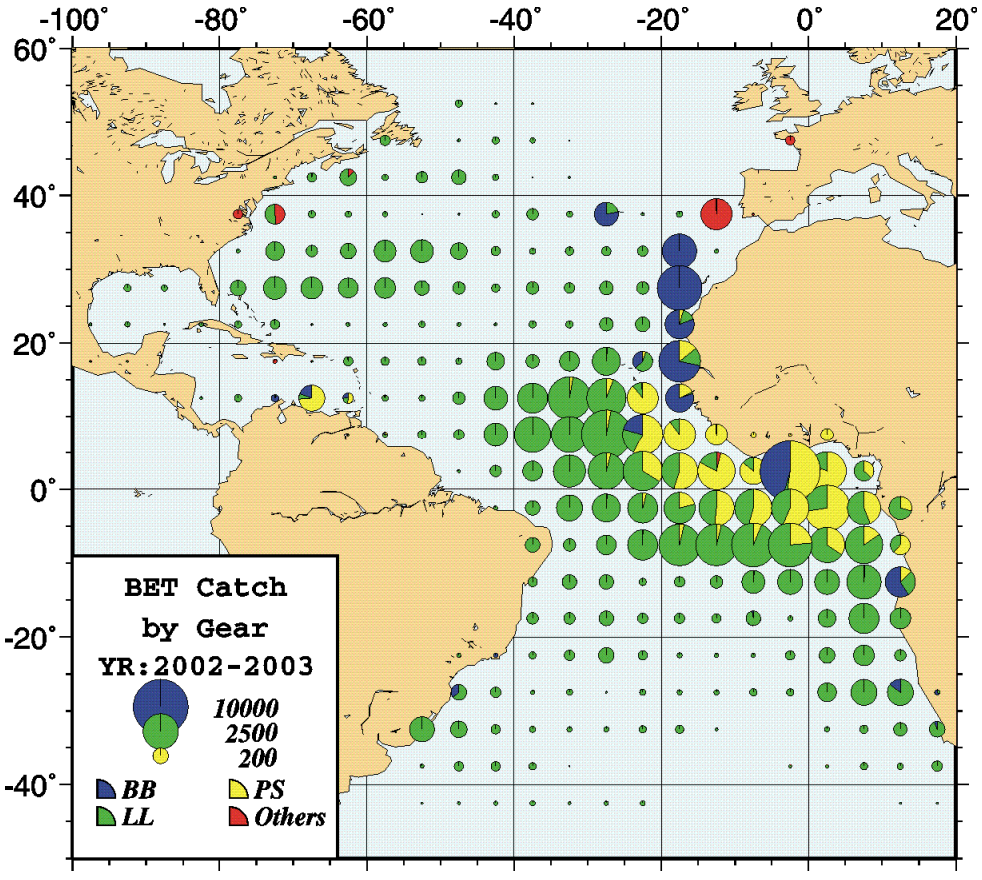
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL	63596	67753	73493	59370	71052	78215	65396	55976	65796	78068	84337	94795	97758	110060	129512	123155	119114	105639	109890	121183	102635	95818	75910	84576	72349
Longline	41677	41608	51805	33757	43303	52595	39942	35570	47758	58389	56537	61556	62359	62871	78296	74816	74900	68251	71836	76527	71194	55265	46584	51065	43620
Purse seine	9204	15656	14476	15654	16063	7554	9286	7148	7859	6371	9407	15055	18547	30074	29952	22226	24902	18213	16362	20923	17909	22060	16192	22237	13388
Bait boat	12349	10124	6922	9796	11439	17651	15618	12631	9710	12672	18106	17750	16248	16467	20290	25552	18959	18639	21263	22360	12311	16870	11639	9932	14107
Other surf.	366	365	290	163	247	415	550	626	469	636	287	434	604	648	974	561	353	536	429	1373	1221	1623	1496	1342	1233
Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Argentina	0	0	0	0	0	100	41	72	50	17	78	22	0	0	0	0	0	0	0	0	0	0	0	0	
Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	17	18	18	6	11	11	
Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Benin	0	40	45	0	0	0	15	6	7	8	10	10	7	8	9	9	9	30	13	11	0	0	0	0	
Brasil	698	505	776	521	656	419	873	756	946	512	591	350	790	1256	601	1935	1707	1237	644	2024	2768	2659	2582	2455	1496
Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	
Canada	0	0	0	0	0	0	0	0	95	31	10	26	67	124	111	148	144	166	120	263	327	241	279	182	143
Canada (Japan)	0	0	0	0	0	0	11	144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cape Verde	27	72	200	293	167	112	86	60	117	100	52	151	105	85	209	66	16	10	1	1	2	0	1	1	1
China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	70	428	476	520	427	1503	7347	6564	7210	5840	7890	6555
Chinese Taipei	2561	1887	2147	1623	925	1220	1125	1488	1469	940	5755	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	18483	18682	16399
Congo	5	0	0	0	0	8	19	10	10	14	15	12	12	14	9	9	8	0	0	0	0	0	0	0	
Cuba	1385	711	521	421	447	239	171	190	151	87	62	34	56	36	7	7	5	0	0	0	0	0	16	16	
Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
EC.España	8430	10010	9332	8794	13617	10340	10884	8875	8475	8263	10355	14705	14656	16782	22096	17849	15393	12513	7115	13739	11250	10134	10524	10969	8251
EC.France	6283	8020	7074	8124	4254	4615	4266	3905	4161	3261	5023	5581	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293	3940	2926
EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0
EC.Poland	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EC.Portugal	3706	3086	1861	4075	4354	6457	7428	5036	2818	5295	6233	5718	5796	5616	3099	9662	5810	5437	6334	3313	1498	1605	2590	1655	3204
FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	28	
Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	8	0	0	0	
Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	1	87	10	0	0	0	184	150	121	0	0	
Ghana	332	780	791	491	2162	1887	1720	1178	1214	2158	5031	4090	2866	3577	4738	5517	5805	7431	13252	11460	5586	14095	5893	4816	6944
Grenada	0	0	0	0	0	0	0	0	0	0	0	65	25	20	10	10	0	1	0	0	0	0	0	0	
Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	
Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
Japan	20922	22091	33513	15212	24870	32103	23081	18961	32064	39540	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24605	18087	15473	19055	15203
Korea, Republic of	10235	12274	10809	9383	8989	10704	6084	4438	4919	7896	2690	802	866	377	386	423	1250	796	163	124	43	1	87	143	629
Liberia	0	0	0	0	0	0	0	0	0	206	16	13	42	65	53	57	57	57	57	57	57	57	57	57	
Libya	0	0	0	0	0	0	0	0	0	0	0	0	508	1085	500	400	400	400	400	400	400	31	593	593	
Maroc	387	622	625	552	120	30	0	8	0	0	0	0	0	0	0	0	0	0	0	700	770	857	913	889	929
Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	6	8	6	2	2	7	4	5
* NEI (ETRO)	0	0	338	1141	157	0	0	85	20	93	785	751	1462	2787	2321	2008	3822	1910	1685	3697	2285	3024	2248	7229	5278
NEI.Other	0	0	0	46	369	354	758	1406	2155	4650	5856	8982	6151	4378	9000	10697	11862	16569	24896	24060	15092	8470	531	0	
Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	29	7	46	16	423	589	640	274	215	177
* Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1893	2890	2919	3428	2359	2803	1879	3203	
Norway	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Panama	4518	2500	2844	2732	3165	4461	5173	5616	3847	3157	5258	7447	9991	10438	13234	9927	4777	2098	1252	579	952	89	63	0	
Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1154	2113	975	377	837	855	1854
Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	38	4	8	91	0	0	0	
S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	
Senegal	0	0	0	0	0	0	0	0	0	0	0	15	5	9	126	237	138	258	730	1473	1131	1308	565	407	548
Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	162	0	
Seychelles (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	
South Africa	422	381	137	187	60	102	168	200	553	367	296	72	43	88	76	27	7	10	53	55	249	239	341	113	270
St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	2	2	1	1216	506	15	103	18
Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	2	0

	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
Togo	0	0	0	14	52	18	24	22	7	12	12	6	2	86	23	6	33	33	33	0	0	0	0	0	
Trinidad and Tobago	0	0	0	191	41	22	0	0	1	19	57	263	0	3	29	27	37	36	24	19	5	11	30	6	5
U.S.A.	202	158	422	315	539	639	1085	1074	1127	847	623	975	813	1090	1402	1209	882	1138	929	1263	574	1085	601	482	414
U.S.S.R.	2813	2832	635	352	1233	870	1071	1887	1077	424	95	0	0	0	0	0	0	0	0	0	0	0	0	0	
UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
UK.Sta. Helena	9	14	23	14	19	0	0	5	1	1	3	3	10	6	6	10	10	12	17	6	8	5	5	0	
Uruguay	0	86	397	605	714	597	177	204	120	55	38	20	56	48	37	80	124	69	59	28	25	51	67	59	40
Venezuela	661	1684	999	4284	4142	2918	1136	349	332	115	161	476	270	809	457	457	189	274	222	140	226	708	629	516	1060
U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

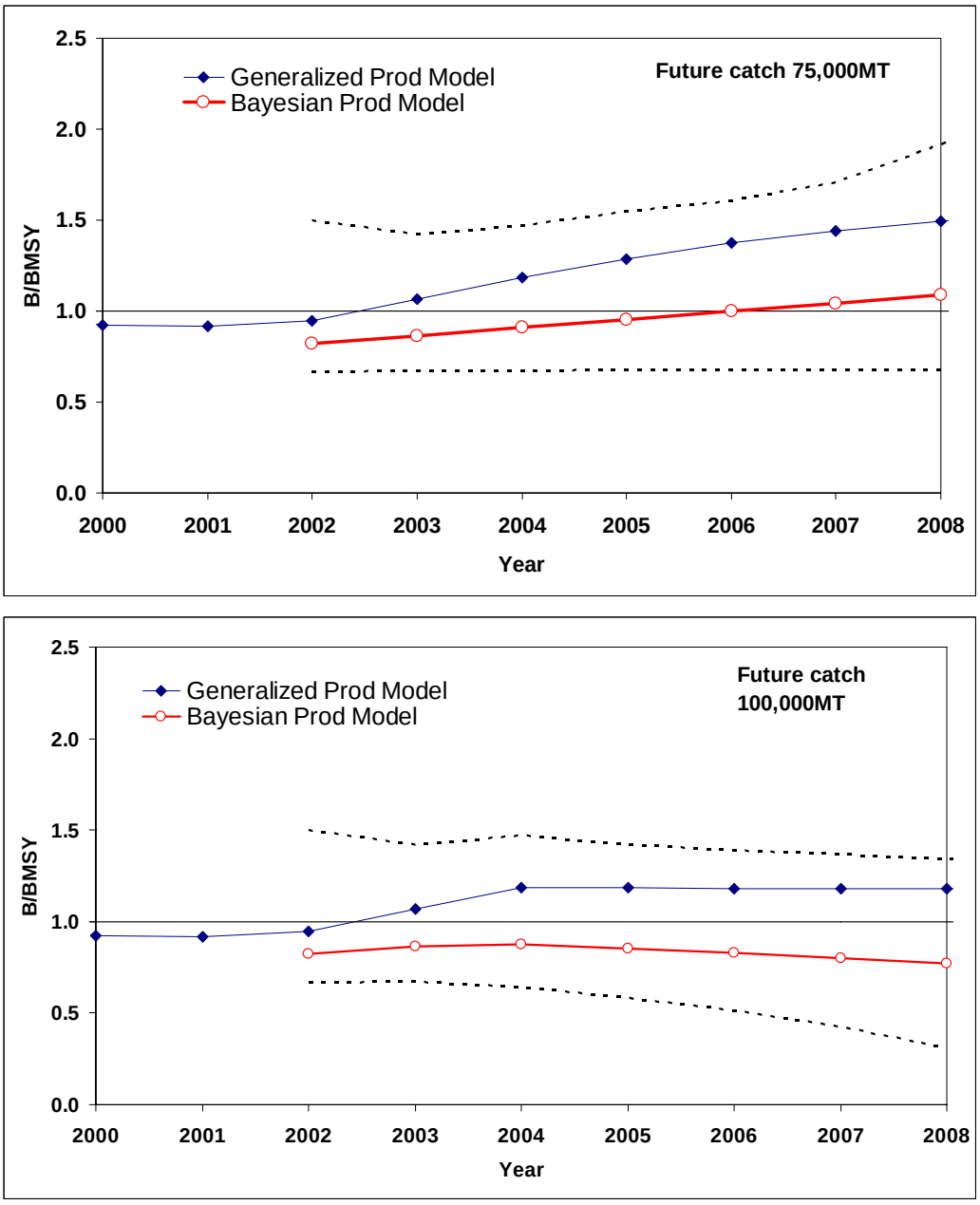
* Netherlands Antille's catch is included on NEI (ETRO) for 2004.
La capture de Antilles néerlandaises est incluse au NEI (ETRO) au titre de 2004.
La captura de Antillas Holandesas está incluida en NEI (ETRO) para 2004



BET-Figure 1. Trend of bigeye catches (1950-2004) by major tuna fishery.



BET-Figure 2. Geographical distribution of bigeye catches for most recent years (2002-2003) by major tuna fishery.



BET-Figure 3. Future projections from production model results. Constant catches of 75,000 t (top) and 100,000 t (bottom) are assumed after 2003. Dashed lines are 80% confidence intervals from generalized surplus production models (ASPIC).

8.3 SKJ – SKIPJACK TUNA

No Atlantic skipjack stock assessment has been carried out since 1999, in spite of some signs of local over-exploitation. This report includes only the latest updates on the state of knowledge on this species.

SKJ-1. Biology

Skipjack tuna is a gregarious species that is found in schools in the tropical and subtropical waters of the three oceans **(SKJ-Figure 1)**. Skipjack are often caught under FADs in association with juvenile yellowfin tuna, bigeye tuna and with other minor tunas. One of the characteristics of skipjack is that it spawns opportunistically throughout the year in vast sectors of the ocean and its growth varies according to the latitude. During the ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas in July 2005 (Document SCI-032), a re-analysis on the tagging data in the Senegalese area showed however that the parameters of the growth curve obtained in this region were in fact closer to the growth estimates made in the Gulf of Guinea or in other oceans than those done previously in Senegal.

The increasing use of fish aggregation devices (FADs) seems to have changed the behavior of the schools and the movements of this species ("ecological trap" concept). It is noted that, in effect, the free schools of mixed species were considerably more common prior to the introduction of FADs than they are at present.

SKJ-2. Fisheries indicators

The total catches obtained in 2004 in the Atlantic Ocean amounted to almost 161,000 t **(SKJ-Table 1**, **SKJ-Figure 2)** which represents an increase on the order of 12.9% as compared to the average of the last five years.

Since the early 1990s numerous changes in the fishery (such as the use the FADs and the expansion of the fishing area to the west) have increased skipjack catchability as well as the proportion of the skipjack stock which is exploited. At present, the major fisheries are the purse seine fisheries, particularly those of EC-Spain, EC-France, NEI, Ghana and Netherlands Antilles, followed by the baitboat fisheries of Ghana, EC-Spain and EC-France. The catches made in 2004 in the East Atlantic reached 134,000 t, representing a 15.8% increase as compared to the average of 1999-2003 **(SKJ-Figure 3)**.

In the West Atlantic, the major fishery is the Brazilian baitboat fishery, followed by the Venezuelan purse seine fleet. The 2004 caches in the West Atlantic amounted to 26,900 t, which is a level close to the average of the historical period in recent years **(SKJ-Figure 4)**.

There is no quantified information available on the effective fishing effort exerted on skipjack tuna in the East Atlantic **(SKJ-Figure 5)**. It is supposed, however, that the increase in fishing power linked to the introduction to improved technologies on board the vessels as well as to the development of fishing under floating objects have resulted in an increase in the efficiency of the various fleets. An estimate of the increase in the coefficient of total mortality (Z) between the early 1980s and the end of the 1990s was carried out with a model using tagging data (cf. Workshop on the mortality of juveniles in July 2005). For the range of sizes considered (about 40-60 cm FL) the increase in Z on the order of a factor 3 would reflect this increase in efficiency. The comparison of the size distributions of skipjack for the East Atlantic between the periods prior to and following the use of FADs reinforces this interpretation in the measure or an increase is observed in the proportion of small fish in the catches.

A document on the Spanish observer program on board purse seiners, presented during the 2005 SCRS, shows that for the 2001-2005 period the average rate of discards of skipjack tunas under FADs in the East Atlantic is estimated at 42 kg per ton of skipjack landed.

Fishing effort of the Brazilian baitboats which comprises the major skipjack fishery in the West Atlantic, decreased by half between 1985 and 1996, but seems to be stabilized since, after a slight increase.

SKJ-3. State of the stocks

The last assessment on Atlantic skipjack tuna was carried out in 1999.

The skipjack stocks show some characteristics of a biological and a fishery nature, which make it very difficult to apply traditional stock assessment models. For these reasons, no standardized assessment (for example, global models, VPA, etc.) of the Atlantic skipjack stocks have been carried out. Notwithstanding, some estimates were made to analyze the temporal development of several fishery indices that would reflect the changes in the state of the stocks over time.

The fisheries operating in the east are extended towards the west beyond 30°W longitude. However, based on the scientific studies, the Committee decided to maintain the hypothesis in favor of two distinct stock units. However, taking into account the biological characteristics of the species and the location of the various fishing areas, small stock units can be envisaged.

Eastern stock

The indices from the purse seine fishery often show divergent trends depending on the area concerned. The fact that a reduction in abundance for a local segment of the stock would have little repercussion on the abundance of the stock in other areas, leads to suppose that only a minor proportion of skipjack carry out extensive migrations between areas (cf. notion of stock viscosity) **(SKJ-Figures 6 to 9)**.

The presence of negative values in the development of the Grainger and García index over time could be interpreted as a sign that catches are too high. Therefore, the state of potential over-exploitation would have occurred in 1994-1995, i.e., after the massive use of FADs in fishing operations **(SKJ-Figure 10)**. The group, however, expressed doubts as regards the generalization of this conclusion to the overall stocks in the East Atlantic, due to the moderate mixing rates that seem to occur among the different sectors of this region. The application of a non-equilibrium production model based on a generalized model confirms the previous analysis, showing a possible decline in the yield of the stock following the introduction of FADs. The last model estimated a general increase in the efficiency of the fishing gears of about 5% annually for this species.

Western stock

The development of nominal abundance indices of Brazilian baitboat fisheries and Venezuelan purse seiners seem, obtained up to 2004, seemed to show a stable stock status **(SKJ-Figure 11)**.

SKJ-4 Effects of current regulations

The Committee could not determine if the effect of the FADs on the resource is only at local level or if it had a broader impact, affecting the biology and behaviour of the species. If this is the case, maintaining high concentrations of FADs could reduce the productivity of the overall stock.

There is currently no specific regulation in effect for skipjack tuna. However, with the aim of protecting juvenile bigeye tuna, French and Spanish boat owners voluntarily decided to apply a moratorium for fishing under floating between November and the end of January for the 1997-1998 period and 1998-1999. The Commission recommended the implementation of a similar moratorium that was from 1999 to January 2005. This moratorium has had an effect on skipjack catches made with FADs.

On the basis of a comparison of average catches between 1993-1996, prior to the moratoria, and those between the 1998-2002 period, the average skipjack catches between November and January for the purse seine fleets that applied the moratoria, were reduced by 64%. During the whole period when the moratoria had been applied (1998-2002), the average annual skipjack catches by purse seine fleets that applied the moratoria decreased by 41% (42,000 t per year). However, this decrease is likely a combined result of the decrease in effort and the impact of the moratoria (the average annual catch per boat decreased only 18% between these two periods).

A new regulation on time-area stratum of fishing effort of the surface fisheries was proposed by the Commission and studied by the Workshop on the mortality of juveniles (see section 9.4). It was noted that compared to the 2003 landings, the catches of skipjack would increase about 7.5% if this new regulation stratum replaced the moratoria.

SKJ-5. Management recommendations

No management recommendations were proposed for this species.

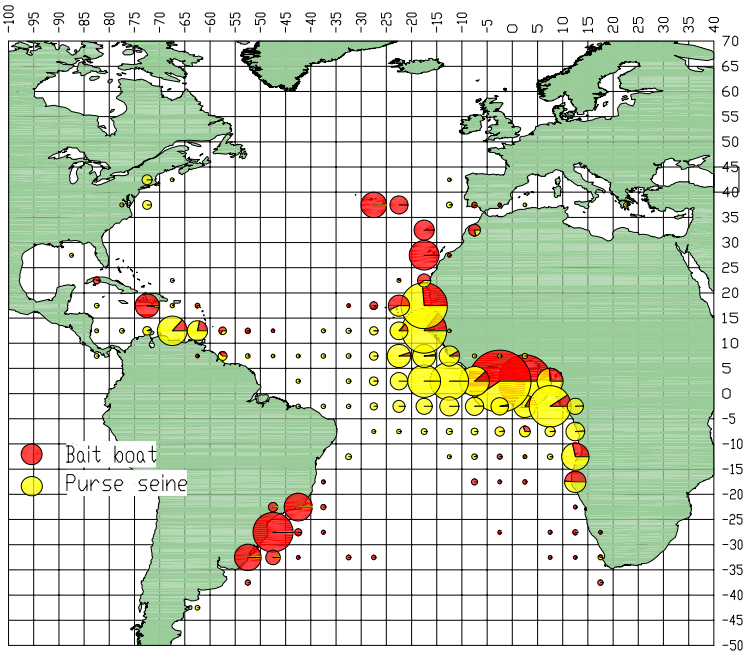
ATLANTIC SKIPJACK TUNA SUMMARY		
	East Atlantic	**West Atlantic**
Maximum Sustainable Yield	Not estimated	Not estimated
Current (2004) Yield	134,274 t	26,910 t
Current Replacement Yield	Not estimated	Not estimated
Relative Biomass (B_{2004}/B_{MSY})	Not estimated	Not estimated
Relative Fishing Mortality: F_{2004}/F_{MSY}	Not estimated	Not estimated
Management measures in effect	None	None

SKJ-Table 1. Estimated Catches (t) of Skipjack tuna by major Area, Gear and Flag --Prises estimées (t) de listao par zone, engin et pavillon---Capturas estimadas (t) de listado por zona, arte y bandera

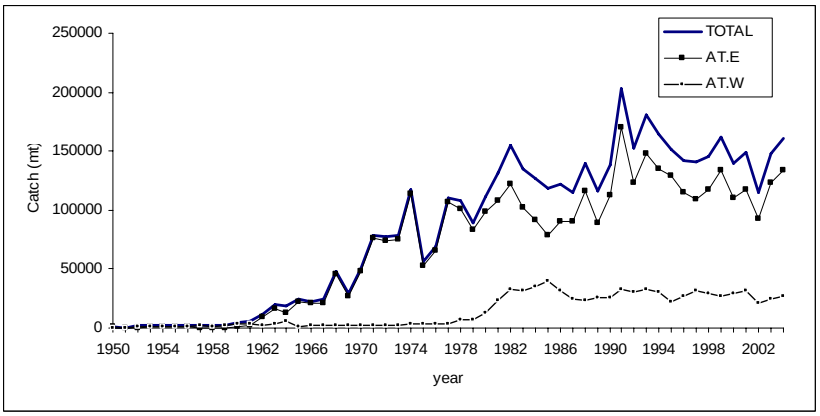
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL		111173	131061	154909	135038	126826	118713	122172	114566	139962	116120	138659	203175	152815	180929	164435	151249	142118	141079	145875	161514	139935	149301	114882	147728	161089
	AT.E	98774	107941	122368	102669	91230	78441	90021	90402	116226	89738	112549	169771	122660	147708	134486	129390	114557	109367	116790	134159	110630	117850	93258	123599	134174
	AT.W	12388	23073	32520	31839	35596	40272	32151	24164	23736	26382	26110	33404	30155	33221	29949	21859	27561	31712	29085	27356	29306	31451	21507	24125	26910
	UNCL area	11	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	5	4
AT.E	Longline	0	22	2	62	22	6	19	6	4	9	0	5	3	2	10	3	7	47	85	42	48	53	33	78	308
	Purse seine	56734	66473	74824	65492	61795	48348	58353	50553	66875	47260	74802	126264	85548	115022	96348	95388	82180	70558	73762	92425	77699	72698	68598	90474	86548
	Bait boat	38134	38918	44488	34873	28085	29868	30009	38803	48015	41000	36569	41612	35660	31656	37817	33691	32047	38624	42012	41403	30548	44437	23877	32466	46272
	Other surf.	3906	2528	3054	2242	1328	219	1640	1040	1332	1469	1178	1890	1449	1028	311	308	323	138	930	288	2335	662	750	580	1046
AT.W	Longline	1	9	23	8	25	24	8	6	9	25	23	33	29	20	16	33	19	12	21	58	23	60	143	95	231
	Purse seine	2887	4654	9705	11121	17958	11191	5208	4964	2315	2466	3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116	2296	2769
	Bait boat	9351	17999	22402	20057	16771	28490	25278	18675	21057	23292	22246	23972	20852	19697	22645	17744	23741	26797	24724	23881	25754	25142	18737	21366	23537
	Other surf.	149	410	390	653	842	567	1657	518	355	600	600	872	764	710	1577	2023	452	556	515	481	465	951	511	367	373
UNCL area	Longline	11	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5	4
	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	
AT.E	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	43	89	77	0	0	
	Angola	3482	2532	2257	318	46	131	56	80	30	85	69	66	41	13	7	3	15	52	2	32	14	14	14	14	
	Benin	30	60	68	38	10	20	11	5	3	7	2	2	2	2	2	2	2	7	3	2	2	0	0	0	
	Bulgaria	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Cape Verde	2094	1588	1636	1400	1391	2030	877	2076	1456	971	806	1333	864	860	1007	1314	470	591	684	962	789	794	298	371	371
	Cayman Islands	289	1800	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	
	Chinese Taipei	0	0	2	2	7	4	0	0	1	3	0	5	3	2	10	3	5	47	73	39	41	24	23	26	18
	Congo	1250	200	0	5	10	8	8	8	8	11	12	9	9	10	7	7	6	0	0	0	0	0	0	0	
	Cuba	196	198	189	135	310	246	569	81	206	331	86	0	0	7	0	0	0	0	0	0	0	0	0	0	
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1173	259	292	143	559
	EC.España	26384	35458	38016	28934	46659	35100	41992	33076	47643	35300	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25441	44832	38747
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.France	25767	26926	31132	29727	12994	13645	13045	17114	16504	15211	17099	33271	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16637	19899	21879
	EC.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	
	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	99
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	29	34
	EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Portugal	1954	2825	5530	1113	3974	2409	5446	8420	14257	7725	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958	4315	8477
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11	51	26	0	59	76	21	101	0	0	
	Ghana	5812	7858	18272	24376	20697	19082	22268	24347	26597	22751	24251	25052	18967	20225	21258	18607	19602	27667	34150	43460	29950	43340	31887	32766	33600
	Japan	12304	12935	9930	6002	1504	2098	2031	1982	3200	2243	2566	4792	2378	0	0	0	0	0	0	0	0	1	0	0	
	Korea, Republic of	6718	7538	2827	1553	699	153	5	6	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Maroc	5001	3017	3956	2532	885	1015	1222	1041	428	295	1197	254	559	312	248	5024	684	4513	2486	858	1199	268	281	524	809
	* NEI (ETRO)	0	0	1560	3383	927	590	540	791	2994	2263	10516	6054	6941	9482	6521	6146	10220	4901	6749	7701	7128	8121	8544	7696	28232
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	1	0	0	0	8	0	0	0
	* Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7096	8444	8553	9932	10008	13370	5427	12084	
	Norway	0	0	0	0	0	0	0	581	738	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	1735	144	2541	1611	0	0	0	0	0	0	0	8312	8719	13027	12978	14853	5855	1300	572	1308	1560	281	342	0	
	Rumania	8	0	0	0	0	0	3	0	0	59	142	349	73	0	0	0	0	0	0	0	0	0	0	0	
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	1175	1110	540	1471	1450	381	1146	2086	1426	374	0	0	0	
	S. Tomé e Príncipe	33	90	78	103	18	20	20	20	21	22	25	24	25	15	0	0	0	7	0	0	0	0	0	0	
	Senegal	0	0	0	0	0	0	0	0	0	47	134	652	260	95	59	18	163	455	1963	1631	1506	1271	1046	733	1271
	South Africa	48	110	37	104	14	66	101	88	157	96	17	15	7	6	4	4	1	6	2	1	0	1	0	2	2
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
	U.S.A.	2608	2800	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	U.S.S.R.	2991	1750	3957	1223	1000	1404	1688	547	1822	1915	3635	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UK.Sta. Helena	70	112	271	103	85	62	139	139	158	397	171	24	16	65	55	115	86	294	298	13	64	205	63	63	63
	Venezuela	0	0	0	0	0	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AT.W	Argentina	17	1	137	243	505	101	138	90	7	111	106	272	123	50	1	0	0	0	0	0	0	0	0	0	
	Barbados	0	78	72	39	48	36	33	21	3	9	11	14	5	6	6	6	5	5	10	3	3	0	0	0	
	Brasil	6071	13913	18322	15945	13567	25101	23155	16286	17316	20750	20130	20548	18535	17771	20588	16560	22528	26564	23789	23188	25164	24146	18338	20416	23037
	Canada	0	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Chinese Taipei	0	9	18	6	6	3	1	2	7	19	0	32	26	9	7	2	10	1	2	1	0	1	16	14	25
	Colombia	0	0	0	0	0	0	0	0	0	0	0	0	0	2074	789	1583	0	0	0	0	0	0	0	0	

		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
	Cuba	2255	1086	1134	1700	1248	1632	1277	1101	1631	1449	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0	0	
	Dominica	0	0	0	0	0	0	0	0	0	0	60	38	41	24	43	33	33	33	33	85	86	45	55	51	30
	Dominican Republic	59	71	80	106	68	204	600	62	63	117	110	156	135	143	257	146	146	0	0	0	0	0	0	0	
	EC.España	0	0	0	209	2610	500	0	0	0	0	0	1592	1120	397	0	0	0	0	0	1	1	0	0	0	
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	3	29
	Grenada	8	1	1	15	12	7	9	5	22	11	23	25	30	25	11	12	11	15	23	23	23	15	14	16	21
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0	0	0	0	0	
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Korea, Republic of	0	0	0	0	17	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mexico	1	3	0	25	30	48	11	13	10	14	4	9	8	1	1	0	2	3	6	51	13	54	71	75	9
	Netherlands Antilles	40	40	40	40	40	40	40	40	40	40	40	40	40	45	40	35	30	30	30	30	30	0	0	0	
	Panama	1026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	17	28	29	27	20	66	56	53	37	42	57	37	68	97	264	92	251
	Sta. Lucia	40	37	38	35	64	53	76	60	53	38	37	51	39	53	86	72	38	100	263	153	216	151	106	132	137
	Trinidad and Tobago	0	0	0	1	2	1	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	
	U.S.A.	981	2753	33	697	853	1814	1115	734	57	73	304	858	560	367	99	81	85	84	106	152	44	70	88	79	102
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Venezuela	1890	4900	12645	12778	16526	10712	5690	5750	4509	3723	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	3003	6870	2554	3247	3270
UNCL area	Chinese Taipei	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5	4
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Korea, Republic of	4	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	

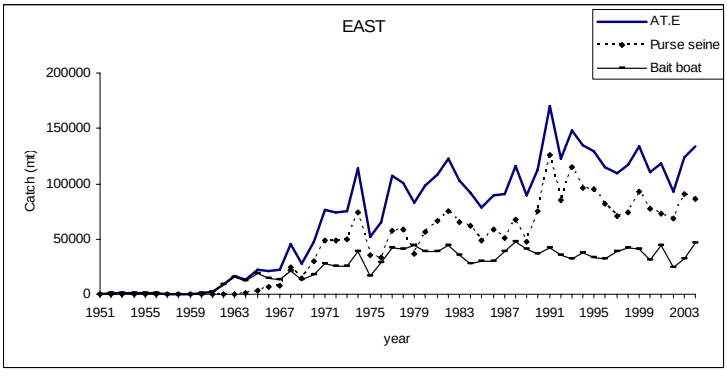
* Netherlands Antille's catch is included on NEI (ETRO) for 2004.
La capture de Antilles néerlandaises est incluse au NEI (ETRO) au titre de 2004.
La captura de Antillas Holandesas está incluida en NEI (ETRO) para 2004



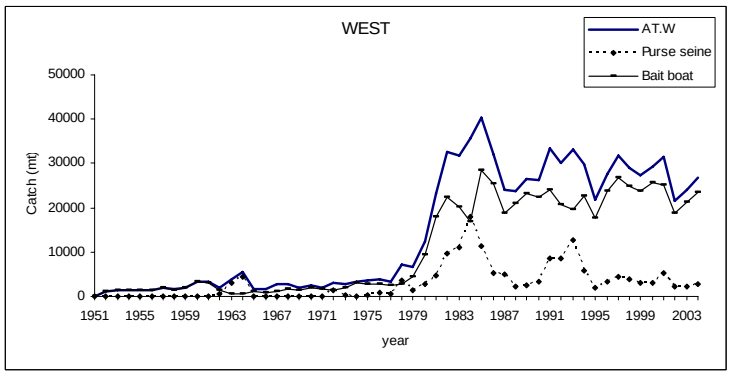
SKJ-Figure 1. Geographical distribution of skipjack catches by gear for the period 1950-2003.



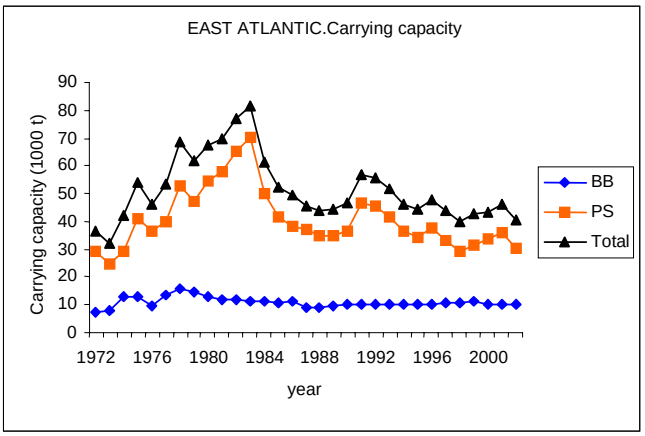
SKJ-Figure 2. Total eastern and western Atlantic skipjack landings (1950-2004).



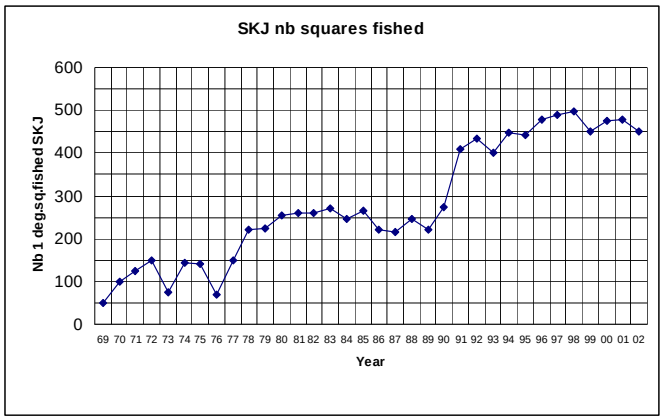
SKJ-Figure 3. Reported landings of skipjack in the eastern Atlantic, by major gear (1950-2004).



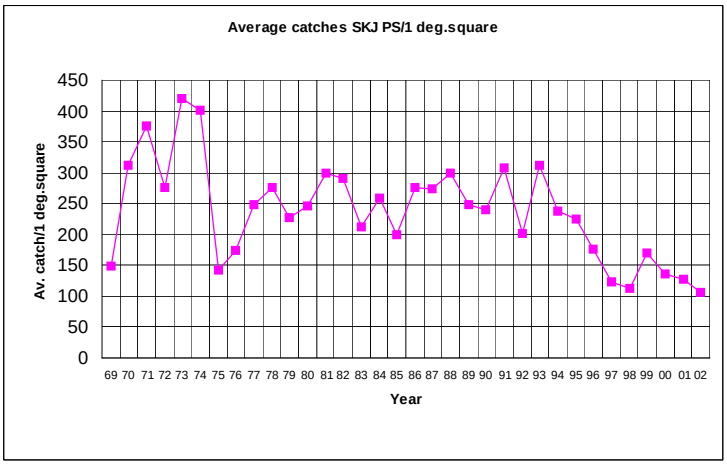
SKJ-Figure 4. Reported landings of skipjack in the western Atlantic, by major gear (1950-2004).



SKJ-Figure 5. Carrying capacity (in t) of purse seiners and baitboats in the eastern Atlantic (1969-2002).

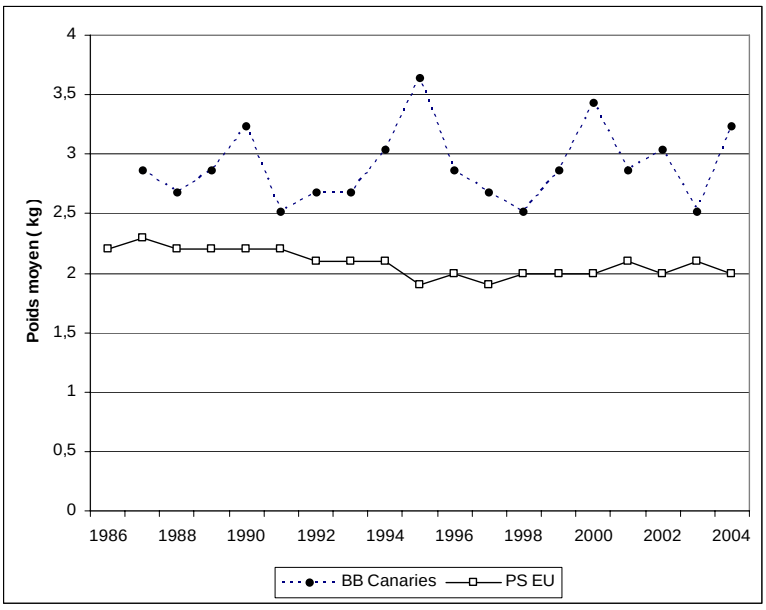


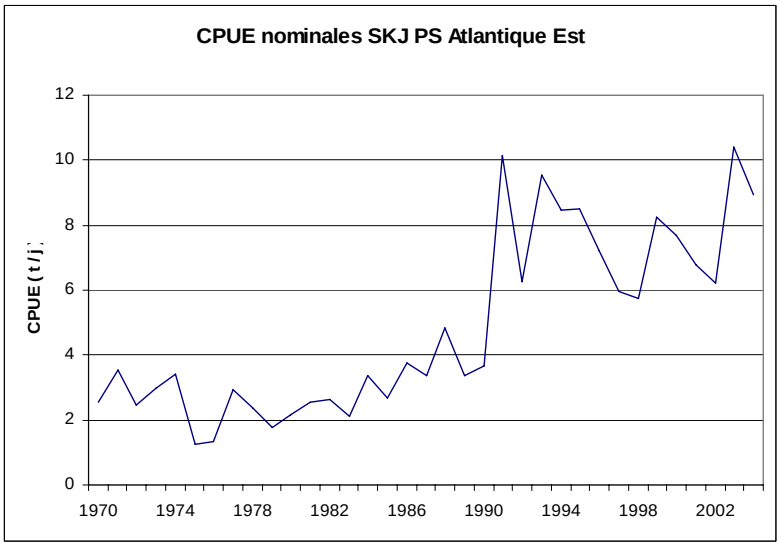
SKJ-Figure 6. Number of 1x1 degree areas where skipjack catches were reported in the eastern Atlantic purse seine fisheries (1969-2002).



SKJ-Figure 7. Average skipjack catch per 1x1 degree area (where catches were reported) by the eastern Atlantic purse seine fishery (1969-2002).

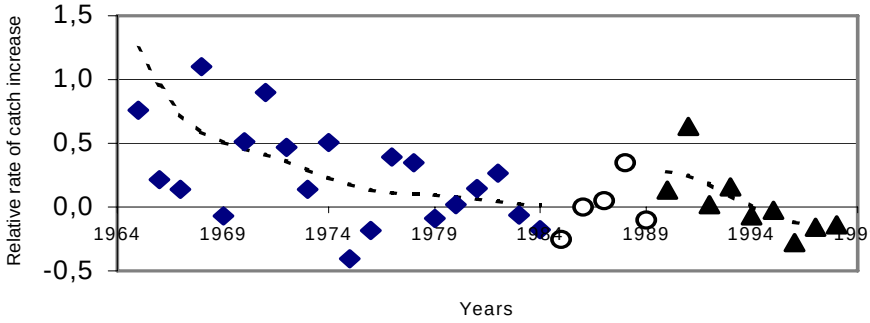
SKJ-Figure 8. Development of the average weight of skipjack tuna landed in the East Atlantic.

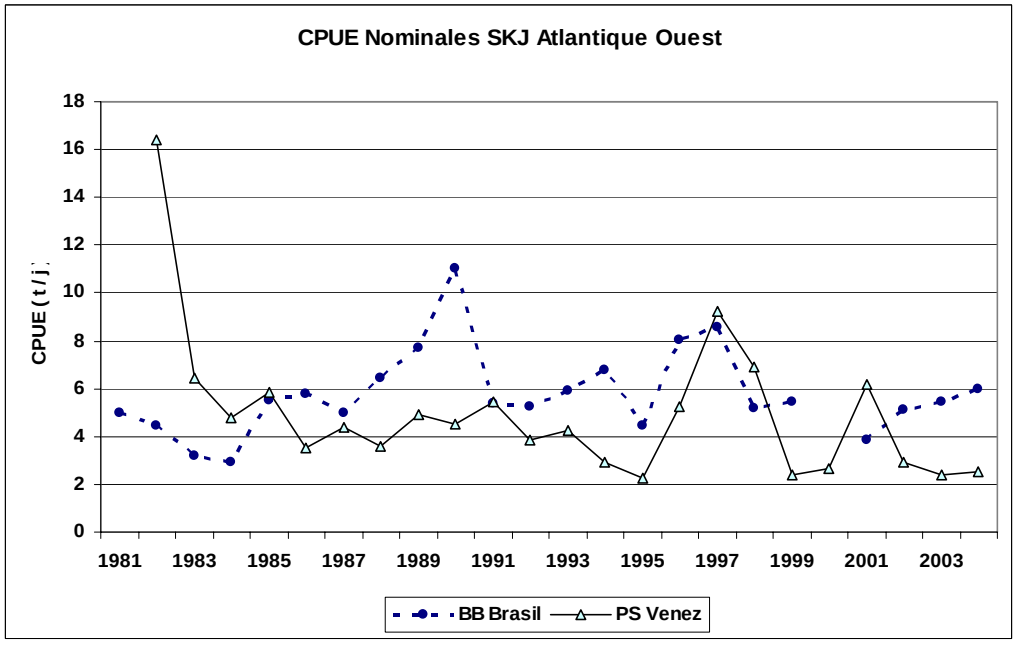




SKJ-Figure 9. Development of nominal CPUE of SKJ from European purse seiners in the East Atlantic.

SKJ-Figure 10. Changes over time in Grainger and Garcia index (RRCI revised to account for the assumption concerning the increase in fishing effort) for eastern Atlantic skipjack for the two main historical periods of the fishery. Years that correspond to major changes in the fishery were not used and are represented by empty circles.





SKJ-Figure 11. Development of nominal CPUEs of SKJ from Venezuelan purse seiners CPUEs and Brazilian baitboats CPUEs in the West Atlantic.

8.4 ALB – ALBACORE

The last assessment of the North stock was conducted in 2000 (1975-1999) and that of the Southern stock in 2003; no assessment of the Mediterranean stock has ever been carried out. This report updates the latest information and catch data available for 2004.

Complete information for North stock assessment can be found in Col. Vol. Sci. Pap. ICCAT, 52(4): 1283-1390 and for South stock in Col. Vol. Sci. Pap. ICCAT, 56(3): 1223-1311.

ALB-1. Biology

Albacore is a temperate tuna widely distributed throughout the Atlantic Ocean and Mediterranean Sea. On the basis of the biological information available for assessment purposes, the existence of three stocks is assumed: north and southern Atlantic stocks (separated at 5ºN) and a Mediterranean stock (**ALB-Figure 1**).

A paper was presented on albacore growth for the North Atlantic stock, which supported previous estimates on albacore growth. Present available knowledge about habitat distribution according to size, growth, spawning areas and maturity estimates remained the same for the three albacore stocks considered.

ALB-2. Description of fisheries or fisheries indicators

North Atlantic

The northern stock is exploited by surface and longline fisheries targeting mainly immature fish (50cm to 90 cm FL) and sub-adult and adult albacore (60-120 cm FL) respectively. The main surface fisheries are carried out by EC fleets (Spain, France, Portugal and Ireland) in the Bay of Biscay, in the adjacent waters of the northeastern Atlantic, and in the vicinity of the Canary and Azores Islands. The main longline fleet is of Chinese Taipei and operates in the central and western North Atlantic. Total reported landings for the North Atlantic generally declined since 1983, largely due to a reduction of fishing effort by traditional surface (trolling and baitboats) and longline fisheries (**ALB-Table 1**; **ALB-Figure 2**). Some stabilization followed in the 1990s, mainly due to the increased effort and catch by new surface fisheries (driftnets and mid-water pair pelagic trawl) with a peak in 1993 at 38,063 t. Catches decreased to the lowest on record in 2002 caused by a decrease in catches in the surface fishery. The declared catch in 2004 was 25,460 t, and was similar to that of 2003 and higher than the total reported landings for 2002. The surface fisheries accounted for the bulk of the total catch (72%) in 2004. The troll fleet catch increased by approximately 40 % and mid–water pair pelagic trawl fleet catch decreased by about 33% in comparison to 2003 catches.

South Atlantic

The recent total annual South Atlantic albacore landings were largely attributed to four fisheries, namely the surface baitboat fleets from South Africa and Namibia, and the longline fleets from Brazil and Chinese Taipei (**ALB-Table 1**; **ALB-Figure 2**). The surface fleets are entirely albacore directed and mainly catch juvenile fish (70-90 cm FL). These fisheries operate seasonally, from October to May, when albacore are available in coastal waters. The longline fleets consists of vessels that target albacore and vessels that take albacore as a by-catch in swordfish- or bigeye-directed fishing operations. On average, the longline vessels catch larger albacore (60-120 cm) than the surface fleets.

Total reported albacore landings for 2004 was 22,468 t and decreased by about 5,500 t compared to 2003. Furthermore, the total reported landings for 2004 has been the lowest on record since 1984. The decline in catch is likely due to a reduction in fleet size as is the case for Chinese-Taipei and Brazil. Chinese-Taipei longliners stopped fishing for Brazil in 2003, which resulted in albacore only being caught as a by-catch in swordfish- and tropical tuna-directed longline fisheries. In addition, the decreased availability of albacore in the inshore waters of South Africa and unfavorable foreign currency exchange rates in the last two years has caused a general reduction in the number of active baitboat vessels. There has also been an increasing component of the South African baitboat fleet which has shifted targeting to yellowfin tuna in the last two years.

Mediterranean

Reported landings in 2004 accounted for 4,847 t, which represents a decrease of 3,045 t in respect to 2003 catches, which are the largest catch reported in the time series for the Mediterranean Sea (**ALB-Table 1** and **ALB-Figure 2**). The 2004 albacore fishing season in the Mediterranean was affected by bad weather conditions in the late spring and autumn, the most important seasons for this fishery. This situation had resulted in a relevant reduction in catches compared to 2003, particularly remarkable from the EC-Italy catch, which showed a reduction of 47% and EC-Greece (18%). The situation of catch statistics in the Mediterranean appears still incomplete, because albacore catches are known to happens almost in all the Mediterranean Sea, either as a target fishery or, more common, as by-catch in other pelagic fishery, however reporting number of fleets is scarce.

ALB-3. State of stocks

North Atlantic

In 2003 the Committee concluded that it was inappropriate to proceed with a VPA assessment based on the catch-at-age until the catch-at-size to catch-at-age transformation is reviewed and validated. In 2005 a document was presented on the analyses of catch-at-size and identifying the source of bias in the catch-at-age of the North Atlantic albacore stock. The Committee recommends holding a data preparatory working group meeting to allow for a thorough revision of North Atlantic stock prior to the next assessment in 2007.

Consequently the current state of the north albacore stock is based primarily on the last assessment conducted in 2000 together with observations of CPUE and catch data provided to the Committee in 2003.

The Committee noted that CPUE trends have varied since the last (2000) assessment, and in particular differed between those representative of the surface fleets (Spain Troll age 2 and Spain Troll age 3) and those of the longline fleets of Japan, Chinese Taipei and the United States (**ALB-Figure 3**). The Spanish age 2 troll series, while displaying an upward trend since the last assessment, nonetheless declines over the last 10 years. For the Spanish age 3 troll series the trend in the years since the last assessment is down, however, the trend for the remainder of the last decade is generally unchanged. For the longline fleets, the trend in CPUE indices is either upwards (Chinese Taipei and US) or unchanged (Japan) in the period since the last assessment. However, variability associated with all of these catch rate estimates prevented definitive conclusions about recent trends of albacore catch rates.

Equilibrium yield analyses, carried out in 2000 and made on the basis of an estimated relationship between stock size and recruitment, indicate that spawning stock biomass was about 30% below that associated with MSY (**ALB-Figure 4**). However, the Committee noted considerable uncertainties in these estimates of current biomass relative to the biomass associated with MSY (B_{MSY}), owing to the difficulty of estimating how recruitment might decline below historical levels of stock biomass. Thus, the Committee concluded that the northern stock is probably below B_{MSY}, but the possibility that it is above it should not be dismissed. However, equilibrium yield-per-recruit analyses made by the Committee in 2000 indicate that the northern stock is not being growth-over fished ($F < F_{max}$; **ALB-Figure 5**).

South Atlantic

In 2003 the Committee assessed the status of the Southern Atlantic albacore stock with an age-structured production model (ASPM), using the same specifications as in 2000, to provide a Base Case assessment for South Atlantic albacore. Results were similar to those obtained in 2000, but the confidence intervals were substantially narrower in 2003 than in 2000. In part this may be a consequence of additional data now available, but the underlying causes need to be investigated further. The estimated MSY and replacement yield from the 2003 Base Case (30,915 t and 29,256 t, respectively) were similar to those estimated in 2000 (30,274 t and 29,165 t). In both 2003 and 2000 the fishing mortality rate was estimated to be about 60% of F_{MSY}. Spawning stock biomass has declined substantially relative to the late 1980s, but the decline appears to have leveled off in recent years (**ALB-Figure 6**) and the estimate for 2002 remains well above the spawning stock biomass corresponding to MSY. A statistical (Bayesian) age-structured production model was used for the first time in 2003. The results from this model were qualitatively similar to those from the ASPM. Projections were carried out using this alternate model.

Mediterranean

Due to the lack of proper data, an assessment of the Mediterranean stock has never been carried out by the ICCAT Committee.

ALB-4. Effects of current regulations

North Atlantic

Since 2001, the Commission established a total allowable catch (TAC) of 34,500 t for this stock and, in 2003 extended it up to 2006. A 1998 Recommendation that limits fishing capacity to the average of 1993-1995 also remains in force. The Committee noted that reported catches for 2001, 2002, 2003 and 2004 have been below the TAC **(ALB-Table 1)** and is unable to assess whether or not these recommendations have had a direct effect on the stock.

South Atlantic

Since 1999, the Commission established the total allowable catch (TAC) for this stock (in 2001-2003 the TAC has been set to 29,200 t) and, in 2003 extended it to 2004. The Committee noted that reported catches have not exceeded the TAC in 2004. Also the total catch by Chinese Taipei, South Africa, Brazil and Namibia (21,640 t) did not exceed the 27,500 t catch limit of parties actively fishing for southern albacore [Res. 02-06]. Japan adhered to its by-catch limit of 4% of the total catch of bigeye tuna in the Atlantic Ocean [Rec. 03-06]. However, the Committee is unable to assess whether or not these catch limits have had a direct effect on the stock.

Mediterranean

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

ALB-5. Management recommendations

North Atlantic

The Committee reiterates the advice that in order to maintain a stable Spawning Stock Biomass in the near future, the catch should not exceed 34,500 t (the 1999 catch level) and extends it until the 2007 scheduled assessment.

South Atlantic

The Committee continues to recommend that in order to maintain SSB in the near future the catch should not exceed 31,000 t until the next scheduled assessment in 2007.

Mediterranean

There were no management recommendations for the Mediterranean stock.

ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY			
	North Atlantic[1]	**South Atlantic**[2]	**Mediterranean**
Current (2004) Yield	25,460 t[5]	22,468 t	4,847 t
Maximum Sustainable Yield	32,600 t (32,400-33,100)	30,915 t (26,333-30,915)	Unknown
Replacement Yield (2004)	Not estimated	29,256 t (24,530-32,277)	Not estimated
Relative Biomass[3]			
$B_{current}/B_{MSY}$	0.68 (0.52-0.86)	1.66 (0.74-1.81)	Not estimated
Relative Fishing Mortality[3,4]			
$F_{current}/F_{MSY}$	1.10 (0.99 - 1.30)	0.62 (0.46-1.48)	Not estimated
$F_{current}/F_{MAX}$	0.71 (0.66 - 0.78)	--	Not estimated
$F_{current}/F_{0.1}$	1.25 (1.14 - 1.39)	--	Not estimated
Management measures in Effect	[Rec. 98-08]: Limit number of vessels to 1993-1995 average. TAC: 34,500 t [Rec. 03-06]	[Rec. 03-07]: Limit catches to 29,200 t.	None

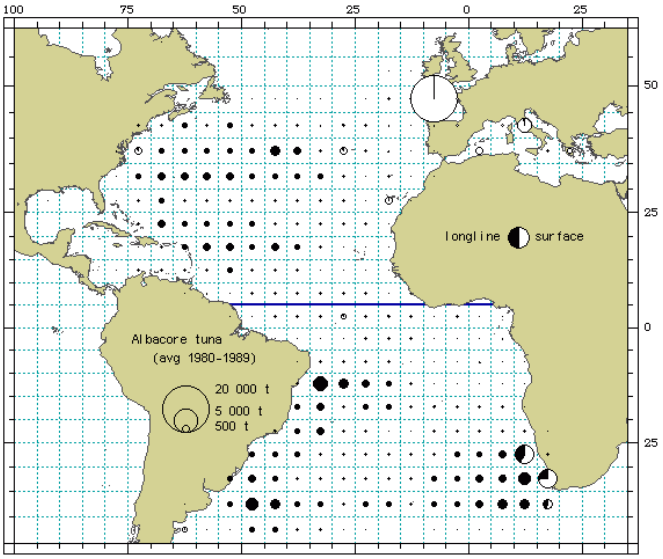
[1] VPA results based on catch data (1975-1999). 80% confidence intervals from bootstrap.
[2] ASPM results based on catch data (1956-2002). 80% confidence intervals from bootstrap.
[3] F_{1999} = North Atlantic, Geometric Mean 1996-1998.
[4] North "current" is from 2000 assessment (F_{1999}); South "current" is from 2003 assessment (F_{2002}).
[5] This figure includes reported catch, provisional catch reported to the Committee.

ALB-Table 1. Estimated Catches (t) of Albacore by major Area, Gear and Flag Prises estimées de germon (t) par zone, engin et pavillon Capturas estimadas (t) de atun blanco por zona, arte y bandera

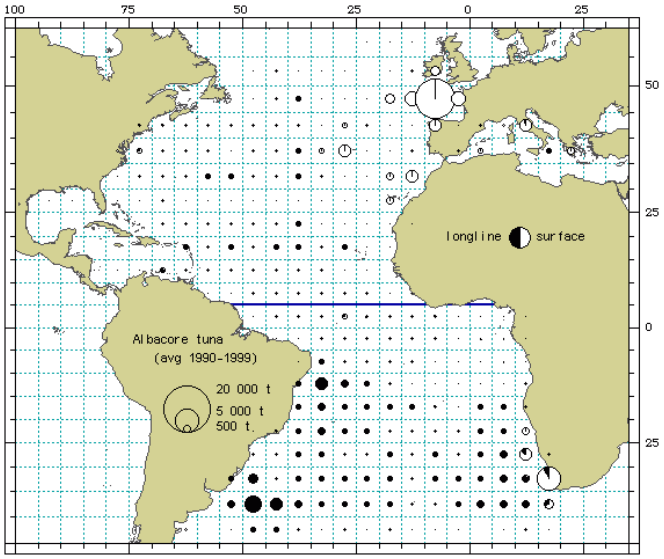
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL		62137	60071	73617	67643	59842	76052	88554	82738	68048	63342	67167	56342	69598	73078	71614	67512	60352	59439	58880	67295	71424	70259	60023	61375	52775
	AT.N	38707	34531	42673	51490	41829	40826	47554	38115	33878	32070	36557	27938	30815	38063	35036	38295	28780	28988	25587	34840	33762	25222	22632	25516	25460
	AT.S	22930	24040	29672	14918	14599	31097	37288	40630	30107	27212	28714	25866	35918	32516	34733	27231	27898	27802	30487	27553	29266	34508	31710	27967	22468
	MEDI	500	1500	1272	1235	3414	4129	3712	3993	4063	4060	1896	2378	2202	2130	1349	1587	3125	2541	2698	4851	5577	4866	5608	7893	4847
	UNCL area	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	73	0	
AT.N	Longline	9451	9819	13206	16863	19709	17413	21232	7296	3013	2228	2683	5304	3103	7020	7196	4776	4620	4044	3875	6621	6614	5975	6162	7290	6246
	Purse seine	16	0	84	364	555	59	60	1	97	12	1	222	139	229	278	278	263	0	91	55	191	263	118	211	348
	Bait boat	16170	13410	15857	21108	8305	12589	15202	18756	16752	15374	18625	8985	12449	15646	11967	16411	11337	9820	7562	8781	12113	6099	6639	7918	8128
	Trawl	0	1	0	0	0	2	0	262	1693	2240	1033	469	2603	1779	2131	3049	2571	2877	1318	4892	3703	5485	5331	3836	1089
	Troll	13059	10778	12831	12788	11029	10654	10847	11457	11329	10554	10350	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4007	5249	7487
	* Other surf.	10	523	694	367	2231	108	213	343	994	1662	3865	3999	5173	7279	7506	3555	3337	4378	6846	7646	6119	3089	376	1013	2162
AT.S	Longline	20671	20426	25255	11941	9834	22672	29815	30964	21828	19407	21590	21859	26519	23650	24224	19718	20472	19447	19699	20588	22282	23747	21636	20603	14694
	Purse seine	464	1804	1349	699	365	182	244	948	185	0	4	416	2516	1448	1079	412	257	118	435	183	53	25	39	309	0
	Bait boat	1346	1721	2575	1794	4166	7909	6829	8181	7696	7393	5981	3454	6490	7379	8947	7091	6960	8110	10353	6709	6873	10360	9712	6973	7475
	Other surf.	449	89	493	484	234	334	400	537	398	411	1139	137	393	39	483	10	209	127	0	73	58	377	323	82	299
MEDI	Longline	0	0	0	0	226	375	150	161	168	165	624	523	442	402	350	87	366	348	194	417	2800	2597	3706	4248	2345
	Purse seine	0	0	0	0	141	274	10	50	16	16	91	110	6	559	23	0	0	0	0	0	0	0	1	478	326
	Bait boat	0	900	539	535	1331	243	0	0	0	0	83	499	171	231	81	163	205	0	33	96	88	77	29	0	
	Troll	0	0	33	0	0	264	0	0	0	0	0	48	50	59	129	306	119	202	45	73	0	0	117	0	
	Other surf.	500	600	700	700	1716	2973	3552	3782	3879	3879	1098	1198	1533	879	766	1031	2435	1991	2426	4265	2689	2193	1755	3166	2176
UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	18	0	
	Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	
AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	5	5	
	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	
	Canada	0	0	0	0	0	0	0	0	47	22	6	5	1	9	32	12	24	31	23	38	122	51	113	56	27
	Canada (Japan)	0	0	0	0	0	0	1	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Cape Verde	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	8	20	0	0	21	16	57	196	155	32
	Chinese Taipei	7090	6584	10500	14254	14923	14899	19646	6636	2117	1294	3005	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4330	4557	4278
	Cuba	31	48	82	38	69	20	31	15	4	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	
	Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	323	121	73	95	0	0	0	
	EC.España	25202	20819	25478	29557	15685	20672	24387	28206	27557	25424	25792	17233	18176	18380	16998	20197	16323	17294	13285	15364	15965	9177	8952	12530	15379
	EC.France	3955	2929	2855	2391	2797	1860	1200	1921	2805	4050	3300	4123	6924	6293	5934	5304	4694	4618	3711	7189	6019	6344	4289	3641	2537
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100	755	175
	EC.Portugal	79	442	321	1778	775	657	498	433	184	169	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953	553	513
	EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	59	499	613	196	49	33	117	343	15	0	0	0	
	FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	
	Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	7	6	12	21	23	46	25
	Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Japan	1036	1740	781	1156	576	844	470	494	723	764	737	691	466	485	505	386	466	414	446	425	688	1126	713	684	1169
	Korea, Republic of	797	938	1326	478	967	390	373	18	16	53	34	1	0	8	0	0	2	1	0	0	0	0	0	0	
	Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	120
	Mexico	2	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	193	177	494	357	2551	601	525	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	
	Sierra Leone	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	91	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	300	1555	89
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	3	2	10	
	Trinidad	0	0	0	268	194	318	0	0	0	0	4	0	247	0	0	0	0	2	1	1	2	11	9	12	12
	U.S.A.	22	472	699	347	2206	98	251	301	288	243	357	479	438	509	741	545	472	577	829	315	406	322	480	444	646
	U.S.S.R.	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	0	0	
	Venezuela	300	331	137	823	1076	467	172	26	137	41	95	319	205	246	282	279	315	49	107	91	1374	349	162	424	457
	Argentina	4	2	7	55	209	153	356	469	344	354	151	60	306	0	2	0	0	0	0	0	0	0	0	0	
AT.S	Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	8	2	0	0	0	
	Brasil	476	276	800	731	732	382	520	395	421	435	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228	2647	522

		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
	Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	
	China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	89	26	30	26	112
	Chinese Taipei	18710	18187	22800	9502	7889	19643	27592	28790	20746	18386	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351	13288
	Cuba	27	53	29	36	67	27	24	10	2	1	2	17	5	3	0	0	0	0	0	0	0	0	0	0	
	EC.España	0	889	106	295	307	155	200	807	185	0	0	280	1943	783	831	457	184	256	193	1027	282	573	836	376	81
	EC.France	457	912	947	372	7	18	35	100	0	0	0	50	449	564	129	82	190	38	40	13	23	16	18	63	
	EC.Portugal	0	0	0	0	741	1357	1029	899	1153	557	732	81	184	483	1185	655	494	256	124	232	486	41	433	415	9
	Honduras (observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	1	6	0	0	0	0	
	Japan	333	558	569	188	224	623	739	357	405	450	587	654	583	467	651	389	435	424	418	601	554	341	213	299	468
	Korea, Republic of	803	682	563	599	348	511	321	383	180	54	19	31	5	20	0	0	18	4	7	0	18	1	0	5	37
	Maroc	0	0	113	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NEI-1	0	0	0	0	0	0	0	0	0	0	4	8	122	68	55	63	41	5	27	0	2	10	14	53	
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	915	950	982	1199	1429	1162	2418	3419	2962	3152	3328
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	192	0	2	0	0	0	
	Panama	167	129	210	0	0	0	280	924	0	0	0	240	129	168	213	12	22	0	3	14	0	0	0	0	
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	
	Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	South Africa	1850	2320	3180	2760	3540	6697	5930	7275	6570	6890	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507	3469	4502
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	
	U.S.A.	0	2	102	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	1	1	2	8	2	1
	U.S.S.R.	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UK.Sta. Helena	4	7	11	7	9	0	0	2	1	1	1	5	28	38	5	82	47	18	1	1	58	12	2	0	
	Uruguay	0	23	235	373	526	1531	262	178	100	83	55	34	31	28	16	49	75	56	110	90	90	135	111	108	120
MEDI	EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	12	30	255
	EC.España	0	900	572	535	1331	531	0	0	3	0	84	547	227	290	218	475	404	380	126	284	152	200	209	1	138
	EC.France	0	0	0	0	141	250	20	60	31	31	121	140	11	64	23	3	0	5	5	0	0	0	1	0	
	EC.Greece	0	0	0	0	0	0	484	500	500	500	500	500	500	1	1	0	952	741	1152	2005	1786	1840	1352	950	773
	EC.Italy	500	600	700	700	1942	3348	3208	3433	3529	3529	1191	1191	1464	1275	1107	1109	1769	1414	1414	2561	3630	2826	4032	6912	3671
	EC.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	0	2	0	10
	Ex. Yugoslavia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	0	0	0	0	0	0	0	0	
UNCL area	Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	
	NEI.Other	0	0	0	0	0	0	0	0	0	0	0	160	281	159	133	110	180	50	50	50	0	0	0	0	
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	382	210	363	289	369	58	58	0	0	0	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2819	5662	18	0	

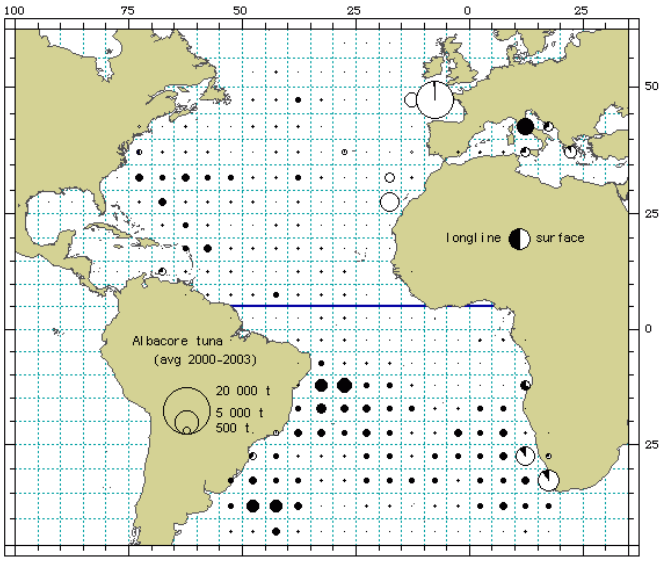
* For 2003 and 2004, most of the catch reported under "Other surf." gear were made by EC.France pelagic trawlers.
Pour 2003 et 2004, la plupart de la capture déclarée comme "Other surf." (autres engins de surface) a été réalisée par les chalutiers pélagiques de CE_France.
Para 2003 y 2004, la mayor parte de la captura comunicada como "Other surf." (Otros artes de superficie) fue realizada por los arrastreros pelágicos de CE_Francia.



1980-1989

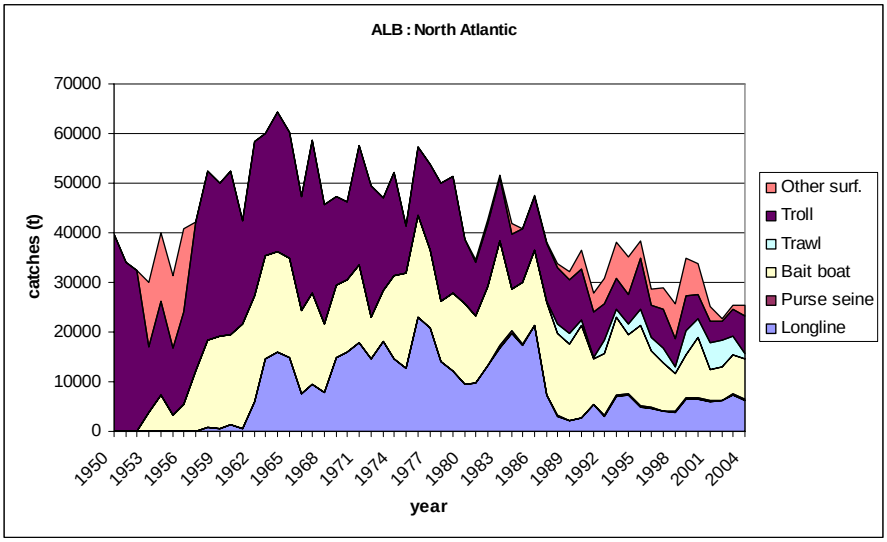


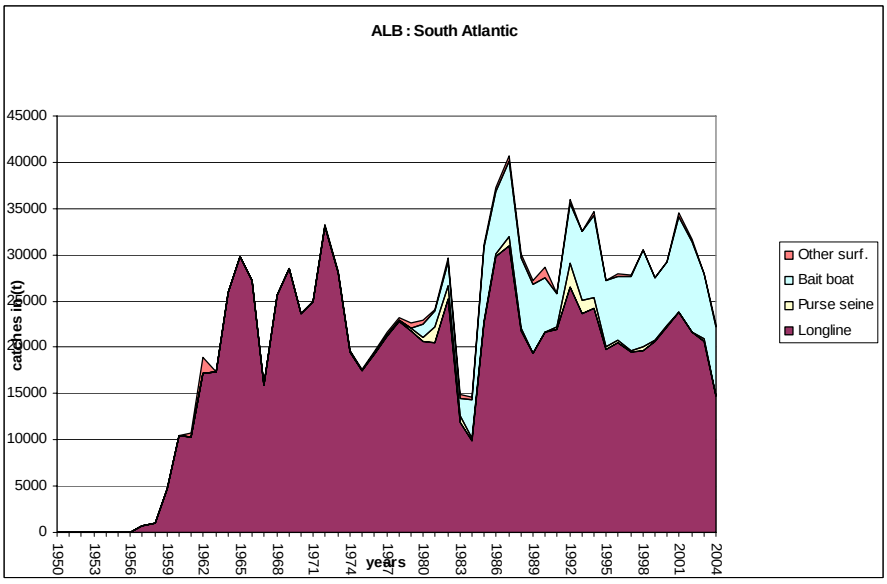
1990-1999

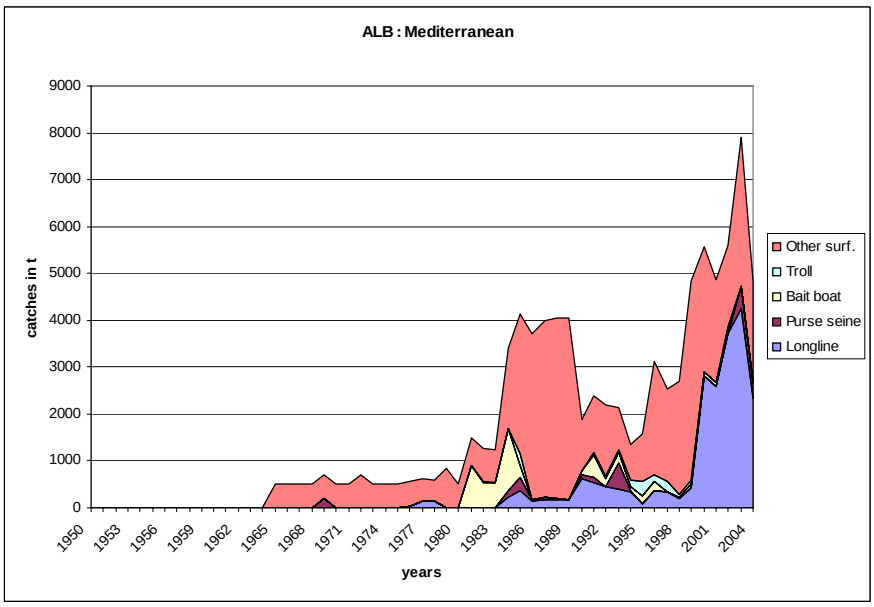


2000-2003

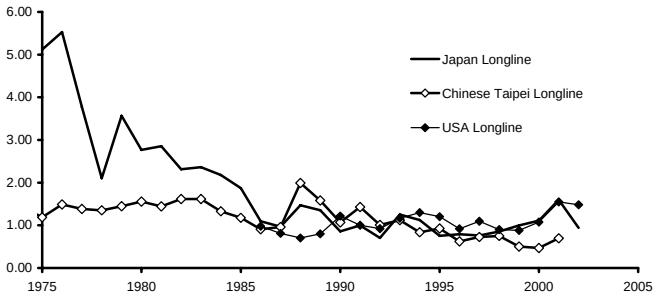
ALB-Figure 1. Average albacore catches by decade and gear group.

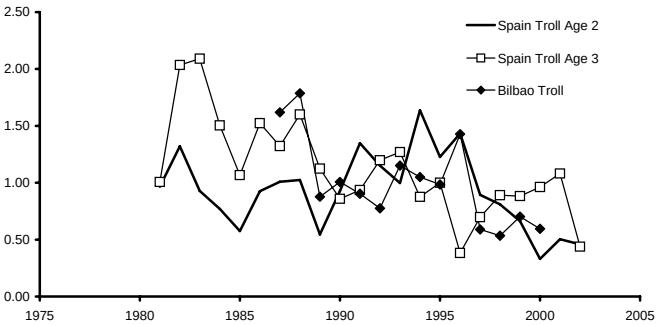


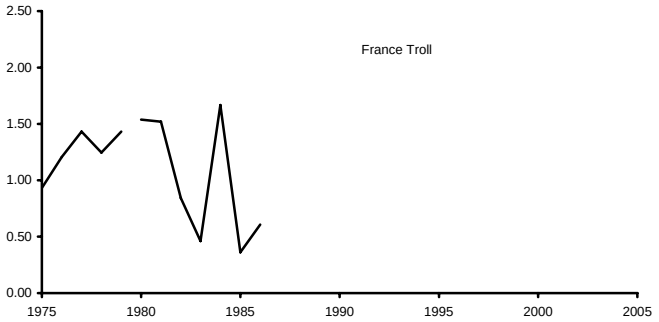


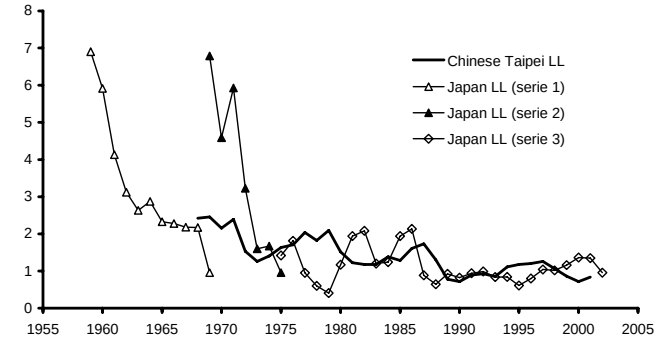


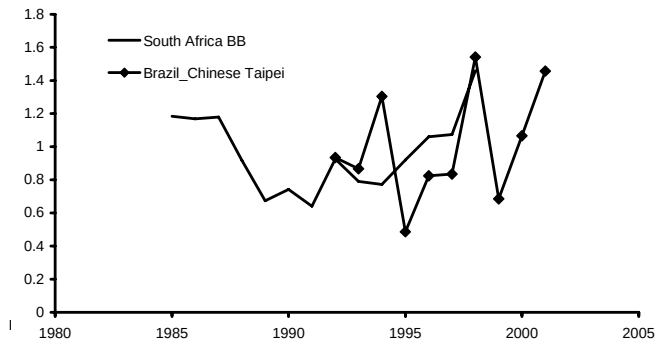
ALB-Figure 2. Albacore landings (t) by stock and major gear types, 1950-2004. Data from the Mediterranean Sea are highly uncertain and provisional in recent years.



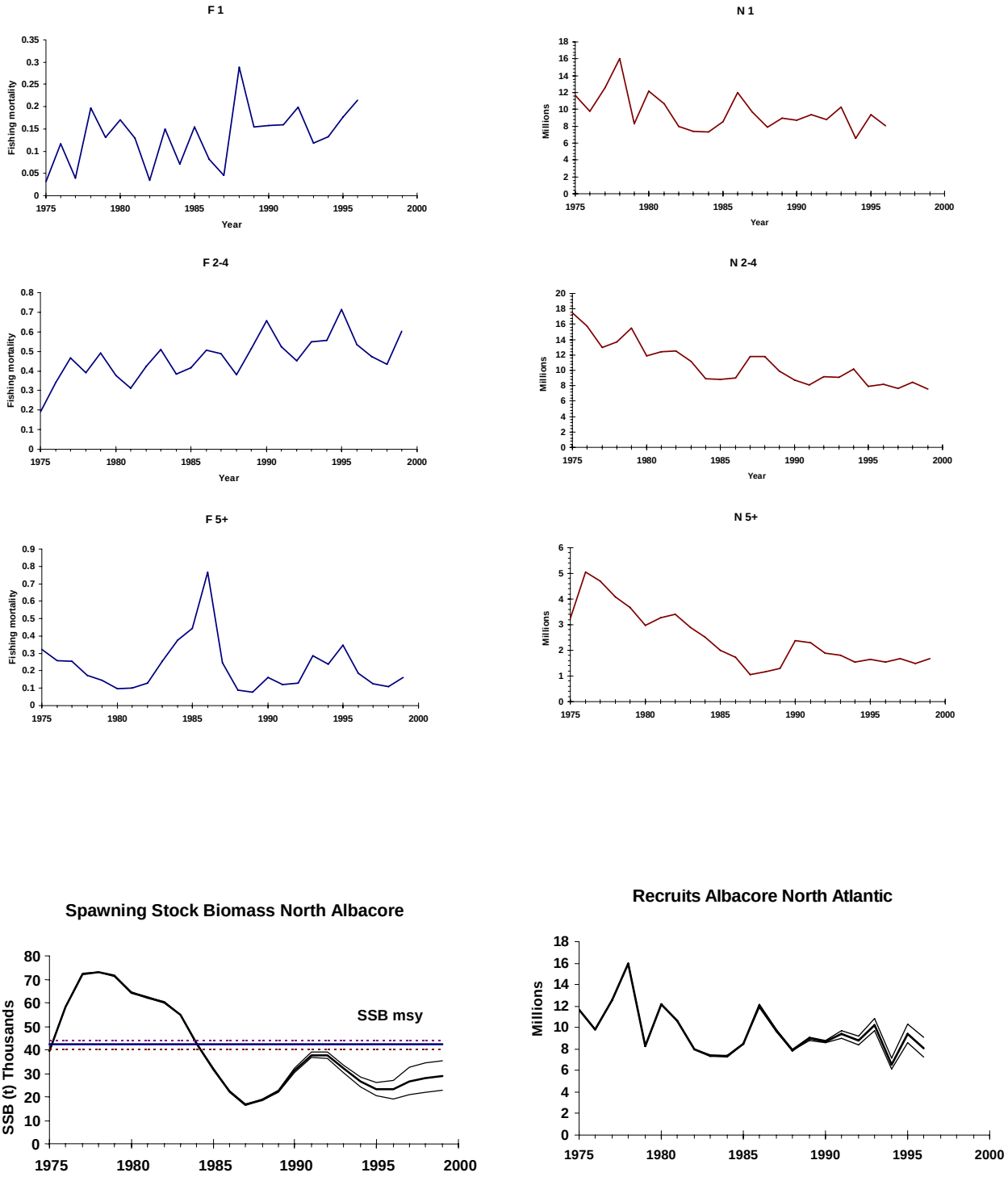




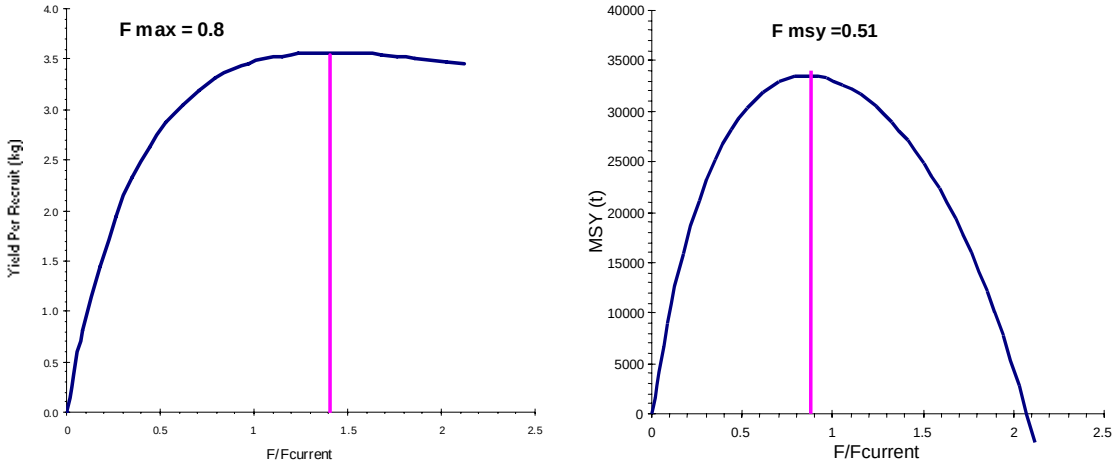




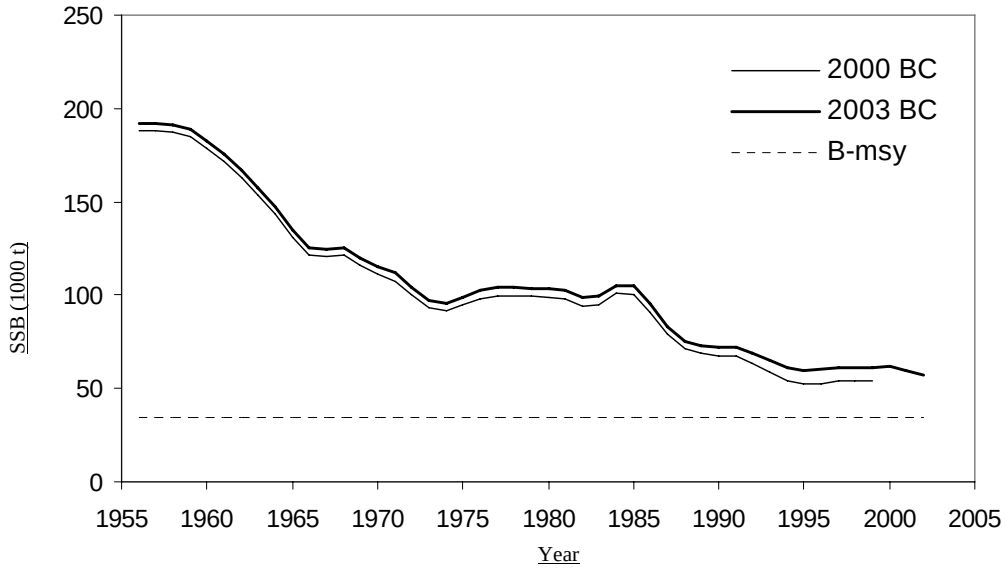
ALB-Figure 3. CPUE series for North (top 3 panels) and South Atlantic (bottom 2 panels) albacore (scaled to the means).



ALB-Figure 4. North Atlantic albacore Base Case VPA estimates (2000 assessment) of fishing mortality rates (F) and numbers of fish by age-groups (top 6 panels), and spawning stock biomass and recruits with 80% confidence limits (bottom panels).



ALB-Figure 5. Yield-per-recruit (left) and equilibrium yield (right) estimated by the 2000 VPA for the northern albacore stock. Fishing mortality (x-axis) is relative to current fishing mortality (F_{1999} = 0.57).



ALB-Figure 6. Spawner biomass for South Atlantic albacore estimated from ASPM fits for the 2003 Base Case (heavy line) and 2000 Base Case (thin line), for comparison.

8.5 BFT – ATLANTIC BLUEFIN TUNA

Present fisheries for Atlantic bluefin tuna are distributed from the Gulf of Mexico to Newfoundland in the West Atlantic, from roughly the Canary Islands to south of Iceland in the East Atlantic, and throughout the Mediterranean Sea **(BFT-Figure 1)**. The last assessments for Atlantic bluefin tuna were conducted in 2002. This document focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Atlantic bluefin tuna should consult the report of the 2004 SCRS meeting.

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

- Section 16.4 contains recommendations regarding management issues identified by the Commission's Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies at its 2005 meeting in Japan.
- Section 16.7 contains recommendations in regards to the prioritized Bluefin Tuna Research Program that the SCRS is proposing in order to address issues identified by the Commission's Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies [Rec. 02-11].
- SCRS/2004/013 summarizes the main findings and recommendations of the 2004 Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna. These relate to main data-related problems that the Committee identifies for the assessment of the eastern stock, namely: (i) probable misreporting of Task I data, (ii) the low proportion of size samples, (iii) the very large amount of substitutions to estimate the size composition of the various fleets for which no size samples are available, and, (iv) high uncertainties in the ageing of older age-classes.
- The bluefin research program planning and preliminary time-area closure analyses are provided in Col. Vol. Sci. Pap. ICCAT, 58(2), 662-699.
- **Appendix 7** reports on the 2005 GFCM/ICCAT discussions on sustainable bluefin farming practices.
- **Appendix 8** summarizes the main activities and future plan for the Bluefin Year Program (BYP).

BFT-1. Biology

More than 20 scientific documents related to bluefin tuna biology were presented to the 2005 SCRS. Many of the contributions dealt with the important issue of stock structure and mixing, and new information is available for both stocks. In particular, studies of otolith microchemistry and genetics have resulted in advances in our understanding of this component of the biology of bluefin tuna. These results continue to advance our knowledge about the overlapping distribution of fish originating from the east and the west. Therefore, the SCRS continues to question present hypotheses on stock identification. While these results are promising, more complete sampling and development of appropriate analytical approaches are required. The Committee also received contributions relating to age and growth, sampling, parasitology and condition of bluefin tuna.

BLUEFIN TUNA - WEST

BFTW-2. Fishery indicators

A noteworthy pattern of change in the fisheries since 1998 has been the trend of increase followed by a trend of decrease in catches to below TAC level. The reported total catches of western Atlantic bluefin tuna increased from about 2600 t in 1998 to about 3,200 t in 2002 and has subsequently fallen below 2,000 t in 2004 **(BFT-Table 1; BFT-Figure 2)**. The 2002 catches were the highest since 1981; however the 2004 catches were the lowest since 1982, when ICCAT catch restrictions were first established.

The Japanese longline fishery catch in the West Atlantic in 2003 was a substantial decrease from its 2002 catch level, but increased in 2004 to a level somewhat below its average catch from 1993-2002. This variation resulted from the adjustments made by Japan for previous quota overages. The Canadian reported landings remained at relatively stable levels over the past decade. Recent declines in U.S. landings have been attributed to a general lack of availability of large fish in the fisheries off the northeastern U.S. coast for the past several years. **BFT-Table 1** provides details on country specific catches.

BFTW-3. State of the stock

The 2002 assessment results indicate that the spawning stock biomass (SSB) declined steadily from 1970 (the first year in the assessment time series) through the late 1980s, before leveling off at about 20% of the level in 1975 (which has been a reference year used in previous assessments). A steady decline in SSB since 1997 was estimated, leaving the 2001 SSB at 13% of the 1975 level. The 2002 assessment also indicated that the fishing mortality rate during 2001 on the spawning stock biomass (SSB) was the highest level in the series used for the assessment.

While the large decline in SSB since the early 1970s is clear from the assessment, the potential for rebuilding is less clear. Key issues are the reasons for relatively poor recruitment since 1976, and the outlook for recruitment in the future. One school of thought is that recruitment has been poor because the SSB has been low. If so, recruitment should improve to historical levels if SSB is rebuilt. Another school of thought is that the ecosystem changed such that it is less favorable for recruitment. If so, recruitment may not improve even if SSB increases. Therefore, the Committee considered two future recruitment scenarios. For both scenarios, the assessment indicates that the fishing mortality on the western Atlantic bluefin resource exceeds F_{MSY} and the SSB is below B_{MSY} (thus the stock is over-fished according to the Convention's objective of maintaining stocks at the MSY-biomass level) (See Summary Table).

The results of projections based on the high recruitment scenario estimated that a constant catch of 2,500 t per year has a 60% probability of allowing rebuilding to the 1975 level of SSB, and there is a 20% chance of rebuilding SSB to SSB_{MSY} by 2018. If the low recruitment scenario is valid, those projections indicated the TAC could be increased to at least 3000 t without violating the Commission's rebuilding plan. If the high recruitment scenario is valid, those projections indicated the TAC should be decreased to less than 1,500 t to comply with the plan.

The Committee cautioned that the conclusions of the 2002 assessment do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin. Furthermore, the projected increases in stock size are strongly dependent on estimates of recent recruitment, which are a particularly uncertain part of the assessment.

BFTW-4. Effects of current regulations

In 1998, the Commission adopted a 20-year Rebuilding Program for the western Atlantic bluefin management area [Rec. 98-07] aimed at rebuilding the stock to the biomass that will produce MSY (B_{MSY}) by 2018 with a 50% or greater probability. According to the Program, the MSY rebuilding target can be adjusted according to advice from SCRS. In 2002, the Commission set the annual Total Allowable Catch, inclusive of dead discards, for the western Atlantic management area to 2,700 t, effective beginning in 2003 [Rec. 02-07]. The reported 2003 catches were 2,191 t. The reported catches in 2004 were about 2,000 t.

For the West Atlantic, a size limit of 6.4 kg with 15 percent allowance, in number of fish, has been in effect since 1975. In addition, a prohibition on the taking and landing bluefin tuna less than 30 kg (or 115 cm) with an 8% tolerance, by weight on a national basis, became effective in 1992. Since 1992, the proportion of undersized fish for all reported catches combined has been below the allowance level (e.g., 1% and 3% <115cm in 2000 and 2001, respectively). No estimates are available since that time, but will be available at the next stock assessment.

WEST ATLANTIC BLUEFIN TUNA SUMMARY
(Catches and Biomass in t)

Current (2004) Catch[1] (including discards)	~2,000 t	
Short-term Sustainable Yield	Probably >3,000 t	
Maximum Sustainable Yield (MSY)	3,500 (3,300-3,700)[2]	7,200 (5,900-9,500)[3]
Relative Spawning Stock Biomass		
$B_{2001}B_{1975}$	0.13 (0.07-0.20)[2]	0.13 (0.07-0.20)[3]
$B_{2001}B_{MSY}$	0.31 (0.20-0.47)[2]	0.06 (0.03-0.10)[3]
Relative Fishing Mortality		
F_{2001}/F_{MSY}	2.35 (1.72-3.24)[2]	4.64 (3.63-6.00)[3]
$F_{2001}/F_{0.1}$	4.87	
F_{2001}/F_{max}	2.35	
Management Measures:	- TAC of 2,700 t from 2003 including dead discards [Rec. 02-07].	

1 These estimates do not include any unreported catches that might have occurred.
2 Median and approximate 80% confidence interval from bootstrapping from the 2002 assessment; assumes a "low recruitment" scenario at high spawning levels.
3 Median and approximate 80% confidence interval from bootstrapping from the 2002 assessment; assumes a "high recruitment" scenario at high spawning levels.

BLUEFIN TUNA - EAST

BFTE-2. Fishery indicators

The reported catch for 2004 is 26,961 t, but it is incomplete and substantial revisions are expected. The Republic of Korea indicated very low landings since 1999, but has reported 700 t in 2004. The reported catch for 2003 is 28,205 t. However, information regarding size composition of catch is missing and should be provided to the Secretariat. Based on the knowledge of the fisheries and fishing conditions in 2003, the Committee was surprised by such a low value reported. A substantial amount of additional unreported catch that was not in accordance with the Commission's recommended allocation scheme has previously been recorded through the Bluefin Tuna Statistical Document program. Unfortunately, the Committee is no longer confident that this system provides an adequate basis for estimating total unreported catch levels since the markets for "sashimi" have expanded beyond that of Japan and since not all countries are reporting to the program. This and the inadequacy of the 2003 and 2004 reports clearly reinforce the skepticism of scientists regarding the veracity of basic fishery statistics for the East Atlantic and Mediterranean bluefin tuna stock. The Committee suspects that there was over-reporting between 1993 and 1997 and that there has been increased under-reporting in the last few years, especially since 1998.

Economic gains in Atlantic bluefin tuna farming have led the private sector to continue investing in this relatively new culture system. The interest over the past few years has increased remarkably as reflected by the increased number of farming units established throughout the Mediterranean Sea (see **Appendix 7** for more details) There was general agreement within the Committee that bluefin tuna farming operations in the Mediterranean Sea have significantly affected data collection, especially Task I and Task II (size) statistics, and consequently the quality of stock assessments.

BFTE-3. State of the stock

In addition to the uncertainties about basic catch statistics, the CPUE and size data are not available for important Mediterranean fisheries. Thus, the Committee does not have confidence in assessments based upon these data. Nevertheless, the Committee's best determination of the state of the stock is that which was developed in the 2002 assessment at the Commission's request.

Results of the 2002 assessment indicate that the SSB in 2000 was about 86% of the 1970 level (first year of data in the assessment). There appears to have been a general trend of increasing recruitment in the early 1980s followed by a period without trend. The 2000 level of fishing mortality was almost 2.5 times higher than that which maximizes yield per recruit. Estimates in recent years should be judged with caution since such VPA estimates are generally imprecise.

The results of projections of the 2002 assessment assuming constant recruitment suggest that current reported catch levels cannot be sustained in the long-term under the current selectivity pattern and current fishing mortality rate for the stock. If either total fishing mortality or the mortality of small fish could be reduced substantially, then projections by the Committee indicated that current or even higher yields (perhaps more than 50,000 t) could be sustained.

The Committee remains concerned about the intensity of fishing pressure on small fish. This contributes substantially to growth over-fishing, and it seriously reduces the long-term potential yield from the resource. Additionally, the abrupt increase of catches of large fish since 1994 is of grave concern because these levels are considered unsustainable. Furthermore, the Committee believes recent catches are substantially underreported, thus leading to the false impression of potential for improved stock condition.

BFTE-4. Effect of current regulations

Catch limits have been in place for the eastern Atlantic and Mediterranean management unit since 1998. In 2002, the Commission fixed the Total Allowable Catch for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006 [Rec. 02-08]. Reported landings for 2003 and 2004 (28,205 and 26,961 t, respectively) are clearly below that level, but the Committee strongly believes, based on the knowledge of the fisheries and caging system, that substantial under-reporting is occurring.

A number of minimum size regulations have been in place since 1975. High catch of small individuals still occurred in recent years and the Committee recommended that every effort be made so that the current measures on the size limit of 6.4 kg [Rec. 02-08] are adhered to. [Rec. 04-07] reinforces size limit regulations at 6.4 kg and 10 kg, without tolerance, in the East Atlantic and Mediterranean, respectively. Reduction of fishing on juveniles could contribute substantially to increase in both biomass and yield (see section 16.4). Also, the use of smaller bluefin for tuna farming is a reason for concern to the Committee. Additionally, compliance with minimum sizes in these situations is difficult to evaluate.

The enforcement of [Rec. 04-06] partially allows recovery of the size composition of fish caught by Mediterranean purse seiner fleets and put into cages.

The time closure of the whole Mediterranean Sea from 16 July through 15 August for purse seine catches and from 1 June through 31 July longline catches [Rec. 02-08] seems to be adhered to, but the Committee is not able to evaluate the effect of this measure.

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY[1]

Current (2004) Yield [2]	26,961 t
2001 Replacement Yield	Not estimated
Maximum Sustainable Yield	Not estimated
Relative biomass SSB_{2000}/SSB_{1970}	0.86
Relative numbers $N_{8+,2000}/N_{8+,1970}$	0.70
Relative fishing mortality F_{2000}/F_{max}	2.4
TAC (annually, 2003-2006)	32,000 t

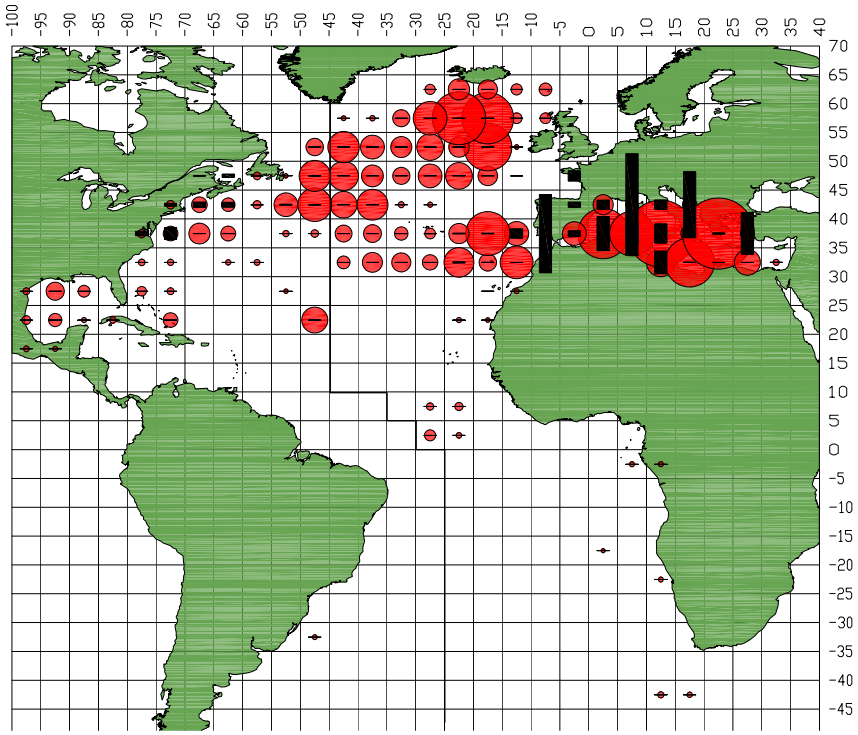
[1] Summary statistics are based on three runs (Trials 5, 9 and 12 in the 2002 Detailed Report) that represent alternative model formulations.

[2] 2004 reported yields are incomplete and are further suspected to be strongly under-reported.

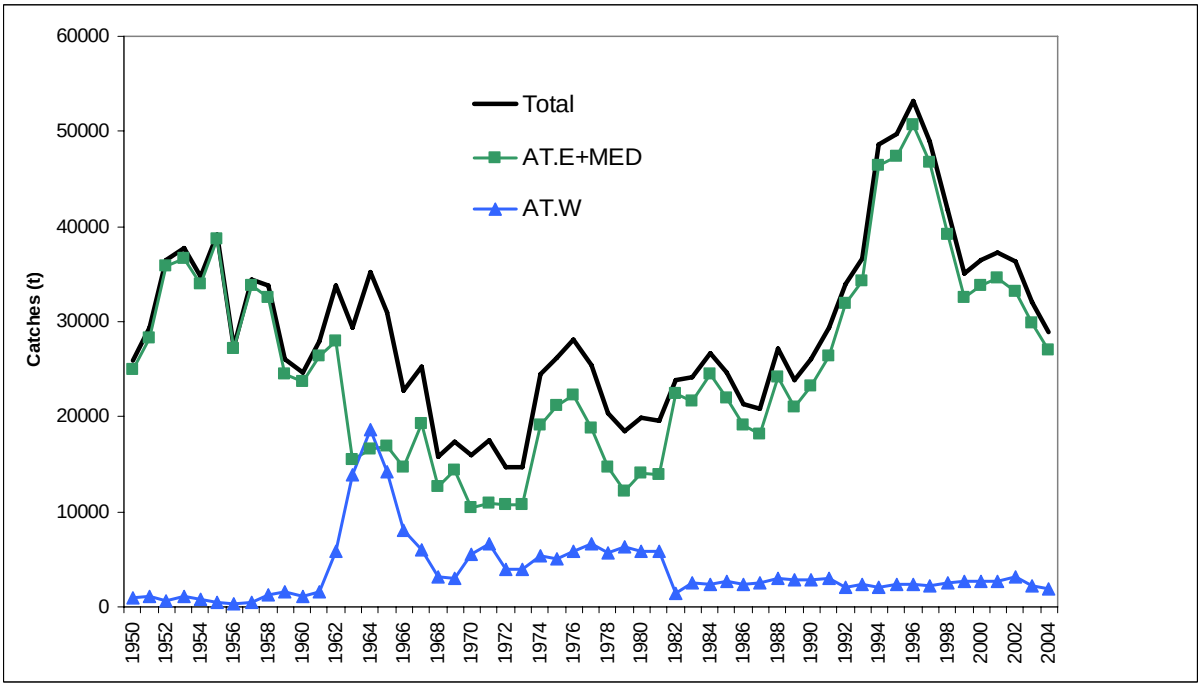
BFT-Table 1. Estimated Catches (t) of Northern bluefin tuna by major Area, Gear and Flag --Prises estimées (t) de thon rouge par zone, engin et pavillon--Capturas estimadas (t) de atún rojo por zona, arte y bandera

			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
TOTAL			19904	19616	23820	24202	26717	24647	21373	20789	27128	23818	26045	29420	34012	36579	48577	49716	53163	48988	41688	35116	36417	37274	36298	31982	28889
	AT.E+MED		14103	13845	22375	21660	24425	21962	19051	18196	24117	20951	23247	26428	31897	34268	46471	47290	50762	46758	39097	32454	33752	34557	33111	29791	26961
	AT.W		5801	5771	1445	2542	2292	2685	2322	2592	3011	2867	2798	2992	2115	2311	2106	2426	2401	2230	2591	2662	2665	2718	3187	2191	1928
	UNCL area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	AT.E+MED	Longline	1255	917	4255	3606	2734	1763	1448	1703	2396	1974	2522	6066	6416	5059	9224	12867	12959	10206	7049	6484	7052	7052	5180	4480	3683
		Purse seine	8978	8795	12786	10746	10302	11305	9621	8857	11198	9450	11304	13291	18269	19321	26026	24046	26344	25006	21608	15636	17341	17324	18340	15260	12277
		Bait boat	1874	1653	1010	3032	4647	2644	2253	2128	2682	2683	2018	1796	1624	4048	2285	3299	5362	3542	2787	1590	2014	2426	2568	1371	1790
		HAND+RR	105	93	100	194	275	508	323	436	839	459	1553	738	951	1237	2257	3556	2105	2468	1252	1652	2032	1334	1688	1473	1297
		Traps	1251	1446	3673	3274	4507	2390	1740	1953	3658	2789	4376	2993	2186	2001	2834	1924	2522	4367	4129	3711	3735	4763	3644	2223	1239
		Other surf.	640	941	551	808	1960	3352	3666	3119	3344	3596	1474	1544	2451	2602	3845	1598	1470	1168	2272	3380	1577	1657	1691	4984	6674
	AT.W	Longline	3972	3879	363	829	835	1245	764	1134	1373	678	739	895	674	696	539	466	528	382	764	914	859	610	727	228	542
		Purse seine	758	910	232	384	401	377	360	367	383	385	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32
		Bait boat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		HAND+RR	893	808	459	808	676	750	518	726	601	786	1004	1083	586	854	804	1114	1028	1179	1106	1124	1120	1656	2035	1398	1139
		Traps	47	41	68	7	3	20	0	17	14	1	2	0	1	29	79	72	90	59	68	44	16	16	28	84	32
		Other surf.	131	133	323	514	377	293	166	156	425	755	536	578	509	406	307	384	433	295	344	281	283	202	110	149	97
	UNCL area	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	AT.W	Longline	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	73	51	57	50	113	38	79	66	86
		HAND+RR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	3	0	0	0	0	0	
		Other surf.	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	4	0	0	0	0	0	0	0	
Landings	AT.E+MED	Algerie	190	220	250	252	254	260	566	420	677	820	782	800	1104	1097	1560	156	156	157	1947	2142	2330	2012	1710	1586	1208
		Cape Verde	0	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	137	93	49	85	103	80	68	39	19	41
		Chinese Taipei	5	6	16	2	0	0	0	0	0	0	0	0	0	334	729	502	472	504	456	249	313	633	666	445	51
		Croatia	0	0	0	0	0	0	0	0	0	0	0	1418	1076	1058	1410	1220	1360	1105	906	970	930	903	977	1139	827
		EC.Cyprus	10	10	10	10	10	10	10	10	10	10	10	10	10	14	10	10	10	10	21	31	61	85	91	79	105
		EC.Denmark	0	3	0	0	1	2	1	0	0	0	0	0	0	37	0	0	0	0	1	0	0	0	0	0	
		EC.España	2468	2601	3813	5257	7547	5090	3577	3654	5995	5210	5379	3664	4532	7096	5878	8426	8762	8047	5800	5363	6246	5867	6304	4650	5154
		EC.France	1961	2503	5028	4060	4202	5920	3838	4863	6504	4894	5223	5185	8270	8094	12179	10329	9690	8470	7713	6741	7321	6748	6565	6498	7030
		EC.Germany, Fed. Rep.	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Greece	0	0	5	0	0	11	131	156	159	182	201	175	447	439	886	1004	874	1217	286	248	622	361	438	422	389
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	21	52	22	8	15	3	1
		EC.Italy	6272	6017	6658	5865	7140	7199	7576	4607	4201	4317	4110	3783	5005	5328	6882	7062	10006	9548	4059	3279	3845	4377	4628	4973	4686
		EC.Malta	24	32	40	31	21	21	41	36	24	29	81	105	80	251	572	587	399	393	407	447	376	219	240	255	264
		EC.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	24	17	41	174	34	29	193	163	48	3	27	395	358	208	668	481	473	749	377	487	502	468	186	63	26
		EC.Sweden	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	12	0	0	0	0	
		Ex. Yugoslavia	573	376	486	1222	755	1084	796	648	1523	560	940	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	104	118	0	0	0	
		Guinée Conakry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	0	0	0	0	0	0	0	0	0	
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	27	0	0	1	0	
		Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	
		Japan	999	615	3534	3286	2550	1426	1080	1180	1427	965	1636	3066	3473	3277	2611	4784	4106	3090	3556	3071	3031	2577	2926	3011	2624
		Korea, Republic of	0	0	0	3	0	77	0	0	0	0	0	0	0	0	688	663	683	613	66	0	6	1	0	0	700
		Libya	398	271	310	270	274	300	300	300	300	84	328	370	737	635	1422	1540	1388	1029	1331	1195	1549	1940	0	0	
		Maroc	161	179	993	366	175	98	344	472	577	746	1557	1456	767	494	1812	1713	1621	2603	2430	2227	2923	3008	2986	2557	2780
		NEI.COMB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	773	211	0	101	1030	1995	109	571	508	0	
		NEI-1	0	0	1	0	25	3	172	183	638	763	415	1754	1349	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	0	0	0	0	0	0	0	0	0	19	49	49	0	0	0	0	0	0	0	0	0	0	0	
		NEI.Other	0	0	0	0	0	0	0	0	0	0	0	85	144	223	495	828	242	1274	891	140	17	0	0	0	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Norway	282	161	50	1	243	0	31	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	
		Panama	117	48	12	0	17	22	11	76	67	0	74	287	484	467	1500	1517	3400	491	0	13	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	118	0	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Tunisie	228	218	298	293	307	369	315	456	624	661	406	1366	1195	2132	2503	1897	2393	2200	1745	2352	2184	2493	2528	791	
		Turkey	391	565	825	557	869	41	69	972	1343	1707	2059	2459	2817	3084	3466	4220	4616	5093	5899	1200	1070	2100	2300	3300	1075
		U.S.A.	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Yugoslavia Fed. Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	4	0	0	0	
	AT.W	Argentina	0	0	0	0	0	6	0	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brasil	2	3	1	1	0	1	0	2	0	2	1	0	0	0	0	0	0	0	0	13	0	0	0	0	0
		Canada	324	425	291	433	264	142	41	50	393	619	438	485	443	459	392	576	597	503	595	576	549	524	604	557	537
		Canada (Japan)	0	0	0	0	0	0	32	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Chinese Taipei	15	7	11	2	3	3	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
		Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	0	
		EC.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	11	
		Japan	3936	3771	292	711	696	1092	584	960	1109	468	550	688	512	581	427	387	436	322	691	365	492	506	575	57	396
		Korea, Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	10	20	14	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	8	14	29	10	12	22	9
		NEI-1	0	0	14	1	0	0	0	0	0	30	24	23	17	0	0	0	0	0	0	0	0	0	0	0	
		NEI.Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	429	270	49	0	0	
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	9	14	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	1	3	2	14	14	14	2	43	9	3	0	0	0	0	0	0	0	
		Trinidad and Tobago	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

			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
		U.S.A.	1505	1530	807	1394	1320	1424	1142	1352	1289	1483	1636	1582	1085	1237	1163	1311	1285	1334	1235	1213	1212	1589	1840	1478	899
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	
		Uruguay	0	1	3	0	9	16	6	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1	0	
	UNCL area	EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	AT.W	Canada	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	6	16	11	46	13	37	14	15
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	77	51	44	39	67	25	42	52	72



BFT-Figure 1. Distribution of Atlantic bluefin catches by longline (circle) and surface gears (bars) for the period 2000-2003.



BFT-Figure 2. Atlantic bluefin catches (in t, including discards) by region.

8.6 BUM - BLUE MARLIN

No new blue marlin assessments have been conducted since 2000.

BUM-1. Biology

Seven scientific documents related to BUM biology were presented to the 2005 SCRS. Several of these papers analyzed data derived from satellite archival tags. The results of these studies improve our knowledge of how marlin use habitat depths and will aid in the quantification of the interactions of marlin and longline gear. The results of the research presented are generally consistent with the basic assumptions used by the SCRS in the last assessment. Important advances continue to be made in obtaining data from archival tags, but it is not clear how the new information will be taken into account for the next stock assessment.

BUM-2. Description of the fisheries

The spatial distribution landings are given in **Figure BUM-1**. The fishery first developed in the early 1960s, reached a peak of over 9,000 t in 1963, declined to the range of about 2,000-3,000 t during the period 1967-1977, and have fluctuated with an increasing trend over the period 1978-1996, and a decreasing trend thereafter **(BUM-Table 1 and BUM-Figure 2)**. The 2004 reported catches for blue marlin (2,076 t) are incomplete and may represent a substantial underestimate of the real catch, because of the lack of reports from some of the fleets that have historically landed large numbers of this species. The general trends in catches have followed the intensity of the offshore longline fisheries, however, recent reported catches in the coastal gillnet fisheries have become important. A recent study suggests that catches of blue marlin made around moored FADs in Martinique may be important and suggests that other neighboring islands are also making similarly important catches around FADs. These nations are encouraged to monitor and report these catches.

The Committee notes that some blue marlin are likely to have been caught by IUU fleets. Unfortunately there is no information on billfish equivalent to that available from market statistics for bigeye tuna or bluefin tuna that can be used to estimate IUU catches of billfish.

Recently some large catches of unclassified billfish have been reported to the Committee. The 2001-2004 reported catch of unclassified billfish was 12% of the reported catch of all billfish. For some fisheries this percentage is much greater. The Committee recommends that every effort be made to report catches by species for all fisheries. Overall, catches of blue marlin are probably under-estimated.

BUM-3. State of the stock

New CPUE data are available through 2004 for the Venezuela pelagic and artisinal longline and gillnet fisheries, the Brazilian longline fishery and the US recreational and pelagic longline fisheries. Substantial progress was made in 2005, particularly at the Natal meeting, in the development of statistical and modeling methods for the analysis of CPUE data. In spite of this progress we still can not satisfactorily interpret the historic CPUE trends, especially explain the large decrease in longline CPUE of the early 1970s. Furthermore, additional analysis on the available information on relative abundance is needed to provide precise descriptions about recent trends in stock size.

The 1996 blue marlin assessment indicated that in the mid-1990s biomass was about 25% of B_{MSY}, that fishing mortality was about three times F_{MSY}, and that over-fishing had been occurring for about three decades. MSY was estimated to be near 4,500 t. The 2000 assessment used similar methods to the previous assessment, but with data sets that had been revised extensively in response to concerns raised since the 1996 assessment. The assessment might reflect a retrospective pattern wherein improvement in estimated biomass ratios result in estimated lower productivity. The results from the 2000 assessment were not adjusted for retrospective patterns and were slightly more optimistic than the 1996 assessment. These results suggest that the total Atlantic stock is approximately 40% of B_{MSY} and that over-fishing has taken place in the last 10-15 years. But this assessment also suggests a less productive stock than previously estimated, with an MSY of about 2,000 t, and a current fishing mortality that is about four times higher than F_{MSY}. There is uncertainty in the assessment related to the historical data that is not well quantified. Although sensitivity analyses were not meant to quantify possible biases and the results were generally within the range of uncertainty reported for the assessment, many of the runs provided more optimistic results than those reported above.

BUM-4. Outlook

There is no new information available to change the outlook as presented in the 2000 report. As noted, there is uncertainty in the assessment related to the historical data that is not well quantified. However, given that the 2000 assessment estimated that over-fishing was still occurring and that productivity (MSY and a stock's capacity to replenish) was lower than previously estimated, it is expected that landings in excess of estimated replacement yield would result in further stock decline.

BUM-5. Effect of current regulations

Recommendation [Rec. 97-09] requires to "Reduce, starting in 1998, blue marlin and white marlin landings by at least 25% for each species from 1996 landings, such reduction to be accomplished by the end of 1999." Recommendations [Rec. 00-13], [Rec. 01-10] and finally [Rec. 02-13] placed additional catch restrictions for blue marlin. The latter established that "the annual amount of blue marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 50% of the 1996 or 1999 landing levels, whichever is greater" and also, "All blue marlin and white marlin brought to pelagic longline and purse seine vessels alive shall be released in a manner that maximizes their survival. The provision of this paragraph does not apply to marlins that are dead when brought along the side of the vessel and that are not sold or entered into commerce". Because the last stock assessment was conducted in 2000, it is too early to evaluate the effect of this recommendation on the stock. Some countries already acted on these recommendations but no data are yet available to evaluate the effect of this last recommendation on the stock status of blue marlin. In 2000, the Commission recommended that a blue marlin minimum size be established by recreational fisheries, (e.g., 251 cm LJFL).

BUM-6. Management recommendations

There is no new information available in 2005 to change the last management recommendations that were made in 2004. The current assessment indicates that the stock is unlikely to recover if the landings contemplated by the 1996 Commission recommendation continue into the future. The uncertainties in stock status and replacement yield estimates can only be addressed through substantial investment in research into habitat requirements of blue marlin and further verification of historical data. The Committee recommends that the Commission take steps to reduce the catch of blue marlin as much as possible. Steps such as release of live fish from fishing gear, reductions in fleet-wide effort, a better estimation of dead discards, and establishment of time area closures, along with scientific observer sampling for verification could be considered.

Not enough improvements were made during 2005 in the methods of cpue analysis for marlins. The scope of a 2006 assessment will be limited, as described in section 9.2.

ATLANTIC BLUE MARLIN SUMMARY[1]	
	Total Atlantic
Maximum Sustainable Yield (MSY)	~ 2,000 t (~ 1,000 ~ 2,400 t)[2]
2002 Yield	2,626 t
2003 Yield	2,713 t
2004 Yield[4]	2,076 t
1999 Replacement Yield	~ 1,200 t (~ 840 - 1,600 t)[2]
Relative Biomass (B_{2000}/B_{MSY})	~ 0.4 (~ 0.25 - 0.6)[2]
Relative Fishing Mortality (F_{1999}/F_{MSY})	4.0 (~ 2.5 - 6.0)[2]
Management Measures in Effect	- Reduced pelagic longline and purse seine landings to 50% of 1996 or 1999 levels, whichever is greater [Recs. 00-13[3], 01-10[3] and 02-13].

[1] Assessment results are uncertain. Uncertainty in these estimates is not fully quantified by bootstrapping.
[2] Approximate 80% CI from bootstrap for ASPIC model.
[3] These measures did not take effect until mid-2001.
[4] Reported Task I value, which is likely to be a substantial underestimate of the total catch.

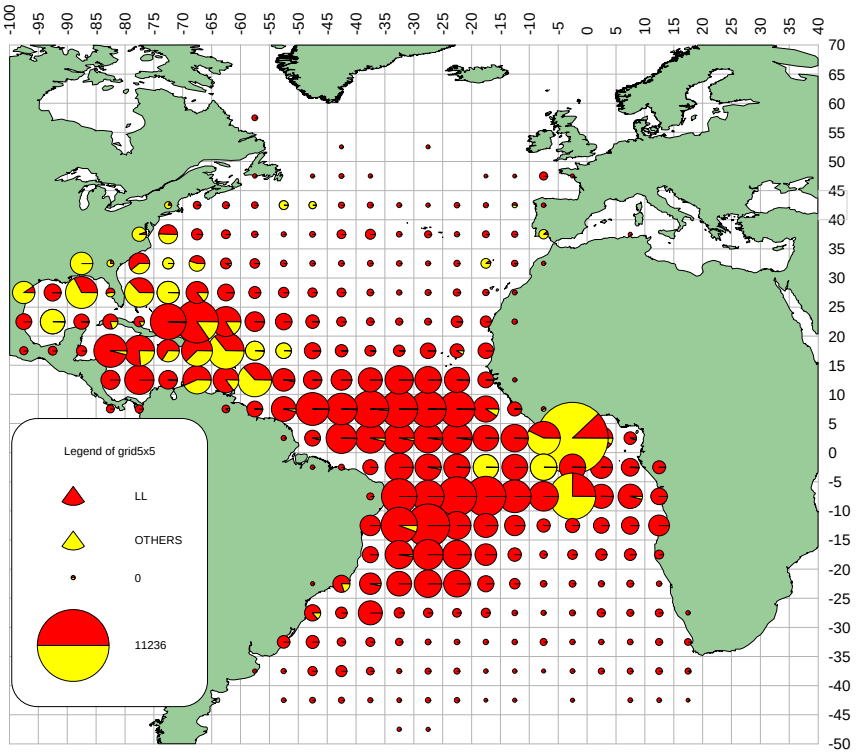
BUM-Table 1 Estimated Catches (t) of Atlantic blue marlin by major Area, Gear and Flag / Prises estimées (t) de makaire bleu de l'Atlantique par zone, engin et pavillon / Capturas estimadas (t) de aguja azul del Atlantico por zona, arte, y bandera

			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
TOTAL			1848	2032	2708	2130	2748	3311	1993	2053	2736	4214	4520	4128	2947	3001	3946	3802	4559	5041	3927	3836	3757	3037	2626	2713	2076
		AT.N	1085	1296	1650	1214	1378	1566	1069	836	909	1540	1943	1411	1081	1057	1510	1446	1742	1711	1489	1248	1101	551	516	641	596
		AT.S	619	567	884	749	1252	1623	789	1085	1690	2530	2378	2580	1750	1798	2303	2229	2607	3073	2299	2430	2335	2276	1975	1745	1481
		UNCL area	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	211	134	327	0
Landings	North	Longline	643	792	1162	809	920	1223	695	327	415	1009	1597	981	629	600	1065	925	1266	1227	950	752	664	331	391	451	448
		Sport (HL+RR)	301	300	299	199	206	169	214	181	186	143	50	63	83	113	122	77	66	56	56	38	36	21	17	19	25
		Other surf.	140	204	189	206	252	174	160	190	184	197	136	225	223	217	212	292	214	331	432	377	341	176	60	151	86
	South	Longline	498	430	822	533	975	1362	661	964	1530	2017	1958	2280	1473	1415	1643	1565	1991	2250	1517	1524	1485	1284	899	1220	895
		Sport (HL+RR)	2	2	2	0	1	1	1	0	1	1	2	1	0	1	2	2	10	28	0	0	0	0	0	0	
		Other surf.	119	135	60	216	276	260	127	121	159	512	418	299	277	382	658	662	605	753	780	904	850	991	1076	524	586
	Uncl	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	
		Other surf.	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	210	130	327	0
Discards	North	Longline	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	49	81	60	22	37	19	33
		Sport (HL+RR)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	11	0	1
	South	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0	
	Uncl	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Landings	North	Barbados	73	117	99	126	126	10	14	13	46	3	18	12	18	21	19	31	25	30	25	19	19	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15
		Canada (Japan)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	48	41	51	79	133	9	31	15	17	10
		Chinese Taipei	160	98	100	125	102	148	117	52	26	11	937	716	336	281	272	187	170	355	80	44	64	65	48	66	46
		Cuba	162	178	318	273	214	246	103	68	94	74	112	127	135	69	39	85	43	0	12	0	0	0	34	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	69
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	71	29	19	0	0	0	
		EC.España	0	0	0	0	3	4	1	0	8	7	2	1	7	7	6	1	22	5	6	3	25	8	1	6	27
		EC.Portugal	0	0	1	2	1	8	12	8	2	1	1	4	2	15	11	10	7	3	47	8	15	17	1	31	27
		Grenada	1	1	12	6	8	11	36	33	34	40	52	64	52	58	52	50	26	47	60	100	87	104	69	72	45
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	
		Japan	193	332	637	192	351	409	174	78	206	593	250	145	193	207	532	496	798	625	656	427	442	155	125	158	168
		Korea, Republic of	48	71	19	43	110	154	36	13	14	252	240	34	11	2	16	16	41	16	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	13	13	13	27	35	68	37	50	70	90
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	0	0	57	100	100	100	100	0	0	0	0	0	0	
		Netherlands Antilles	50	50	50	50	50	50	50	50	50	50	50	40	40	40	40	40	40	40	40	40	40	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	38	38	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	1	1	5	0	0	5	5	5	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2	2	0	1	0	0	0	0	15	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	10	5	0	18	17
		Trinidad and Tobago	0	0	0	3	8	3	17	2	0	28	4	6	4	3	27	46	21	81	70	33	55	17	16	4	11
		U.S.A.	313	342	329	215	280	295	273	291	221	124	29	33	51	80	88	43	43	46	50	37	24	16	17	19	24
		U.S.S.R.	0	0	0	0	0	0	7	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	4	1	2	7	8	9	11	6	8	15	17	18	19	11	15	15	15	3	5	1	2	2	2	2	
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	81	106	83	172	117	219	218	60	76	149	70	49	66	74	122	106	137	130	205	220	108	72	76	84	26
	South	Benin	0	6	8	0	9	10	7	4	12	0	6	6	6	6	5	5	5	5	5	5	5	0	0	0	
	*	Brasil	23	28	30	27	32	33	46	51	74	60	52	61	125	147	81	180	331	193	486	509	452	780	387	577	195
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	25	21	27	41	68	15	61	73	72	49
		Chinese Taipei	129	104	150	47	70	165	98	265	266	462	767	956	488	404	391	280	490	1123	498	442	421	175	246	253	269
		Cuba	187	108	118	123	159	205	111	137	191	77	90	62	69	0	0	0	0	0	0	0	0	0	0	0	

			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
		Côte D'Ivoire	0	0	0	0	100	100	100	100	130	82	88	105	79	139	212	177	157	222	182	275	206	196	78	109	115
		EC.España	0	0	0	0	0	0	0	0	0	15	0	6	23	18	21	38	88	71	82	109	116	86	27	6	24
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	1	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	0	0	0	0	0	0	0	
		Ghana	119	129	52	216	166	150	16	5	7	430	324	126	123	236	441	471	422	491	447	624	639	795	999	415	470
		Japan	115	136	495	248	482	691	335	362	617	962	967	755	824	719	991	913	881	724	529	363	441	180	155	311	359
		Korea, Republic of	46	55	31	88	234	262	60	139	361	437	84	503	13	11	40	40	103	40	2	0	1	1	0	0	
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	0	0	117	100	100	100	100	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
		U.S.S.R.	0	1	0	0	0	7	16	22	32	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta. Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	
	Uncl	Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	38	55	56	0	3	
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	207	
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France+España	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	0	0	0	
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	122	59	37	187	131	130	110	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	
Discards	North	U.S.A.	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	50	81	60	24	49	19	35
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	South	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0	
	Uncl	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	

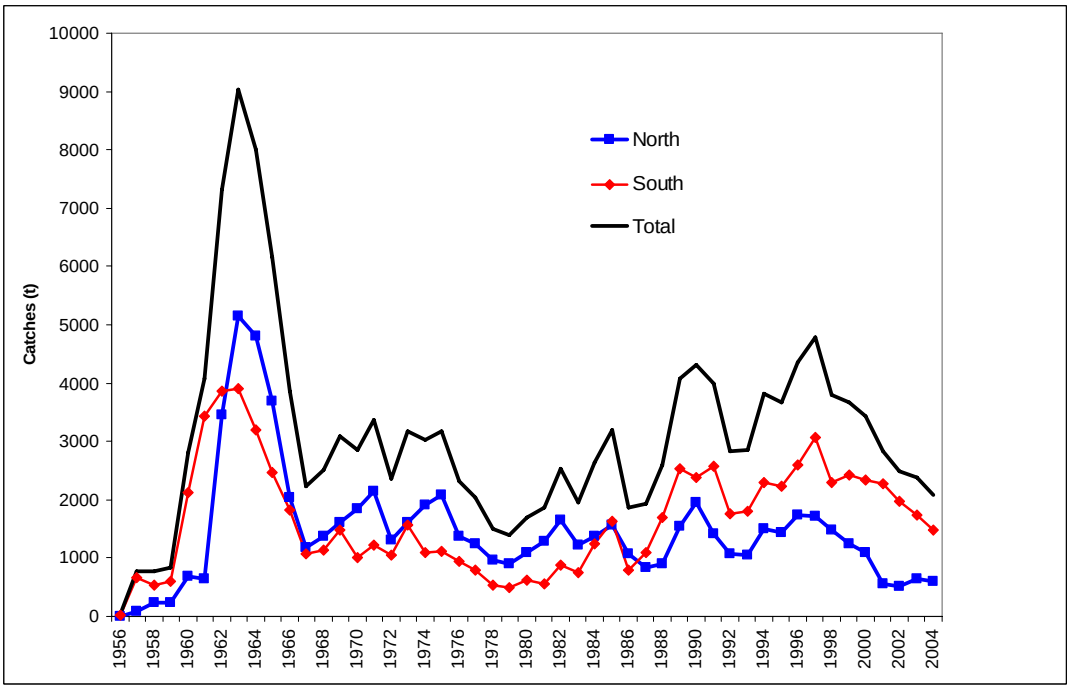
Note: Shaded cells were obtained from FAO-ICCAT comparative analysis (SCRS/2005/089).
Note: Les cellules ombrées ont été obtenues de l'analyse comparative FAO-ICCAT (SCRS/2005/089).
Las celdas sombreadas se extrajeron del análisis comparativo FAO-ICCAT (SCRS/2005/89).

* Includes live discards./ Inclut les rejets de poissons vivants./ Incluye descartes de peces vivos.



BUM - 1956-2003

BUM- Figure 1. Geographical distribution of reported catches of blue marlin for the period 1956-2003.



BUM-Figure 2. Estimated catches (including landings and dead discards in t) of blue marlin in the Atlantic by region (1950-2004).

8.7 WHM - WHITE MARLIN

The last assessment for white marlin was conducted in May 2002.

WHM-1. Biology

Three scientific documents related to white marlin biology/behavior were presented to the Data Preparatory Meeting in May 2005. The results of the research presented are generally consistent with the basic assumptions used by the SCRS in the last assessment. Some important advances have been made form the PSAT tagging researches and aging studies. Post-release survival studies concluded that white marlin can generally survive the trauma of capture on long-line gear (63%-89.5% survival rate) and suggest that current management measures requiring the release of live white marlin will reduce fishing mortality on the stock. Spawning grounds in the western north Atlantic were confirmed by results gathered during larval sampling studies. Two additional papers analyzed data derived from satellite archival tags. The results of these studies improve our knowledge of how marlin use habitat depths and will aid in the quantification of the interactions of marlin and longline gear.

WHM-2. Description of the fisheries

The spatial distribution landings are given in **Figure WHM-1**. Landings for the total Atlantic fluctuated between 1,000 to 2,000 t through 1999. Catches have been less than 1000 tons since 2000 **(WHM Fig 2, WHM-Table 1)**. The 2004 preliminary reported catches were 532 t, slightly decrease from 2003. In the 2002 assessment, significant improvements were made in the historical estimates of catch for the EC purse seine, the U.S. recreational and Japanese longline catches. These studies, however, have identified that recent catch estimates may be more uncertain than previously thought, because discards are not generally reported in logbooks. Additionally, changes in the economic importance of this species or changes in the fishing gear may have led to change in the reporting of catches by some fleets. Reported 2004 catches by Brazil are substantially lower than those reported for previous years. This decrease is the result of the implementation of the ICCAT recommendation to release live marlins that led to a ban on marlin sales, the imposition of compulsory on-board observers and a reduction of longline effort. The Committee notes that some white marlin are likely to have been caught by IUU fleets. Unfortunately there is no information on billfish equivalent to that available from market statistics for bigeye tuna or bluefin tuna that can be used to estimate IUU catches of billfish.

Recently some large catches of unclassified billfish have been reported to the Committee. The 2001-2004 reported catch of unclassified billfish was 12% of the reported catch of all billfish. For some fisheries this percentage is much greater. The Committee recommends that every effort be made to report catches by species for all fisheries. Overall, catches of white marlin are probably under-estimated.

WHM-3. State of the stock

New standardized catch rate information was presented in 2005. Standardized catch rate from US long-line and recreational fisheries in the northwest Atlantic and Gulf of Mexico and, standardized catch rates from the Venezuelan long-line fishery in western central Atlantic an in Caribbean Sea were updated. New standardized catch rates were estimated for the Venezuelan artisanal surface gear. Substantial progress was made in 2005, particularly at the Natal meeting, in the development of statistical and modeling methods for the analysis of CPUE data. In spite of this progress we still can not satisfactorily interpret the historic CPUE trends. Furthermore, additional analysis on the available information on relative abundance is needed to provide precise descriptions about recent trends in stock size.

The last assessment was conducted in 2002 when the data available was not informative enough to provide an estimate of stock status with certainty. However, the previous three white marlin assessments, indicated that biomass of white marlin has been below B_{MSY} for more than two decades, thus that the stock has been over-fished for many years. The last two assessments, made in 2000 and 2002 lead to similar estimates of MSY and $B_{MSY.}$ To evaluate the uncertainty and sensitivity of the assessment to data and model inputs, the Committee considered alternative models and data set combinations. The uncertainty in the estimates of population parameters remains large and not well quantified; the calculated uncertainty underestimates the real uncertainty on these parameters.

WHM-4. Outlook

There is no new information available to change the outlook as presented in the 2002 report. While the stock status evaluations are uncertain, projections indicated that the apparent intent of the Recommendations has, in the short term, some potential for stabilizing the stock biomass near current levels. The projections also indicated that lower catch levels would provide greater potential for increasing stock biomass.

WHM-5. Effect of current regulations

Recommendation [Rec. 97-09] requires to "Reduce, starting in 1998, blue marlin and white marlin landings by at least 25% for each species from 1996 landings, such reduction to be accomplished by the end of 1999." Recommendations [Rec. 00-13], [Rec. 01-10] and finally [Rec. 02-13] placed additional catch restrictions for white marlin. The last one established that "the annual amount of white marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% of the 1996 or 1999 landing levels, whichever is greater. All blue marlin and white marlin brought to pelagic longline and purse seine vessels alive shall be released in a manner that maximizes their survival. The provision of this paragraph does not apply to marlins that are dead when brought along the side of the vessel and that are not sold or entered into commerce". However, because 2000 is the last year of data used for the last stock assessment, it is too early to evaluate the effect of this recommendation on the stock. Some countries already acted on these recommendations but not enough data are yet available to evaluate the effect of this last recommendation on stock status of white marlin.

WHM-6. Management recommendations

Management recommendations here are the same as those made in 2004. While there is substantial uncertainty in stock status and replacement yield, these uncertainties can only be addressed through research. The Committee suggests that the Commission makes substantial investment on research to help produce a more accurate stock assessment.

The Committee suggests that the Commission take steps to make sure that the reductions in catch contemplated by the Commission are complied with and monitored so that proper evaluation of its benefits can be carried out in the future. The Committee therefore recommends continuing to improve observer programs so that better estimates of catch and dead discards of white marlin are obtained.

Not enough improvements were made during 2005 in the methods of CPUE analysis for marlins. The scope of a 2006 assessment will be limited, as described in Section 9.2.

ATLANTIC WHITE MARLIN SUMMARY[1]

	Likely value	*Continuity case[2] estimate (80% conf. limit)*	*Retrospective adjusted estimate[3]*	*Range of sensitivity[4] estimates*
Maximum Sustainable Yield	Below 2000 Yield	964 t (849-1070)		323-1,320 t
2002 Yield	822 t	--		--
2003 Yield	615 t	--		--
2004 Yield[5]	532 t			
2001 Replacement Yield	Below 2000 Yield	222 t (101-416)	371 t	102-602 t
Relative Biomass (B_{2001}/B_{MSY})	<1 (Over-fished)	0.12 (0.06-0.25)	0.22	0.12-1.76
Relative Fishing Mortality (F_{2000}/F_{MSY})	>1 (Over-fishing)	8.28 (4.5-15.8)	5.05	0.80-10.30
Management Measures in Effect:	- In 2001 and 2002, PS and LL fisheries limit landings to 33% of max (1996, 1999) level. [Rec. 00-13], [Rec. 01-10] and [Rec. 02-13].			

[1] Assessment results are highly uncertain.
[2] The data used are not sufficiently informative to choose a "best case". For consistency, the continuity case presented here is based on data and assumptions that closely resemble the analyses made in 2000. Confidence limits from bootstrapping are conditional on this model-data set and thus may underestimate the real uncertainty.
[3] These results are for the continuity case except that they were adjusted for retrospective biases.
[4] The sensitivity analyses made were not chosen in a systematic way; the range is presented only for qualitative guidance.
[5] Reported Task I value for 2004, which is likely an underestimate of total catch.

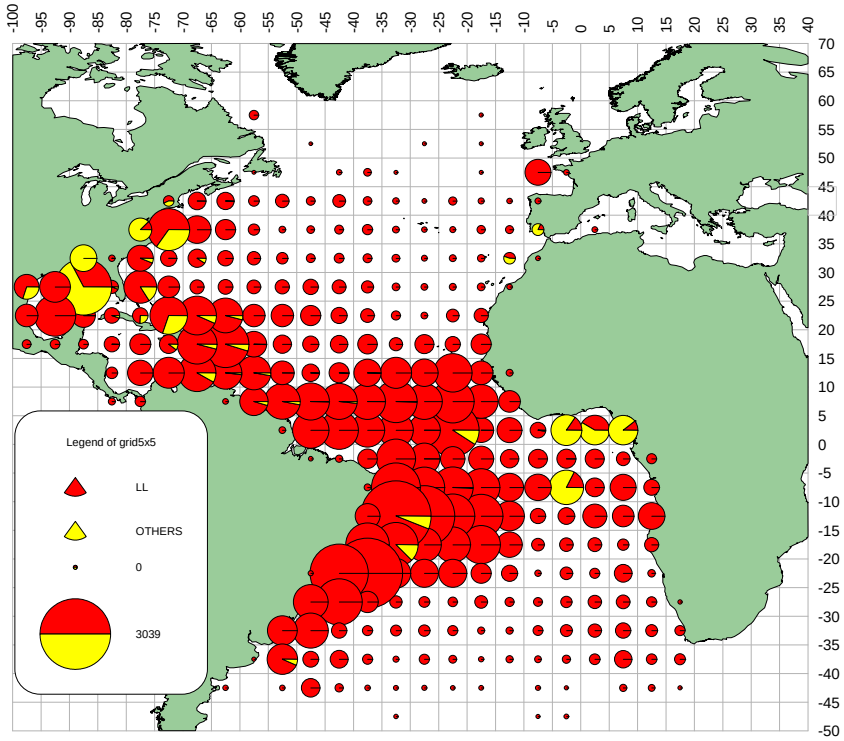
WHM-Table 1. Estimated Catches (t) of Atlantic white marlin by major Area, Gear and Flag / Prises estimées (t) de makaire blanc de l'Atlantique par zone, engin et pavillon / Capturas estimadas (t) de aguja blanca del Atlantico por zona, arte, y bandera

			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
TOTAL			976	1241	1100	1772	1200	1727	1611	1491	1352	1805	1626	1589	1437	1523	1965	1577	1708	1094	1069	1028	961	642	822	615	532
	AT.N		521	750	605	1280	653	860	905	587	406	368	393	235	610	565	657	617	628	407	385	382	362	291	264	205	190
	AT.S		428	460	463	461	525	844	680	879	921	1409	1196	1343	817	946	1297	951	1073	676	676	634	579	350	557	392	343
	UNCL area		27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	10	9	11	21	1	1	18	0
Landings	AT.N	Longline	403	671	548	1196	570	788	812	433	167	234	251	105	466	436	528	451	514	316	333	301	282	248	208	177	161
		Sport (HL+RR)	112	72	45	79	66	43	32	38	29	16	21	19	21	30	30	18	20	9	6	6	1	3	6	1	1
		Other surf.	6	7	12	5	17	29	61	54	150	11	40	21	35	34	57	48	30	49	13	18	38	22	17	10	0
	AT.S	Longline	419	340	442	308	471	825	654	870	832	1333	1152	1320	803	923	1295	945	660	589	552	623	570	327	488	388	340
		Sport (HL+RR)	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	410	0	0	0	0	0	0	0	
		Other surf.	9	120	21	153	54	19	26	9	89	76	40	23	14	22	1	2	3	50	123	11	9	23	69	4	2
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	
		Other surf.	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	11	21	0	1	18	0
Discards	AT.N	Longline	0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	31	57	41	16	29	17	27
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	0	0
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	0	0	
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	117	11	39	17	24	29	26	43	15	41	33	25	25	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	8	8	8	5	5	3	2	1	2
		Canada (Japan)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	6	7	10	20	1	7	4	2	1
		Chinese Taipei	105	174	134	203	96	128	319	153	0	4	85	13	92	123	270	181	146	62	105	80	59	68	61	15	21
		Cuba	70	189	205	728	241	296	225	30	13	21	14	0	0	0	0	0	0	0	0	0	0	0	7	0	
		EC.España	0	0	0	0	9	14	0	0	61	12	4	8	18	15	25	10	75	71	65	88	118	43	4	19	19
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	11
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	8	0	33
		Japan	99	118	84	27	52	45	56	60	68	73	34	45	180	33	41	31	80	29	39	25	66	15	10	22	17
		Korea, Republic of	18	49	12	6	18	147	37	2	2	82	39	1	9	4	23	3	7	2	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	8	0	5	6	11	18	44	15	15	28
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	46	50	50	50	50	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	44	
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	9	6
		U.S.A.	116	78	57	81	81	75	116	124	42	10	17	13	11	19	13	7	12	8	5	5	1	3	6	1	1
		U.S.S.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	
		Venezuela	113	142	113	234	155	155	151	154	42	47	79	47	187	226	148	171	164	90	80	61	25	72	110	55	23
	AT.S	Argentina	0	0	0	0	0	4	4	0	0	8	9	6	0	0	0	0	0	0	0	0	0	0	0	0	
		Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	
		* Brasil	58	100	76	81	61	87	143	93	149	204	205	377	211	301	91	105	75	105	217	158	105	172	407	266	80
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	4	5	10	1	13	19	6	6
		Chinese Taipei	145	136	227	87	124	172	196	613	565	979	810	790	506	493	1080	726	420	379	401	385	378	84	117	89	151
		Cuba	212	116	45	112	153	216	192	62	24	22	6	10	10	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	5	1	2	2	3	1
		EC.España	0	0	0	0	0	0	0	0	1	1	0	9	4	8	0	18	32	3	4	45	68	18	2	3	45
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	406	0	0	0	0	0	0	0	
		Ghana	6	45	21	142	54	15	22	6	88	68	31	17	14	22	1	2	1	3	7	6	8	21	2	1	1
		Honduras (observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	7	25	27	17	24	81	73	74	76	73	92	77	68	49	51	26	32	29	17	15	17	41	6	13	11
		Korea, Republic of	0	36	57	9	44	225	34	25	17	53	42	56	1	4	20	20	52	18	0	0	0	0	0	11	40
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	68	50	50	50	50	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	

			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
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
		U.S.S.R.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	0	1	10	13	65	44	16	6	1	1	1	1	3	0	0	0	0	0	22	0	0	0	0	0	
	UNCL area	Costa Rica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	14	0	0	1	
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France+España	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	
		Honduras (observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Korea, Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
		Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	AT.N	U.S.A.	0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	32	57	41	17	33	17	27
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	0	0	
	UNCL area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	

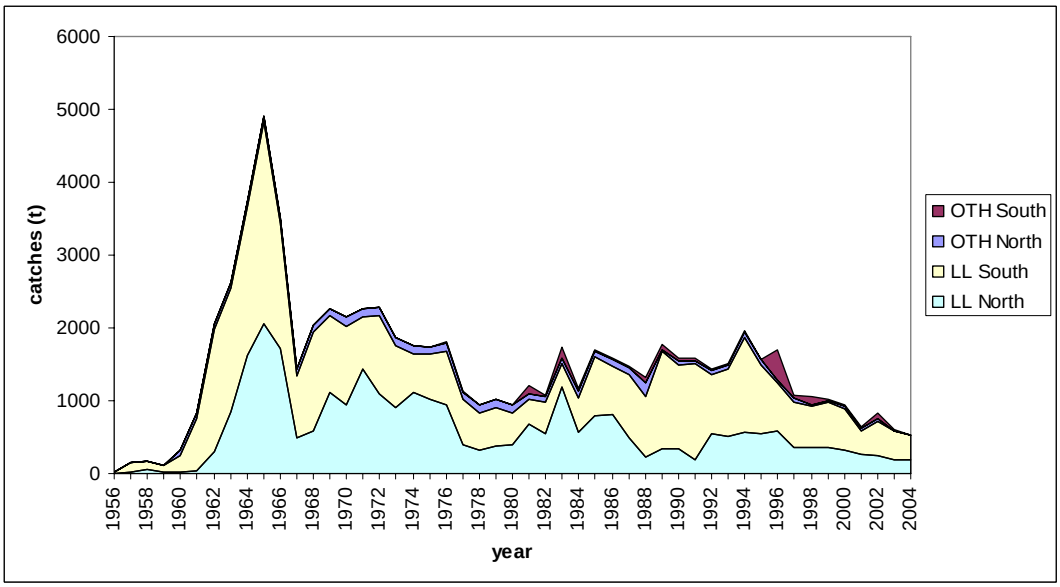
Note: Shaded cells were obtained from FAO-ICCAT comparative analysis (SCRS/2005/089).
Note: Les cellules ombrées ont été obtenues de l'analyse comparative FAO-ICCAT (SCRS/2005/089).
Las celdas sombreadas se extrajeron del análisis comparativo FAO-ICCAT (SCRS/2005/89).

* Includes live discards ./ Inclut les rejets de poissons vivants./ Incluye descartes de peces vivos.



WHM - 1956-2003

WHM- Figure 1. Geographical distribution of white marlin catches for the period 1956-2003.



WHM-Figure 2. Reported catch of white marlin (Task I) for North and South Atlantic for longline (LL) gear and for all other gears (OTH) combined for the South and North Atlantic.

8.8 SAI - SAILFISH/SPEARFISH

No new sailfish or spearfish assessments were conducted in 2005.

SAI-1. Biology

Sailfish *(Istiophorus platypterus=I. albicans)* and longbill spearfish *(Tetrapturus pfluegeri)* have a pan-tropical distribution (**SAI-Figure 1**). No scientific documents related to either sailfish or spearfish biology were presented during the 2005 SCRS.

Historically, ICCAT considered Atlantic sailfish/spearfish as separate eastern and western management units (**SAI-Figure 1**). This separation into two management units was based on the life history information on sailfish, the more abundant and more coastal of the two species.

SAI-2. Description of the fisheries

The recent major catches (landings plus dead discarded catch) of sailfish in both the West and East Atlantic result from the coastal fisheries. In the West Atlantic, the primary artisanal fisheries are from many countries in the Caribbean Sea, whereas in the East Atlantic major artisanal fisheries are off West Africa. Directed recreational fisheries for sailfish occur in the West Atlantic, the Caribbean Sea and off West Africa.

The overall trend in Atlantic catches is very much governed by the large catches from coastal fisheries off West Africa (**SAI-Figure 2**) **(SAI-Table 1)**. Recently, catches from the west are larger than those from the east. However this may be partially due to lack of reporting from some of the coastal fisheries off West Africa that in the past had reported large catches. The Committee notes that some sailfish/spearfish are likely to have been caught by IUU fleets. Unfortunately there is no information on billfish equivalent to that available from market statistics for bigeye tuna or bluefin tuna that can be used to estimate IUU catches of billfish. Sailfish/spearfish catches for 2003 were 2,651 with 1,320 from the East and 1,301 from the West. Catches for 2004, that are preliminary, were 2,167 with 1,088 from the East and 1,017 from the West. Some of these catches are of spearfish because some countries continue to combine in their report the catches of these two species. No new attempts to separate the catches of these two species have been done since 2001.

Large catches of unclassified billfish continue to be reported to the Committee. The 2001-2004 reported catch of unclassified billfish was 12% of the reported catch of all billfish. For some fisheries this percentage is much greater. The Committee recommends that every effort be made to report catches by species for all fisheries.

Mediterranean spearfish catches are generally lacking but some catches have been specifically reported since 2002. Overall, catches of sailfish, spearfish and Mediterranean spearfish are probably under-estimated.

SAI-3. State of the stocks

No new assessments of the sailfish stocks have been conducted since 2001. No new studies on relative abundance indices have been presented since 2001.

Although the 2001 attempts at quantitatively assessing the status of these two stocks (eastern and western sailfish) proved to be unsatisfactory, there were indications of early decreases in biomass for these two stocks. These decreases probably lowered the biomass of the stocks to levels that may be producing sustainable catches, but it is unknown whether biomass levels are below those that could produce MSY.

No assessments have ever been conducted on longbill or Mediterranean spearfish because of the lack of reliable catch or abundance index data.

SAI-4. Outlook

There is no new information available to change the outlook as presented in the 2001 report. It is unknown if the western or eastern sailfish stocks are undergoing over-fishing ($F>F_{MSY}$) or if the stocks are currently over-fished

($B<B_{MSY}$) and for these reasons the outlook for future conditions of the stocks are best interpreted based on the recent trends of CPUE and catch.

For the western sailfish stock, CPUE was highest in the late 1960s and decreased to lower levels by about 1980, after which CPUE remained relatively stable. Over the past two decades, the estimated catch of western sailfish has averaged about 700 t per year. From these observations, the Committee considers that the current catch level is sustainable.

For the eastern Atlantic sailfish, recent reported catches have been in decline, as have the available coastal abundance indices. These patterns could suggest possible further decreases in biomass that, if unchecked, could result in the need for increasingly stringent management actions in the future.

SAI-5. Effect of current regulations

No ICCAT regulations for sailfish or spearfish are in effect.

SAI-6. Management recommendations

Management recommendations here are the same as those made in 2004. The previous management recommendations indicated that the Commission should consider methods for reducing fishing mortality rates. The current western Atlantic assessment leads the Committee to recommend that the West Atlantic sailfish "only" catches should not exceed current levels. For the East Atlantic, sailfish "only" catches should not exceed current levels and the Commission should consider practical and alternative methods to reduce fishing mortality and assure data collection systems.

The Committee is concerned about the incomplete reporting of catches, particularly for the most recent years, the lack of sufficient reports by species, and evaluations of the new methods used to split the sailfish and spearfish catch and to index abundance. The Committee recommends all countries landing sailfish/spearfish or having dead discards, report these data by species to the ICCAT Secretariat. The Committee should consider the possibility of a spearfish "only" assessment in the future.

ATLANTIC SAILFISH "ONLY" SUMMARY

	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	Not estimated	Not estimated
Recent Yield (2000)[1]	506 t[2]	969 t[2]
2000 Replacement Yield	~ 600 t	Not estimated
Management Measures in Effect	None	None

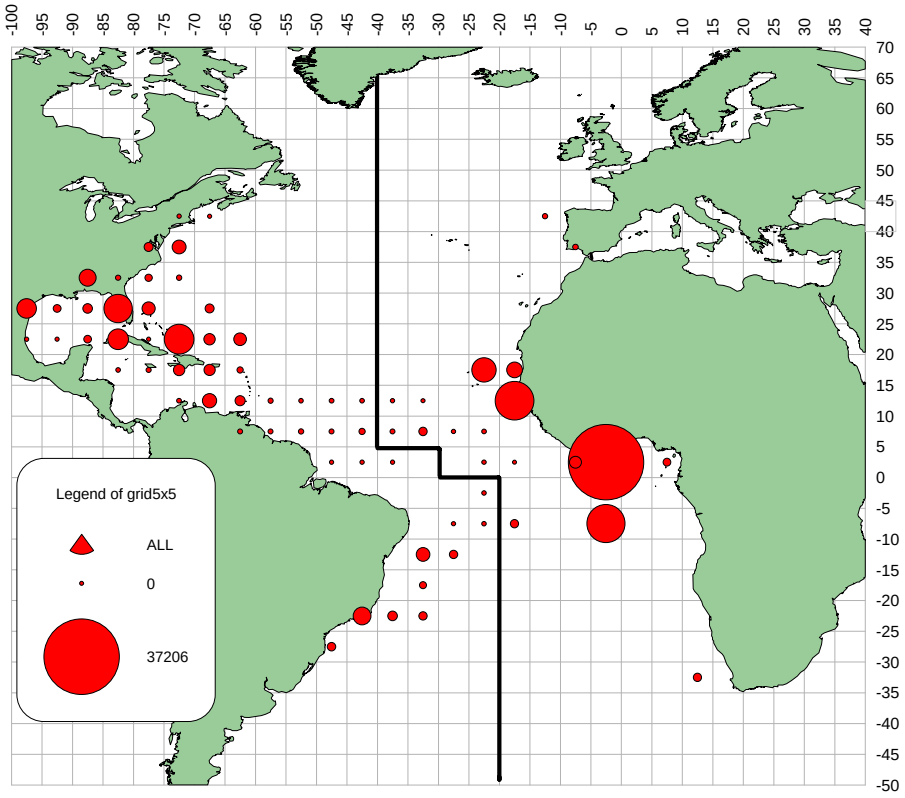
[1] Estimated yield includes that carried over from previous years.
[2] Recent yield (2000) was estimated during the 2001 sailfish assessment. To estimate the 2001-2004 yield, catches of sailfish and spearfish would have to be separated. A separation similar to the one conducted in the 2001 assessment has not yet been conducted.

SAI-Table 1. Estimated Catches (t) of Atlantic sailfish by major Area, Gear and Flag / Prises estimées (t) de voilier de l'Atlantique par zone, engin et pavillon / Capturas estimadas (t) de pez vela del Atlantico por zona, arte, y bandera

			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
TOTAL			3006	3187	3995	4883	3713	3421	3386	3737	3358	2729	3540	2678	3045	3923	2471	2815	3099	2439	2884	2520	2508	2328	3097	2651	2167
	AT.E		2099	2131	2876	3687	2492	2328	2105	2566	2064	1664	2314	1482	1706	2473	1206	1559	1927	1292	995	1209	1004	1043	1088	1320	1088
	AT.W		907	1056	1119	1196	1221	1093	1281	1171	1294	1065	1225	1197	1339	1450	1265	1256	1162	1147	1888	1311	1503	1271	1977	1301	1017
	UNCL area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	14	32	30	62
Landings	AT.E	Longline	151	202	309	270	224	148	140	112	126	152	153	57	51	523	178	240	164	213	198	265	165	159	349	284	241
		Sport (HL+RR)	325	497	568	506	161	240	571	584	537	445	1018	507	738	833	227	588	531	555	263	407	407	0	0	0	
		Other surf.	1623	1432	1999	2911	2107	1940	1394	1870	1401	1067	1143	918	917	1117	801	732	1232	524	535	537	433	884	738	1036	847
	AT.W	Longline	360	408	471	320	512	506	489	451	558	417	382	241	371	657	552	386	346	226	1031	452	770	801	1264	855	650
		Sport (HL+RR)	368	561	475	735	536	313	497	491	471	353	267	371	333	232	217	357	240	360	277	173	86	58	103	0	33
		Other surf.	179	87	173	141	173	274	295	187	208	238	514	521	599	498	468	484	507	503	553	615	602	401	603	440	327
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30	5	57
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	12	2	25	5
Discards	AT.W	Longline	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7
	AT.W	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	AT.E	Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Benin	0	36	48	0	53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5	0	0	0	
		Cape Verde	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	5	9	4	5	11	4	4
		Chinese Taipei	5	12	67	20	8	9	1	0	0	7	13	0	0	420	101	155	65	150	117	178	120	0	124	74	33
		Cuba	79	79	158	200	115	19	55	50	22	53	61	184	200	77	83	72	533	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	40	40	40	40	66	55	58	38	69	40	54	66	91	65	35	80	45	47	65	121	73
		EC.España	0	0	10	0	4	7	9	0	28	14	0	9	2	30	7	13	25	26	18	19	8	148	188	183	148
		EC.France+España	432	504	521	499	354	364	403	394	408	432	595	174	150	182	160	128	97	110	138	131	98	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	53	11	3	8	7	13
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	109	7	0	0	0	1	0	0	
		Ghana	1191	891	1426	2408	1658	1485	925	1392	837	465	395	463	297	693	450	353	303	196	351	305	275	568	529	551	503
		Honduras (observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Japan	33	50	38	47	63	84	71	37	57	57	63	16	42	58	45	52	47	19	58	16	26	6	17	18	51
		Korea, Republic of	34	24	33	3	34	29	2	20	15	17	16	30	3	3	6	6	14	5	0	0	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	11	15	10	10	10	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	0	0	0	0	0	0	
		Senegal	325	498	572	510	163	241	572	596	587	552	1092	546	917	936	260	678	610	556	270	412	412	266	138	361	263
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	2	4	1	1	3	1	0	0	0	0	0	0	0	
		U.S.S.R.	0	37	0	0	0	0	2	5	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Aruba	30	30	30	30	30	30	30	23	20	16	13	9	5	10	10	10	10	10	10	10	10	0	0	0	
		Barbados	0	0	0	0	0	0	0	0	0	69	45	29	42	50	46	74	25	71	58	44	44	0	0	0	
		Brasil	231	64	153	60	121	187	292	174	152	147	301	90	351	243	129	245	310	137	184	356	598	412	547	585	534
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	9	4	3	1	0	1
		Chinese Taipei	36	81	22	31	45	39	64	31	300	171	83	73	33	223	233	38	37	4	129	33	22	0	70	25	16
		Cuba	119	134	181	28	169	130	50	171	78	55	126	83	70	42	46	37	37	40	28	196	208	68	32	18	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1
		Dominican Republic	0	0	22	50	49	46	18	40	44	44	40	31	98	50	90	40	40	101	89	27	67	81	260	91	
		EC.España	0	0	0	0	0	0	0	0	0	0	0	6	7	5	3	36	3	15	20	6	14	277	471	196	125
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	2	12	12
		Grenada	31	36	27	37	66	164	211	104	114	98	218	316	310	246	151	119	56	83	151	148	164	187	151	171	112
		Japan	22	44	135	22	34	38	28	6	22	22	25	73	1	2	8	2	4	17	3	10	12	3	3	8	4
		Korea, Republic of	51	41	19	0	52	72	14	1	0	17	25	0	3	0	8	8	22	8	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19	19	0	9	646	40	118	36	34	45	51
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	31	30	30	30	30	0	0	0	0	0	0	
		Netherlands Antilles	21	21	21	21	21	10	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	2	1	4	4	4	2	1	3	0	1	0	0	131	3	86
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Trinidad and Tobago	0	0	0	64	58	14	25	35	24	11	9	4	4	56	101	101	104	10	0	4	3	7	6	8	10
		U.S.A.	308	533	452	734	495	282	462	454	451	324	242	343	294	202	179	345	231	349	267	163	76	58	103	0	33

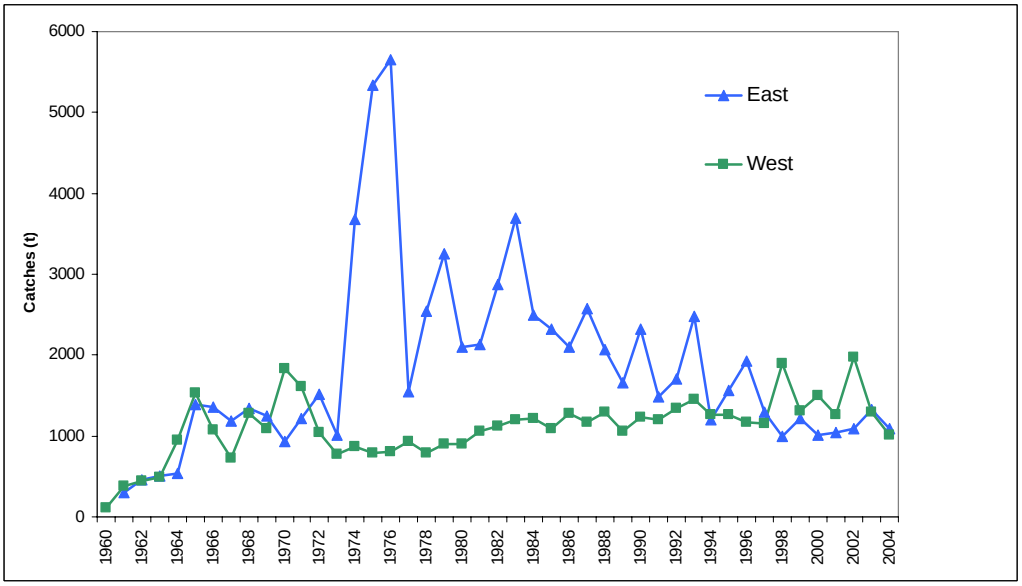
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Venezuela	58	72	57	119	81	81	77	80	22	24	24	65	71	206	162	103	165	185	258	179	93	126	159	133	24
	UNCL area	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	2	2	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30	0	
Discards	AT.W	U.S.A.	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7
	UNCL area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: Shaded cells were obtained from FAO-ICCAT comparative analysis (SCRS/2005/089).
Note: Les cellules ombrées ont été obtenues de l'analyse comparative FAO-ICCAT (SCRS/2005/089).
Las celdas sombreadas se extrajeron del análisis comparativo FAO-ICCAT (SCRS/2005/89).



SAI - 1950-2003

SAI. Figure 1. Geographical distribution of sailfish/spearfish catches for the period 1950-2003.



SAI-Figure 2. Evolution of estimated sailfish/spearfish catches in the Atlantic (landings and dead discards, reported and carried over) in the ICCAT Task I database during 1956-2004 for the east and west stocks.

8.9 SWO-ATL-ATLANTIC SWORDFISH

The last assessment for Atlantic swordfish was conducted in 2002. This document focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Atlantic swordfish should consult the report of the 2004 SCRS meeting.

Other information relevant to Atlantic swordfish is presented elsewhere in this SCRS Report: Advice relevant to Resolution [02-04] is provided in Section 16. The 2006 Atlantic Swordfish Work Plan in support of the next stock assessment is presented in **Appendix 13**. Recommendations pertinent to Atlantic swordfish are presented in Section 15.

SWO-ATL-1. Biology

Five scientific documents related to SWO biology were presented to the 2005 SCRS. The results of the research presented are generally consistent with the basic assumptions used by the SCRS in the last assessment. A Workshop on swordfish stock structure is scheduled to take place in Crete in early 2006 and it is expected that research progress on this issue will be reported upon at that meeting.

SWO-ATL-2. Fishery indicators

Updated information on Atlantic swordfish catch and catch distribution is provided in **SWO-Table 1** and **SWO-Figures 1 and 2**.

As a result of ICCAT and domestic regulatory recommendations, there were several recent developments in the fisheries of some nations: Starting in February 2000 and ending in December 2003, Japanese vessels fishing in the North Atlantic were required to discard all swordfish as the Japanese block quota had been reached; For 2001 and thereafter, U.S. pelagic longline fishing was prohibited or restricted in five areas and times to reduce incidental catches including juvenile swordfish; and the Canadian directed swordfish longline fishery has finished at the end of August from 1999-2000 due to reduced quota. Since 2002, the season was extended to November due to the introduction of an Individual Transferable Quota system. A further change in the fishery has resulted from changes in technology, i.e., there has been a change in the type or style of longline gear used by many European longline vessels that have gone from the traditional multifilament to monofilament gear which has increased efficiency per hook. One concern of all these developments is the effect on the data available, its continuity and complexity and therefore its interpretation.

SCRS scientists believe that ICCAT Task I landings data provide minimum estimates because of unreported catch of swordfish made in association with illegal, unreported and unregulated (IUU) fishing activities. However, the amount of NEI swordfish catch by IUU vessels has not been estimated and the newly implemented swordfish statistical document information has not yet been fully evaluated for developing these estimates.

Total Atlantic. The total Atlantic estimated catch of swordfish (North and South, including discards) reached an historical high of 38,624 t in 1995 **(SWO-Table 1** and **SWO-Figure 2**). The 2004 reported catch was about 25,000 t. A substantial number of countries have reported their 2004 catches, however because of unknown IUU catches and the preliminary nature of these reports, this value should be considered provisional and subject to revision.

North Atlantic. For the past decade, the North Atlantic estimated catch (landings plus discards) has averaged about 12,300 t **(SWO-Table 1** and **SWO-Figure 2)**, and the reported landings plus discards have been below this level since 1998, in response to ICCAT regulatory Recommendations. In 2004, the provisional landings and discards of about 12,300 t represent a nearly 40% decrease in reported catches below the 1987 peak in North Atlantic landings (20,236 t). Reduced landings have also been attributed to shifts in fleet distributions, including movement of some vessels to the South Atlantic and out of the Atlantic. In addition, some fleets, including the United States, EC-Spain, EC-Portugal and Canada have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catch rates for swordfish.

South Atlantic. The South Atlantic estimated catch (landings plus discards) was relatively low (generally less than 5,000 t) before 1980. Since then, landings increased continuously through the 1980s and the early 1990s to a peak of 21,780 t in 1995 (levels that match the peak of North Atlantic harvest). The increase of landings was in part due to progressive shifts of fishing effort to the South Atlantic, primarily from the North Atlantic, as well as other waters. Then the estimated landings decreased to 13,835 t by 1998 (36% reduction). The reduction in catch following the peak in 1995 was in response to the regulations, and partly due to a shift to other oceans and to a shift in target species. In 2003, the 12,553 t reported catches were about 10% lower than the 2002 reported level. The reported 2004 catch is 12,779 t, and should be considered provisional and probably an underestimate.

Discards. Only the U.S. (1991-2004), Canada (1997-2004), and Japan (2000-2003) report positive estimates of dead discards. Japan (2000) also reported live releases. EC-Spain reports zero dead discards. Both the U.S. and Canada used scientific observer data to estimate dead discards. The Japanese estimates in 2000-2003 are based on radio reports and logbooks.

SWO-ATL-3. State of the Stocks

North Atlantic

The 2002 assessment indicated that North Atlantic swordfish biomass had improved due to strong recruitment since 1997 (1996 year-class), combined with recent reductions in reported catch, especially compared to the peak catch values of 1987 **(SWO-Figure 3)**. The estimate of maximum sustainable yield from production model analyses is 14,340 t (with estimates ranging from 11,500 to 15,500 t). Since 1997, North Atlantic swordfish catches have been below 14,340 t **(SWO-Figure 4)**, but the most recent years reports are provisional and probably underestimates.

The biomass at the beginning of 2002 was estimated to be 94% (range: 75 to 124%) of the biomass needed to produce MSY. The 2001 fishing mortality rate was estimated to be 0.75 times the fishing mortality rate at MSY (range: 0.54 to 1.06). The replacement yield for the year 2003 and beyond was estimated to be about the MSY level. As the TAC for North Atlantic swordfish for 2002 was 10,400 t, it was considered likely that biomass would increase further toward the B_{MSY} level under those catch levels. The TAC set for 2003-2005 is 14,000 t [Rec. 02-02].

Estimates of abundance of newly recruiting swordfish (age 1) gradually increased in the early 1980s, shifting to a somewhat higher level from 1985 to 1989 **(SWO-Figure 5)**. Subsequently, the abundance of age 1 shifted back to a lower level between 1990 and 1996 and then increased to the highest levels of the time series in 1999 and 2000. The trends for ages 2, 3 and 4 are similar with the appropriate time lags, but the pattern is less pronounced. The estimated abundance of older (5+) fish declined to about one-third of the numbers in 1978, but increased somewhat after 1998. The estimated fishing mortality rate generally increased for all ages until 1996, after which they decreased sharply. The fishing mortality rate during the last three years averaged about 0.38/year for age 5+. Given this fishing mortality pattern, the spawning biomass likely will increase to a level exceeding 30% of the maximum at equilibrium, largely owing to the very large recruitments estimated for 1997-2000.

South Atlantic

The Committee noted that reported total catches of South Atlantic swordfish have been reduced since 1995, as was recommended by the SCRS. Previously the Committee expressed serious concern about the trends in stock biomass of South Atlantic swordfish based on the pattern of rapid increases in catch before 1995 that could result in rapid stock depletion, and in declining CPUE trends of some by-catch fisheries.

For the 2002 assessment, standardized CPUE series were available for three fleets, the targeted fishery of EC-Spain, and the by-catch fisheries of Chinese Taipei and Japan **(SWO-Figure 6)**. There was considerable conflict in trends among the three CPUE series and it is unclear which, if any, of the series tracks total biomass. It was noted that there was little overlap in fishing area among the three fleets, and that the three CPUE trends could track different components (or cohorts) of the population.

Due to some inconsistencies in the available CPUE trends reliable stock assessment results could not be obtained.

SWO-ATL-4. Effects of current regulations

This report only takes into account catch data transmitted to the SCRS by the different countries and which were available during the meeting. Total catch is considered provisional and subject to revision for 2004 **(SWO-ATL Table 1)**.

Canada, Chinese Taipei, Japan, South Africa, EC-Spain, and the United States provide catch-at-size data based on national sampling. Other nations are either partially (e.g., Brazil, EC-Portugal) or completely substituted from these data. The SCRS considers that it is not appropriate to apply these scientific estimates for purposes of evaluating compliance, and therefore only summary data are provided.

Catch limits

The total allowable catch in the North Atlantic in 2002 was 10,400 t (10,200 t retained and 200 t discarded). The reported landings in 2002 were about 9,000 t and the estimated discards were about 535 t. The total allowable catch in the North Atlantic in 2003 was 14,000 t (13,900 t retained and 100 t discarded). The reported landings in 2003 were about 10,800 t and the estimated discards were about 460 t. The total allowable catch in the North Atlantic in 2004 was 14,000 t. The reported landings and discards in 2004 were about 12,300 t. Reports for 2004 are considered provisional and subject to change.

The total allowable catch in the South Atlantic in 2002 was 14,620 t. The reported landings for 2002 were about 14,000 t and reported discards were 1 t. The total allowable catch in the South Atlantic in 2003 was 15,631 t. The reported landings and discards for 2003 were about 12,300 t. The total allowable catch in the South Atlantic in 2004 was 15,776 t. The reported landings and discards for 2004 were about 12,800 t. Reports for 2004 are considered provisional and subject to change.

Minimum size limits

There are two minimum size options that are applied to the entire Atlantic: 125 cm LJFL with a 15% tolerance, or 119 cm LJFL with zero tolerance and evaluation of the discards. In the absence of size data, these calculations could not be updated or examined for 2004.

In 2000, the percentage of swordfish reported landed (throughout the Atlantic) less than 125 cm LJFL was about 21% (in number) overall for all nations fishing in the Atlantic. If this calculation is made using reported landings plus estimated discards, then the percentage less than 125 cm LJFL would be about 25%. The Committee noted that this proportion of small fish did not increase very much even though recruitment in the North had been at a high level in recent years.

Other implications

The Committee expressed concern about the uncertainties of the stock structure of Atlantic swordfish and the possibility that these assumed stocks do not exactly reflect the geographical distribution of the respective stocks. A Workshop on swordfish stock structure is scheduled to take place in Crete in early 2006 and it is expected that research progress on this issue will be reported upon at that meeting.

The Committee is concerned that in some cases regulations have resulted in the discard of swordfish caught in the North stock and, to a certain extent, could have influenced similar behavior of the fleet that fishes the South Atlantic swordfish stock. The Committee considers that regulations may have had a detrimental effect on the availability and consistency of scientific data on catches, sizes and CPUE indices of the Atlantic fleet. The Committee expressed its serious concern over this limitation on data for future assessments.

For 2001 and thereafter, the United States introduced time and area closures in the North Atlantic to protect small swordfish and other species caught incidentally by longline. These closures have reduced the catches attributed to the United States, and may also have redistributed the fleet. These concerns were reiterated upon examination of the results of updated (through 2004) CPUE analysis from the U.S. fleet. The effects on the CPUE data are unknown, although analyses conducted to examine this impact did not reveal a measurable effect on catch rates in 2001.

ATLANTIC SWORDFISH SUMMARY

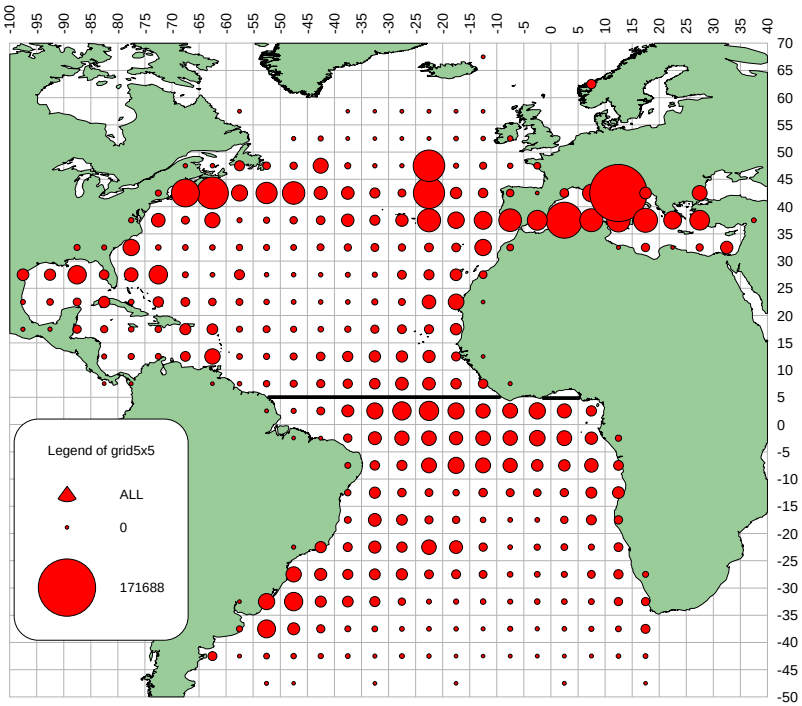
	North Atlantic	**South Atlantic**
Maximum Sustainable Yield[1]	14,340 t (11,580-15,530)[4]	Not estimated
Current (2004) Yield[2]	12,283 t	12,779 t
Current (2002) Replacement Yield[3]	about MSY	Not estimated
Relative Biomass (B_{2002}/B_{MSY})	0.94 (0.75 - 1.24)	Not estimated
Relative Fishing Mortality		
F_{2001}/F_{MSY}[1]	0.75 (0.54 - 1.06)	Not estimated
F_{2000}/F_{max}	1.08	Not estimated
$F_{2000}/F_{0.1}$	2.05	Not estimated
$F_{2000}/F_{30\%SPR}$	2.01	Not estimated
Management Measures in Effect	Country-specific TACs [Rec. 02-02]; 125/119 cm LJFL minimum size.	TAC target [Ref. 02-03]; 125/119 cm LJFL minimum size [Rec. 02-02].

[1] Base Case production model results based on catch data 1950-2001.
[2] Provisional and subject to revision.
[3] For next fishing year.
[4] 80% confidence intervals are shown.

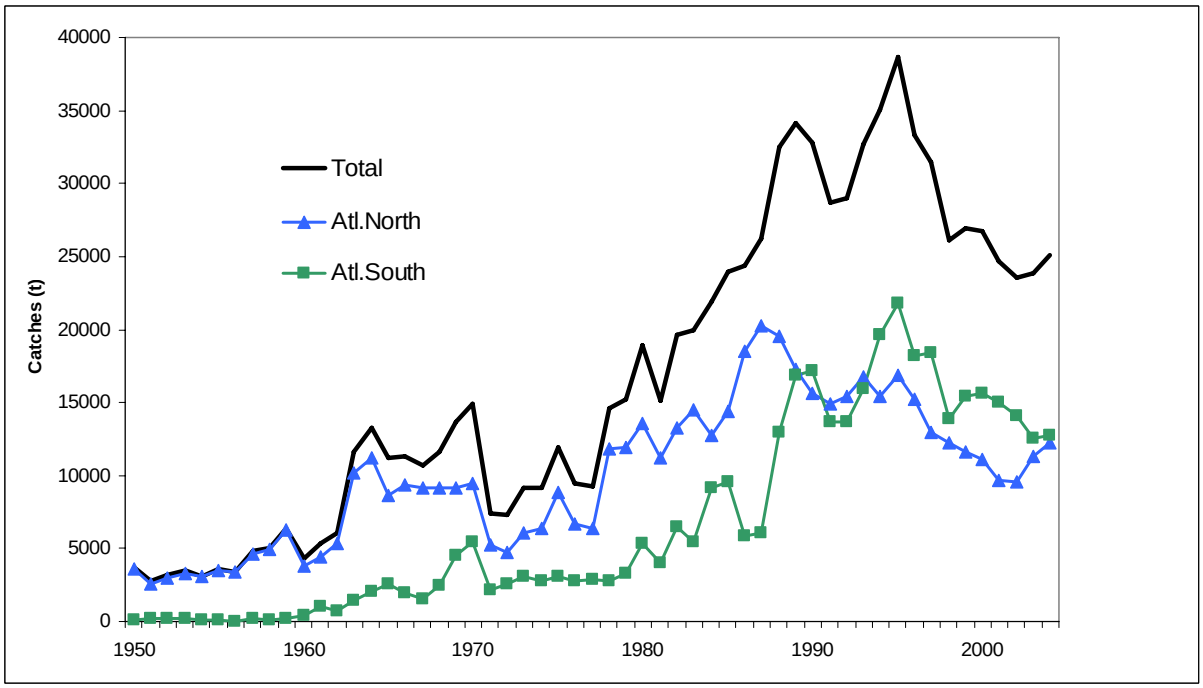
SWO ATL-Table 1. Estimated Catches (t) of Atlantic Swordfish by major Area, Gear and Flag --Prises estimées (t) d'espadon de l'Atlantique par zone, engin et pavillon--Capturas estimadas de pez espada del Atlantico por zona, arte y bandera

			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
TOTAL			18881	15155	19662	19929	21930	23969	24380	26266	32469	34098	32796	28647	29027	32659	35104	38624	33324	31432	26101	26963	26689	24690	23596	23856	25173
	AT.N		13558	11180	13215	14527	12791	14383	18486	20236	19513	17250	15672	14934	15394	16717	15475	16844	15172	12997	12195	11590	11080	9646	9552	11303	12283
	AT.S		5323	3975	6447	5402	9139	9586	5894	6030	12956	16848	17124	13713	13633	15942	19629	21780	18152	18435	13906	15373	15609	15007	14044	12553	12779
	UNCL area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	0	0	112
Landings	AT.N	Longline	12831	10549	13019	14023	12664	14240	18269	20022	18927	15348	14026	14208	14288	15641	14309	15765	13787	12186	10783	10449	9642	8401	8632	9986	11550
		Other surf.	727	631	196	504	127	143	217	214	586	1902	1646	511	723	669	458	553	797	360	928	612	659	687	385	855	317
	AT.S	Longline	5179	3938	6344	5307	8920	8863	4951	5446	12404	16398	16705	13287	13173	15547	17365	20806	17799	18239	13720	14819	15449	14301	13646	11760	12322
		Other surf.	144	37	103	95	219	723	943	584	552	450	419	426	460	395	2264	974	352	175	176	548	158	706	398	793	456
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	4
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	562	439	476	525	778	553	527	457	410
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	9	4	1	6	8	5	7
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	16	16	12	13	19	10	10	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	
		Canada	1885	561	554	1088	499	585	1059	954	898	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285	1203
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	73	86	104	132	40	337	304	22	102	90	316	56
		Chinese Taipei	134	182	260	272	164	152	157	52	23	17	270	577	441	127	507	489	521	509	286	285	347	299	310	257	30
		Cuba	278	227	254	410	206	162	636	910	832	87	47	23	27	16	50	86	7	7	7	7	0	0	10	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		EC.Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	3810	4014	4554	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3993	4595	3968	3957	4586	5376
		EC.France	5	4	0	0	1	4	4	0	0	0	75	75	75	95	46	84	97	164	110	104	122	0	74	169	102
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	132	81	35	17	5	12	1
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Poland	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	15	13	11	9	14	22	468	994	617	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032	1320
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	5	11	0	2	1	0	0	0	221
		FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	39	
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	
		Grenada	0	0	0	0	0	0	0	0	56	5	1	2	3	13	0	1	4	15	15	42	84	0	54	88	73
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
		Japan	1167	1315	1755	537	665	921	807	413	621	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	0	640
		Korea, Republic of	284	136	198	53	32	160	68	60	30	320	51	3	3	19	16	16	19	15	0	0	0	0	0	0	
		Liberia	5	38	34	53	0	24	16	30	19	35	3	0	7	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	136	124	91	129	81	137	181	197	196	222	91	110	69	39	36	79	462	267	191	119	114	523	223	329	335
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	6	14	0	0	14	28	24	37	27	34	32	44
		NEI-1	0	0	0	0	0	0	0	0	76	112	529	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	12	0	0	0	0	14	3	131	190	185	43	35	111	0	0	0	0	0	0	0	0	0	0	
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	44	5
		Rumania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	1	0	6	6	0	0	0	0	0	0	0	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	3	0	3	23	0	4	3	1	0	1	0	0	0	7	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
		Trinidad and Tobago	0	0	0	21	26	6	45	151	42	79	66	71	562	11	180	150	158	110	130	138	41	75	92	78	83
		U.S.A.	5625	4530	5410	4820	4749	4705	5210	5247	6171	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2384	2513	2330
		U.S.S.R.	21	0	69	0	16	13	18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	5	3	3	2	0	0	
		Venezuela	192	24	25	35	23	51	84	86	2	4	9	75	103	73	69	54	85	20	37	30	30	21	34	45	46
	AT.S	Angola	0	0	0	0	26	228	815	84	84	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Argentina	0	0	20	0	0	361	31	351	198	175	230	88	88	14	24	0	0	0	0	0	0	5	0	0	
		Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17	8	0	0	0	
		Benin	0	18	24	0	86	90	39	13	19	26	28	28	26	28	25	24	24	10	0	3	0	0	0	0	
		Brasil	1582	655	1019	781	468	562	753	947	1162	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910	2920	2998
		Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	534	344	200	423	353	278
		Chinese Taipei	702	528	520	261	199	280	216	338	798	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1164	1254	745

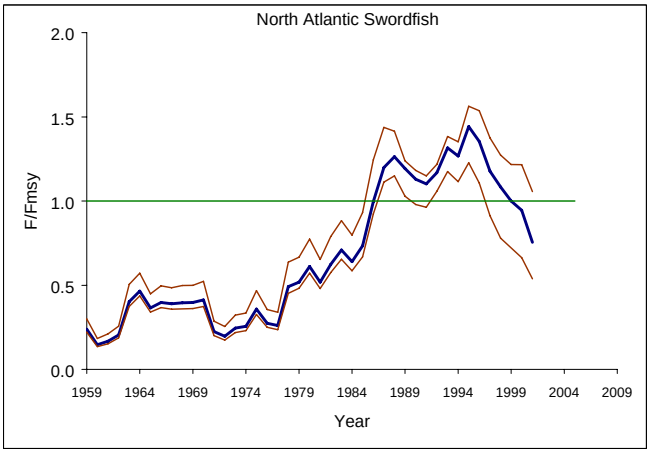
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Cuba	316	147	432	818	1161	1301	95	173	159	830	448	209	246	192	452	778	60	60	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	10	10	10	10	12	7	8	18	13	14	20	19	26	18	25	26	20	19	19	43	29
		EC.España	0	0	0	0	0	0	66	0	4393	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741	4527	5483
		EC.France+España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	380	389	441	384	381	392	393	380	354	345
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	
		Ghana	110	5	55	5	15	25	13	123	235	156	146	73	69	121	51	103	140	44	106	121	117	531	372	734	343
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
		Honduras (observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	5	2	8	0	0	0	0	
		Japan	2029	2170	3287	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	791	684	902	972	523
		Korea, Republic of	399	311	486	409	625	917	369	666	1012	776	50	147	147	198	164	164	7	18	7	0	10	0	2	24	70
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	14	26	28	28	28	28	28	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	856	439	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	730	469	751	504	191	549
		Nigeria	0	0	0	83	69	0	0	0	0	0	0	0	3	0	857	0	9	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	8	1
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	
		South Africa	31	9	3	7	0	8	5	5	4	0	0	5	9	4	1	4	1	1	240	143	328	547	649	293	295
		Togo	0	0	0	0	0	6	32	1	0	2	3	5	5	8	14	14	64	0	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	396	160	179	142	43	200	21	15
		U.S.S.R.	154	40	26	46	158	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta. Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	
		Uruguay	0	92	575	1084	1927	1125	537	699	427	414	302	156	210	260	165	499	644	760	889	650	713	789	768	850	1105
	UNCL area	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Discards	AT.N	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	52	35	50	26	33	79	45
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	239	239	239	102	102
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	588	446	433	494	490	293	263	281	270
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1
	UNCL area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	

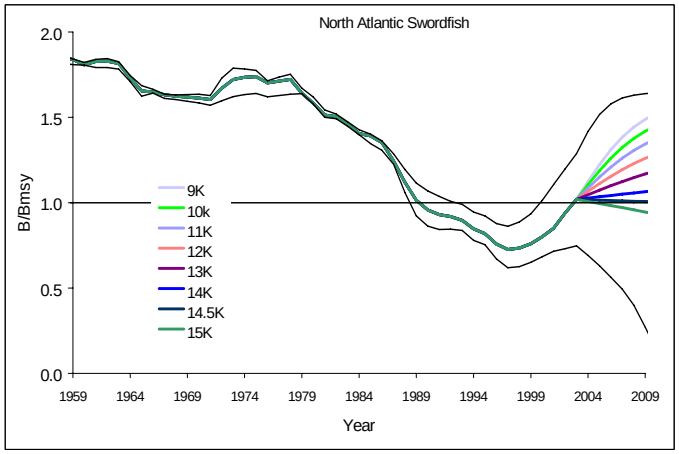


SWO-Figure 1. Geographical distribution of swordfish catches for the period 1950-2003.

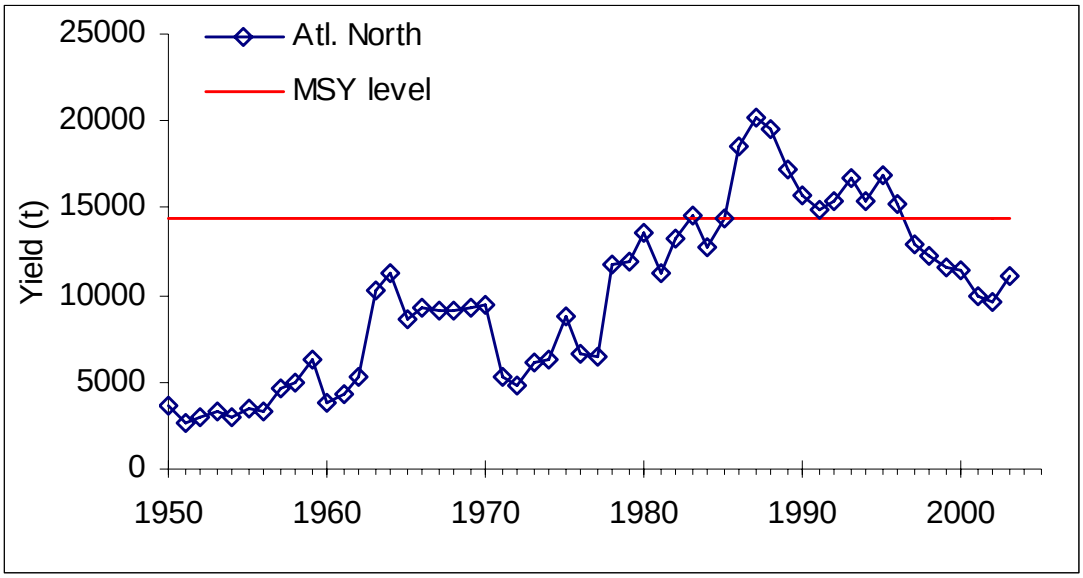


SWO-ATL Figure 2. Reported catches of Atlantic swordfish (in t), including discards for 1950-2004.

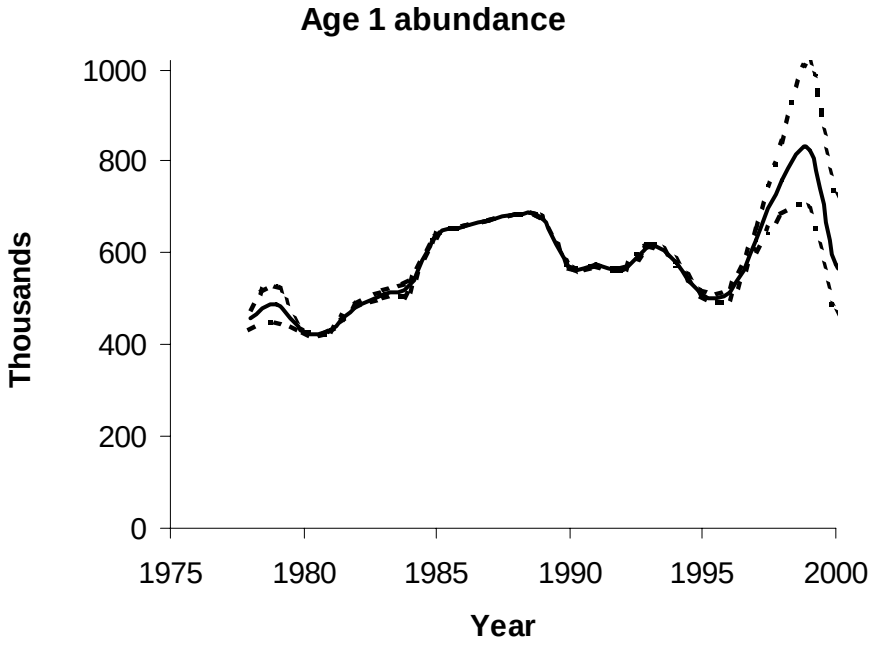




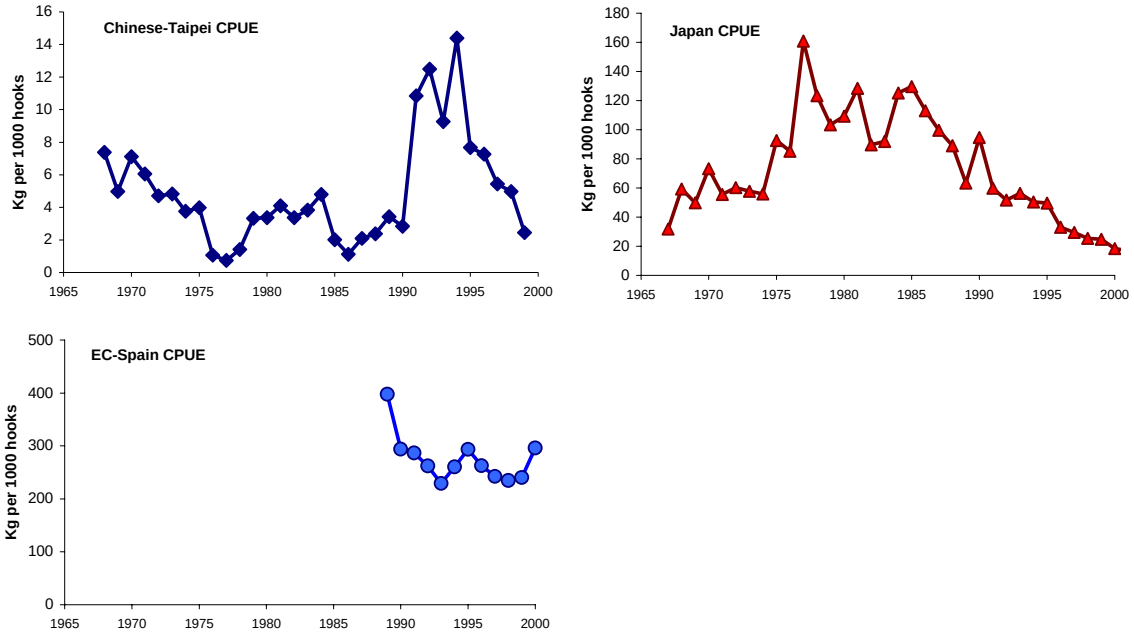
SWO-ATL-Figure 3. North Atlantic swordfish assessment results. Left panel: Estimated fishing mortality rate relative to F_{MSY} (F/F_{MSY}) for the period 1959-2001 (median with 80% confidence bounds based on bootstrapping are shown). Right panel: Estimated biomass relative to biomass at MSY (B/B_{MSY}) for the period 1959-2002, followed by 7-year projected B/B_{MSY} under the constant catch scenarios listed. Upper and lower lines represent approximate 80% confidence ranges. For the catch projection period (2002-2009), the upper line is the upper 80% confidence bound for the 9K (9,000 t) projection and the lower line is the 80% confidence bound for the 15K (15,000 t) projection.



SWO-ATL Figure 4. Annual yield (t) for North Atlantic swordfish relative to the estimated MSY level.



SWO-ATL-Figure 5. Sequential population analysis estimates (numbers of fish) of North Atlantic recruitment (using input data from 1978-2000) with 80% bootstrap confidence limits (dashed lines).



SWO-ATL-Figure 6. Standardized catch rates for South Atlantic swordfish presented at the 2002 meeting, showing contradictory patterns.

8.10 SWO-MED – MEDITERRANEAN SWORDFISH

The most recent assessment was conducted in 2003, making use of catch and effort information through 2001. The present report focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Mediterranean swordfish should consult the report of the 2004 SCRS meeting.

SWO-MED-1. Biology

No documents on Mediterranean swordfish biology were presented during the 2005 meetings. A workshop on swordfish stock structure is scheduled for early January 2006 and research progress on relevant aspects will be presented in future reports.

SWO-MED-2. Fishery indicators

Catch levels are rather stable in the last decade fluctuating between 12,000-16,000 t. Those levels are relatively high similar to those of bigger areas such as the North Atlantic. Updated information on Mediterranean swordfish catch by gear type is provided in **SWO-MED Table 1** and **SWO-MED Figure 1**. Total 2004 catch is estimated to exceed 13,000 t but a final figure cannot be given as the currently available Task I data do not include all Mediterranean countries. The biggest producers of swordfish in the Mediterranean Sea in the recent years are EC-Italy, Morocco, EC-Greece and EC-Spain. Also, Algeria, EC-Cyprus, EC-Malta, Tunisia, EC-Portugal and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, and Libya. The Committee recognized that there may be additional fleets taking swordfish in the Mediterranean, for example, Israel, Lebanon, Egypt, Monaco and Syria, but the data are not reported to ICCAT or FAO.

The main fishing gears used are surface longline and gillnets. Minor catches are also reported from harpoon, trap and recreational fisheries. Surface longlines are used all over the Mediterranean, while gillnets are mostly employed in Italy, Morocco and Turkey. There are also other countries known to be fishing with gillnets but not reporting their catches. However, following ICCAT recommendations for a general ban of driftnets in the Mediterranean, the size of the gillnet fleet has a clear decreasing trend.

Mediterranean total swordfish landings showed an upward trend from 1965-72, stabilized between 1973-1977 and then resumed an upward trend reaching a peak in 1988 (20,365 t; **SWO-MED-Table 1, SWO-MED-Figure 1**). The sharp increase between 1983 and 1988 may be partially attributed to improvement in the national systems for collecting catch statistics. Since 1988, the reported landings of swordfish in the Mediterranean Sea have declined, and since 1990, they have fluctuated between about 12,000 to 16,000 t.

There is a high and growing demand for swordfish for fresh consumption in most Mediterranean countries.

SWO-MED-3. State of the stocks

The 2003 assessment indicated the presence of a stable situation in terms of recruitment, and total and spawning biomass (**SWO-MED-Figures 2, 3**). These findings suggest that the current exploitation level is sustainable, in the short-term. However, the lack of sufficient historical data did not allow the determination of stock status relative to MSY benchmarks. The VPA analysis has also suggested that recent F estimates were higher than the calculated Y/R and SPR benchmarks.

The Committee noted the large catches of small size swordfish, i.e., less than 3 years old (many of which have probably never spawned) and the relatively low number of large individuals in the catches (**SWO-MED-Figure 4**). Fish less than 3 years old represent 50-70% of the total yearly catches.

SWO-MED-4. Effects of current regulations

Although ICCAT has no specific regulatory measures for Mediterranean swordfish fisheries, several countries have imposed technical measures, such as closed areas and seasons, minimum landing size regulations and license control systems. The EC introduced a driftnet ban in 2002 and in 2003 ICCAT adopted a recommendation for a general ban of this gear in the Mediterranean [Rec. 03-04]. The recently adopted Rec. 04-12 forbids the use of various types of nets and longlines for sport and recreational fishing for tuna and tuna-like species in the Mediterranean.

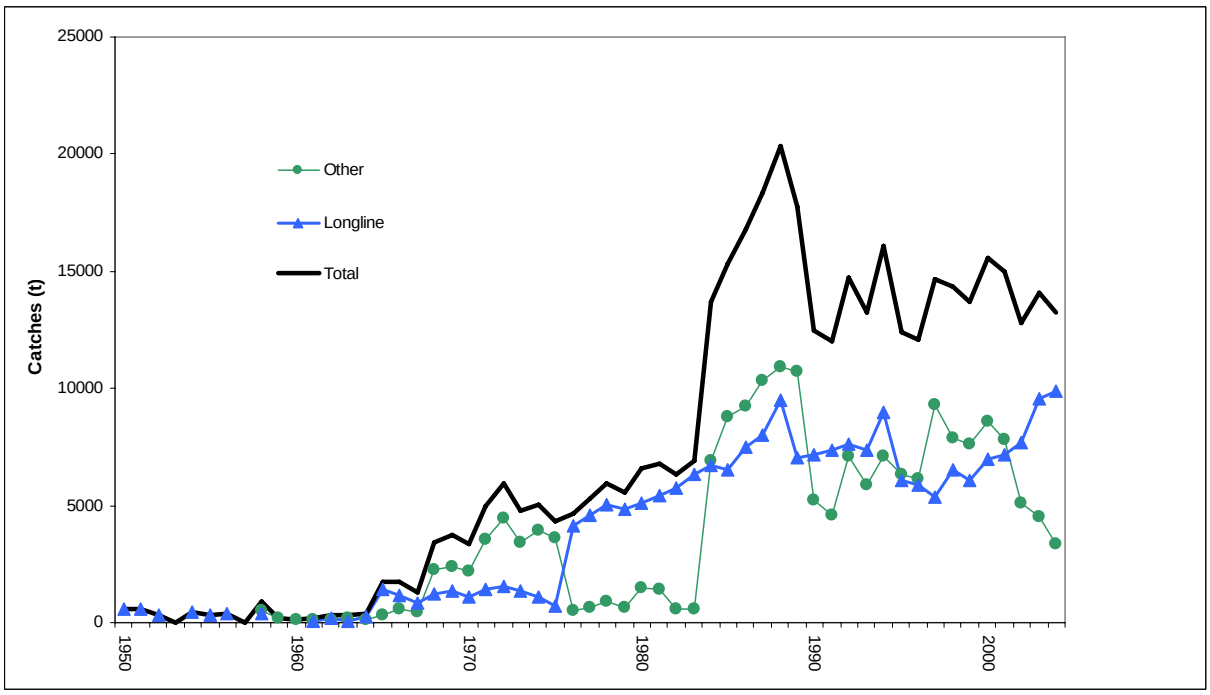
In past meetings, the Committee has reviewed the various measures taken by member countries and noted the difficulties in implementing some of the management measures, particularly that of minimum landing size.

MEDITERRANEAN SWORDFISH SUMMARY	
Maximum Sustainable Yield	Not estimated
Current (2004) Yield[1]	13,222 t
Current (2002) Replacement Yield	~15,000 t
Relative Biomass (B_{2002}/B_{MSY})	Not estimated
Relative Fishing Mortality	
F_{2001}/F_{MSY}	Not estimated
F_{2001}/F_{max}	2.7
$F_{2001}/F_{0.1}$	4.7
$F_{2001}/F_{30\%SPR}$	3.3
Management measures in effect	No ICCAT regulations; national closed areas, minimum size and effort controls.

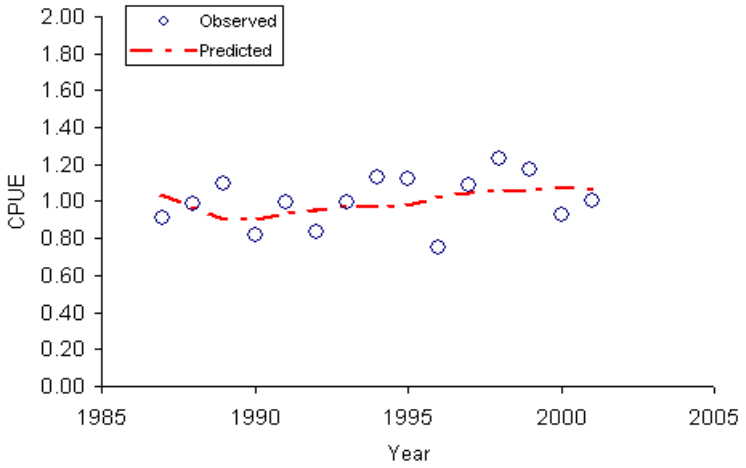
[1] Provisional, and subject to revision.

SWO MED-Table 1. Estimated Catches (t) of Swordfish in Mediterranean sea --Prises estimées (t) d'espadon de la mediterranée--Capturas estimadas (t) de pez espada del Mediterráneo

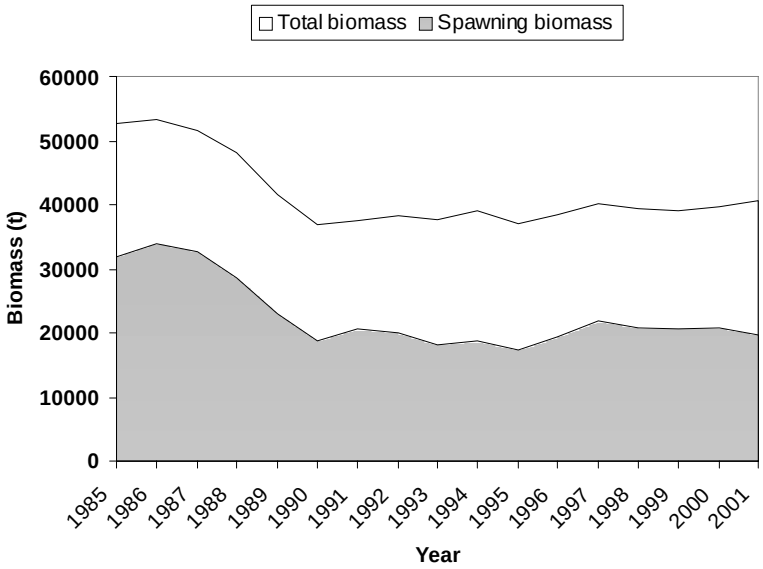
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL		6579	6813	6343	6896	13666	15292	16765	18320	20365	17762	12441	11997	14709	13265	16082	12430	12053	14693	14369	13699	15572	15006	12803	14079	13222
Landings	Longline	5115	5418	5770	6313	6749	6493	7505	8007	9476	7065	7184	7393	7631	7377	8985	6084	5884	5389	6496	6097	6963	7180	7696	9546	9872
	Other surf.	1464	1395	573	583	6917	8799	9260	10313	10889	10697	5257	4604	7078	5888	7097	6346	6169	9304	7873	7602	8609	7826	5107	4534	3341
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Landings	Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0	0	0	
	Algerie	650	760	870	877	884	890	847	1820	2621	590	712	562	395	562	600	807	807	807	825	709	816	1081	814	0	564
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	3	0	0	0	0	0	0	
	Croatia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	0	0	0	
	EC.Cyprus	72	78	103	28	63	71	154	84	121	139	173	162	56	116	159	89	40	51	61	92	82	135	104	47	49
	EC.España	750	1120	900	1322	1245	1227	1337	1134	1762	1337	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498	306	950
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	27	0	19
	EC.Greece	0	91	773	772	1081	1036	1714	1303	1008	1120	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1230	1120
	EC.Italy	4143	3823	2939	3026	9360	10863	11413	12325	13010	13009	5524	4789	7595	6330	7765	6725	5286	6104	6104	6312	7515	6388	3539	8395	6942
	EC.Malta	222	192	177	59	94	172	144	163	233	122	135	129	85	91	47	72	72	100	153	187	175	102	257	163	195
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	115	8	1	120
	Japan	1	0	5	6	19	14	7	3	4	1	2	1	2	4	2	4	5	5	7	4	2	1	0	0	
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	8	6	0	0	
	Maroc	0	0	0	43	39	38	92	40	62	97	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379	3300	3253
	NEI	728	672	517	532	771	730	767	828	875	979	1360	1292	1292	0	0	0	0	0	0	0	0	0	0	0	
	Tunisie	0	7	19	15	15	61	64	63	80	159	176	181	178	354	298	378	352	346	414	468	483	567	1138	288	
	Turkey	13	70	40	216	95	190	226	557	589	209	243	100	136	292	533	306	320	350	450	230	373	360	360	350	
Discards	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9



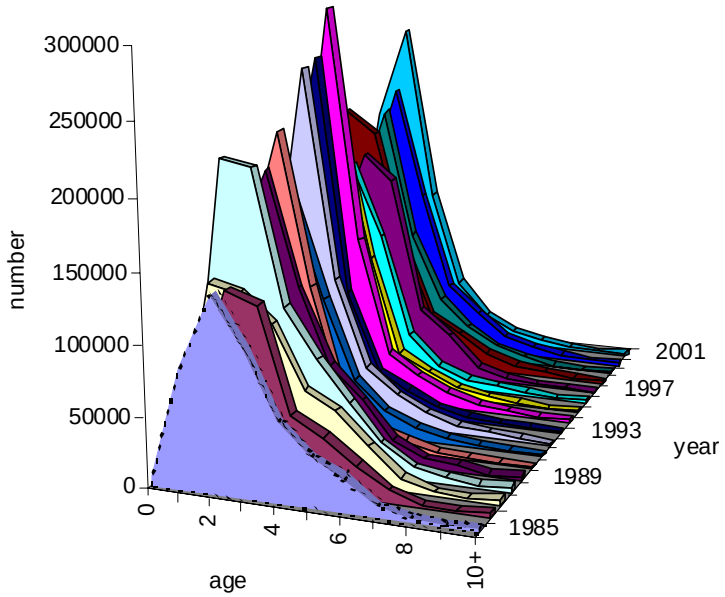
SWO-MED-Figure 1. Cumulative estimates of swordfish catches (t) in the Mediterranean by major gear type, 1950-2004.



SWO-MED-Figure 2. Fit of the non-equilibrium production model to catch and effort since 1987. The predicted CPUE indicates a relatively stable population biomass over the time-period from 1987-2001.



SWO-MED-Figure 3. Total and spawning biomass estimates by year.



SWO-MED-Figure 4. Age distribution of swordfish catches in the Mediterranean by year (1985-2001).

8.11 SBF - SOUTHERN BLUEFIN TUNA

A review of fisheries indicators was conducted by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) Stock Assessment Group during 2005, results of which are summarized below. This report also updates description of fisheries and state of stock, and provides fishery and catch information.

SBF-1. Biology

Southern bluefin tuna (*Thunnus maccoyii*) are found in the southern hemisphere, mainly in waters between 30° and 50°S, but only rarely in the eastern Pacific. The only known breeding area is in the Indian Ocean, south-east of Java, Indonesia. Spawning takes place from September to April in warm waters south of Java and juvenile southern bluefin tuna migrate south down the west coast of Australia. During the summer months (December-April), they tend to congregate near the surface in the coastal waters off the southern coast of Australia and spend their winters in deeper, temperate oceanic waters. Results from recaptured conventional and archival tags show that young southern bluefin tuna migrate seasonally between the south coast of Australia and the central Indian Ocean. After age 5, southern bluefin tuna are seldom found in nearshore surface waters, and extend their distribution over the southern circumpolar area throughout the Pacific, Indian and Atlantic Oceans.

Southern bluefin tuna can attain a length of over 2m and a weight of over 200kg. Direct ageing using otoliths indicates that a significant number of fish bigger than 160cm are older than 25 years, and the maximum age obtained from otolith readings has been 42 years. Analysis of tag returns and otoliths indicate that, in comparison with the 1960s, growth rate has increased since about 1980 as the stock has been reduced. There is some uncertainty about the size and age when southern bluefin tuna mature, but available data indicate that southern bluefin tuna do not mature younger than 8 years (155cm fork length). Southern bluefin tuna exhibit age-specific natural mortality, with M being higher for young fish and lower for old fish.

Given that southern bluefin tuna have only one known spawning ground, and that no morphological differences have been found between fish from different areas, southern bluefin tuna are considered to constitute a single stock for management purposes.

SBF-2. Description of fisheries

Historically, the southern bluefin tuna stock has been exploited by Australian and Japanese fisheries for more than 50 years, with total catches peaking at 81,605t in 1961 (**SBF-Figure 1**). The current (2004) total catch is about 13,490t (preliminary data), continuing a declining trend in total catches from a recent peak of 19,529t in 1999, 16,026t in 2001, 15,212t in 2002 and 14,042t in 2003. Over the period 1952 - 2003, 79% of the catch has been made by longline and 21% using surface gears, primarily purse-seine and pole&line (**SBF-Figure 1**). The proportion of catch made by surface fishery peaked at 50% in 1982, dropped to 11-12 % in 1992 and 1993 and increased again to average 30% since 1996 (**SBF-Table 1** and **SBF-Figure 1**). The Japanese longline fishery (taking a wide age range of fish) recorded its peak catch of 77,927t in 1961 and the Australian surface fishery catches of young fish peaked at 21,501t in 1982 (**SBF-Figure 3**). New Zealand, the Chinese Taipei and Indonesia have also exploited southern bluefin tuna since the 1970s - 1980s, and Korea started a fishery in 1991.

On average 73% of the southern bluefin tuna catch has been made in the Indian Ocean, 21% in the Pacific Ocean and 6% in the Atlantic Ocean (**SBF-Table 1** and **SBF-Figure 2**). The Atlantic Ocean catch has varied widely between about 300t and 8,200t since 1968 (**SBF-Figure 2**), averaging about 1,000t over the past two decades. This variation in catch reflecting shifts in longline effort between the Atlantic and Indian Oceans. Fishing in the Atlantic occurs primarily off the southern tip of South Africa (**SBF-Figure 4**). The Indian Ocean catch has declined from about 54,000t to 11,000t, averaging about 14,600t, and the Pacific Ocean catch has ranged from about 1,200t to 19,000t, averaging about 2,100t, over the same periods.

SBF-3. Summary of stock status

SBF-Figure 5 depicts trends in Japanese longline catch rates for juvenile, maturing and mature southern bluefin tuna. **SBF-Figure 6** shows changes in the size composition of Japanese longline catches from 2000 to 2004.

Southern bluefin tuna stock status was reviewed at the 10th meeting of the CCSBT Scientific Committee in 2005. Assessments using the southern bluefin tuna Operating Model suggest that the southern bluefin tuna spawning

biomass is at a low fraction of its original biomass and well below the 1980 level (**SBF-Figure 10**). The stock is estimated to be well below the level that could produce maximum sustainable yield. Rebuilding the spawning stock biomass (**SBF-Figure 11**) would almost certainly increase sustainable yield and provide security against unforeseen environmental events that might affect recruitment or productivity. Assessments estimate that recruitment in the 1990s fluctuated with no overall trend. Recruitments in the last decade are estimated to be well below the levels in the period 1950-1980.

Analysis of several independent data sources (**SBF-Figure 7** and **SBF-Figure 8**) and the operating model indicate very low recruitments in 2000 and 2001. There is some evidence that the 1999 cohort is relatively weak and that the 2002 cohort is unlikely to be as strong as the average of those estimated during the 1990s. Other indicators show that the Indonesia longline fishery on spawning fish catches fewer older individuals (**SBF-Figure 9**). One plausible interpretation is that the spawning stock has declined in average age and may have declined appreciably in abundance. The decline in average age may be due to the disappearance of older fish, a pulse of younger fish entering the spawning stock, or a combination of the two factors. A pulse of younger fish entering the spawning stock is consistent with the assessment model output which suggests that the spawning stock has been largely stable over the last decade and has increased slightly over the last four years.

Given all the evidence, it seems highly likely that current levels of catch will result in further declines in spawning stock and exploitable biomass, particularly because of recent low recruitments (**SBF-Figure 11**).

SBF-4. Current management measures

Southern bluefin tuna were managed by means of quota limits agreed at tri-partite meetings between Australia, Japan and New Zealand from 1985 through to the establishment of the CCSBT in 1994. The global quota was reduced several times after the initial level of 38,650t for the 1984/85 season. The combined quota for these three countries was maintained at 11,750t from the 1989/90 season through to 2002/03. Following increases in membership of the CCSBT (Republic of Korea, and the Chinese Taipei joined in 2001 and 2002 respectively), the CCSBT extended the following national catch limits for 2003/04 to 2004/05:

Japan	6,065 tons
Australia	5,265 tons
Republic of Korea	1,140 tons
Chinese Taipei	1,140 tons
New Zealand	420 tons
Total	**14,030 tons**

An additional catch limit of 900 tonnes has also been set in 2004/05 for cooperating non-members, of which 50 tonnes was allocated to the Philippines (which was recently admitted as a cooperating non-member) and 800 tonnes set aside for Indonesia should it become a cooperating non-member

The CCSBT has also implemented a Trade Information Scheme (TIS) for southern bluefin tuna. This requires all members of the CCSBT to ensure that all imports of southern bluefin tuna are to be accompanied by a completed CCSBT TIS Document, endorsed by an authorised competent authority in the exporting country, and including details of the name of fishing vessel, gear type, area of catch, dates, etc. Shipments not accompanied by this form must be denied entry by members and cooperating non-members. Completed forms are lodged with the CCSBT Secretariat and are used to maintain a database for monitoring catches and trade. As markets for southern bluefin tuna are now developing outside CCSBT member countries, the TIS scheme was recently amended to require the document to be issued for all exports, and to include the country of destination,

At its annual meeting in October 2003, the CCSBT agreed to establish a list of vessels over 24 metres in length which are approved to fish for southern bluefin tuna, to be completed by 1 July 2004. The list included vessels from CCSBT members and cooperating non-members. At its annual meeting in October 2004, the CCSBT agreed to expand the list to include all of the vessels, regardless of size, that are authorised to catch southern bluefin tuna. Members and cooperating non-members are required to refuse the import of southern bluefin tuna caught by vessels not on the list.

SBF-5. CCSBT management procedure

The 10th meeting of the CCSBT Scientific Committee held in 2005 finalized the development and evaluation of candidate management procedures for southern bluefin tuna, and has recommended a final management procedure, implementation schedule and initial catch reduction for consideration by the CCSBT.

SOUTHERN BLUEFIN TUNA SUMMARY (global stock)	
Maximum Sustainable Yield	Not estimated
Current (2004) Yield	13,490 t (preliminary)
Current Replacement Yield	Less than 15,000 t
Relative Biomass	SSB_{2004}/SSB_{1980} 0.14 - 0.33[1] SSB_{2004} / SSB_{K} 0.05 - 0.12
Current Management Measures	Global quota of 14,030t (Australia, Chinese Taipei, Republic of Korea, Japan, and New Zealand) plus 900 t provision for cooperating non-members.

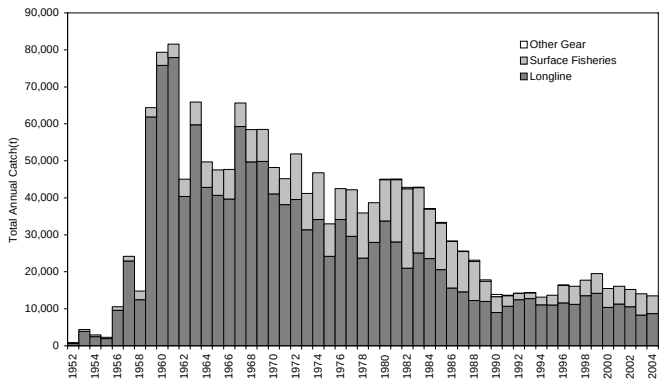
[1]Estimates calculated using the reference set operating model adopted for the development of the CCSBT management procedure; ranges indicated refer to 90% probability intervals.

SBF-Table 1 : Atlantic Ocean, Indian Ocean, Pacific Ocean and global southern bluefin tuna catch (t) by area, gear and flag.

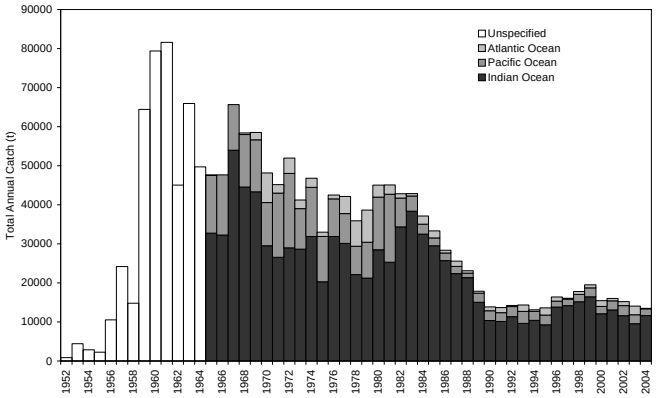
Prises (t) de thon rouge du sud de l'Ocean Atlantic, Indien, Pacific et globales par zone, engin et pavillon

Capturas (t) de atún rojo del Sur del Oceano Atlantico, Indico, Pacifico y globales por zona, arte y bandera

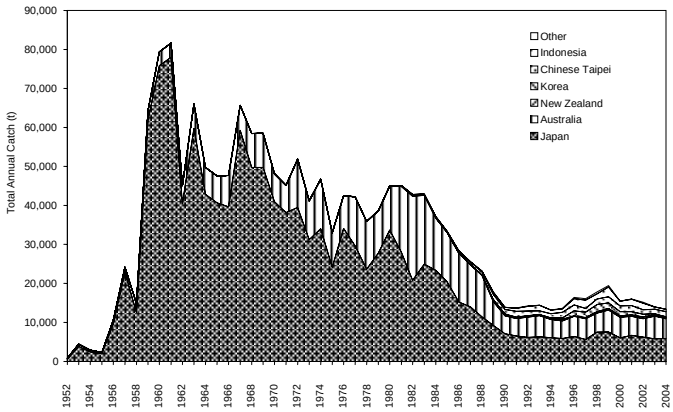
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Atlantic																										
	Total Catch	3086	2400	1114	604	2082	1828	650	1330	602	513	1004	1313	300	1612	483	1845	1040	278	738	819	1470	640	1041	2199	104
	By Gear																									
	Longline	3086	2400	1114	604	2082	1828	650	1330	602	513	1004	1313	300	1612	483	1845	1040	278	738	819	1470	640	1041	2199	104
	BY Flag																									
	Japan	3086	2365	1104	573	2082	1733	434	1228	573	493	987	1080	253	1425	420	1237	1015	189	649	689	1203	327	909	1932	59
	Korea	0	0	0	0	0	0	0	0	0	0	0	0	0	80	7	24	0	0	47	100	242	90	116	96	5
	Chinese Taipei	0	35	9	30	1	95	216	102	28	19	17	233	46	108	56	584	24	89	42	30	24	223	16	170	18
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
Indian																										
	Total Catch	28463	25299	34347	38315	32491	29520	25735	22380	21354	15020	10400	10110	11328	9631	10429	9264	13812	14160	15137	16406	12085	13071	11570	9529	11629
	By Gear																									
	Longline	20602	17355	15139	21522	19192	16864	13165	11489	10530	9281	5781	7146	9664	8077	8319	6629	9064	9343	10942	11059	6953	8304	6887	3737	6795
	Purse Seine	107	420	5489	5083	4339	5179	6342	5411	2820	1626	2511	1034	22	536	1269	1840	3099	2991	3555	5325	5132	4767	4683	5792	4834
	Pole and Line	7754	7524	13708	11698	8960	7410	6147	5393	7770	3794	1803	1823	1639	1018	841	795	1649	1826	640	22	0	0	0	0	0
	Unclassified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gillnet	0	0	11	12	0	67	81	87	234	319	305	107	3	0	0	0	0	0	0	0	0	0	0	0	0
	BY Flag																									
	Australia	7860	7944	19198	16781	13299	12589	12489	10805	10590	5438	4335	3876	4568	4513	4246	3362	4893	4910	4353	5448	5147	4792	4693	5813	4836
	Japan	20526	17284	14966	21391	18935	16780	12938	10946	9754	7536	4383	4137	4238	2869	4132	3684	4248	4500	5838	5126	3370	4453	3153	1926	4652
	Korea	0	0	0	0	0	0	0	0	0	0	0	15	41	12	130	341	1320	1424	1749	1361	893	754	630	155	126
	Chinese Taipei	64	56	173	131	243	146	298	608	828	1376	1160	1227	1176	850	963	848	1442	783	1397	1483	1424	1357	1121	957	1278
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	80	17	43	79	65	58
	Indonesia	5	1	2	5	11	3	7	14	180	568	517	759	1232	1370	904	829	1614	2210	1324	2504	1203	1632	1691	564	677
	Others Unclass.	7	14	9	7	3	2	3	7	2	103	4	97	73	17	54	201	295	333	471	403	31	41	203	48	2
Pacific																										
	Total Catch	13505	17405	7327	3963	2516	1977	1934	1866	1189	2310	2467	2269	2588	3102	2241	2528	1503	1638	1901	2305	1918	2314	2602	2314	1757
	By Gear																									
	Longline	10041	8333	4719	2916	2312	1883	1810	1791	1095	2157	2183	2233	2503	3082	2234	2505	1460	1579	1857	2300	1917	2314	2601	2314	1755
	Purse Seine	1929	6332	1342	790	105	0	34	0	0	0	0	0	0	0	0	0	22	7	29	0	0	0	0	0	0
	Pole and Line	1405	2567	961	125	6	0	8	16	0	13	0	0	33	0	3	0	10	16	0	0	0	0	0	0	0
	Troll	0	0	0	0	0	0	0	0	0	31	21	1	4	0	0	8	3	31	13	3	1	0	1	0	1
	Unclassified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Handline	130	173	305	132	93	94	82	59	94	109	263	35	48	20	4	15	8	5	2	2	0	0	0	0	1
	BY Flag																									
	Australia	3335	8899	2303	914	112	0	42	16	1	680	251	613	680	860	454	1145	236	406	543	104	110	61	19	14	226
	Japan	10041	8332	4719	2916	2312	1883	1810	1791	1095	1193	1686	1260	1630	2024	1510	946	1129	898	1013	1740	1427	1894	2130	1904	1136
	New Zealand	130	173	305	132	93	94	82	59	94	437	529	164	279	217	277	436	139	334	337	461	380	358	450	390	393
	Korea	0	0	0	0	0	0	0	0	0	0	0	232	0	0	0	0	0	0	0	0	0	1	0	3	0
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	2	2
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0
	Others Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
ALL Oceans																										
	Total Catch	45054	45104	42788	42881	37090	33325	28319	25575	23145	17843	13870	13691	14217	14344	13154	13637	16356	16076	17776	19529	15472	16026	15212	14042	13490
	By Gear																									
	Longline	33729	28088	20971	25042	23586	20575	15625	14609	12227	11950	8968	10692	12467	12770	11036	10979	11564	11200	13537	14177	10339	11259	10528	8250	8654
	Purse Seine	2036	6752	6831	5872	4444	5179	6376	5411	2820	1626	2511	1034	22	536	1269	1840	3121	2998	3584	5325	5132	4767	4683	5792	4834
	Pole and Line	9159	10091	14670	11823	8967	7410	6155	5409	7770	3807	1803	1823	1673	1018	844	795	1659	1843	640	22	0	0	0	0	0
	Trol	0	0	0	0	0	0	0	0	0	31	21	1	4	0	0	8	3	31	13	3	1	0	1	0	1
	Handline	130	173	305	132	93	94	82	59	94	109	263	35	48	20	4	15	8	5	2	2	0	0	0	0	1
	Gillnet	0	0	11	12	0	67	81	87	234	319	305	107	3	0	0	0	0	0	0	0	0	0	0	0	0



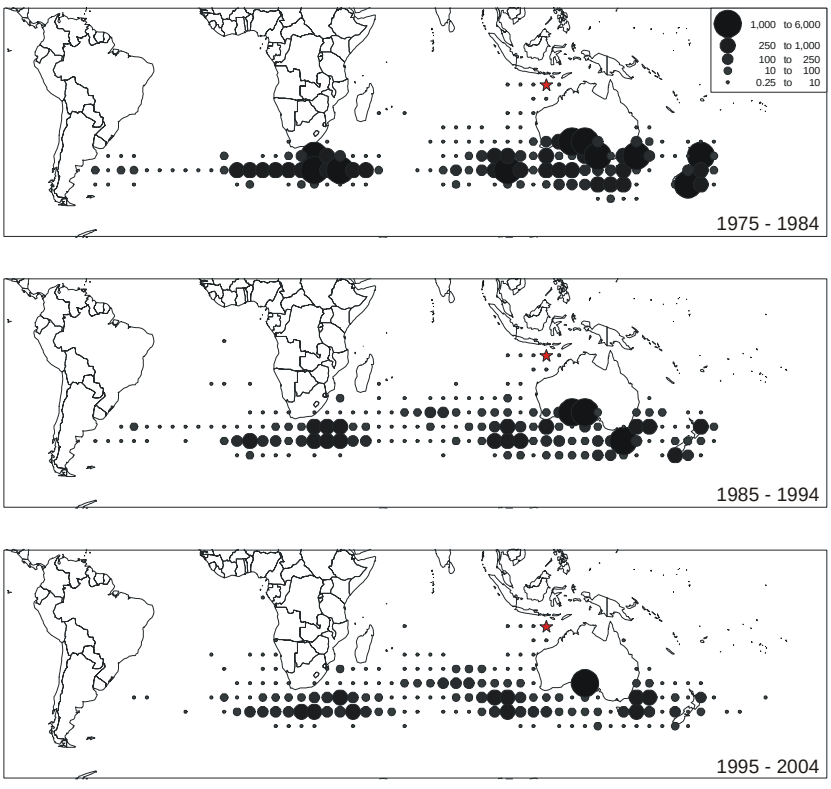
SBF-Figure 1. Global southern bluefin tuna catches by fishing gear (t), 1952 to 2004.



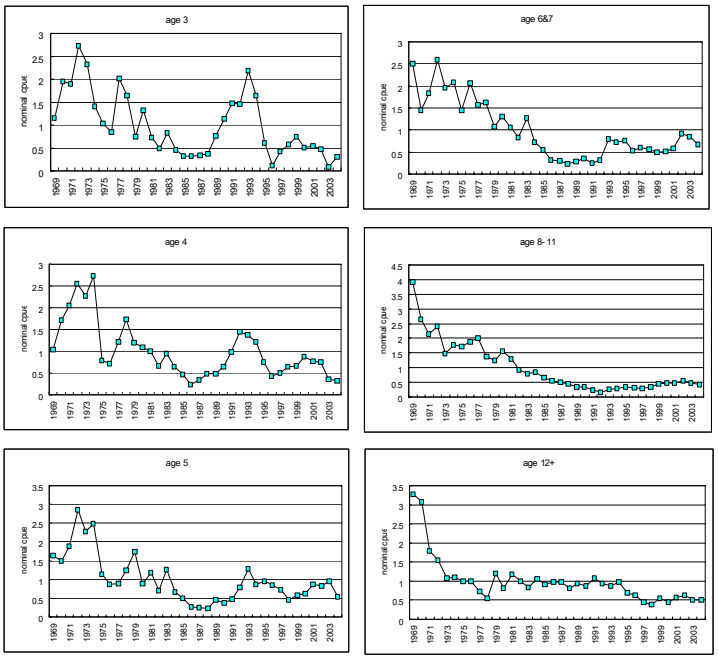
SBF-Figure 2. Southern bluefin tuna catches by ocean (t), 1952 to 2004.



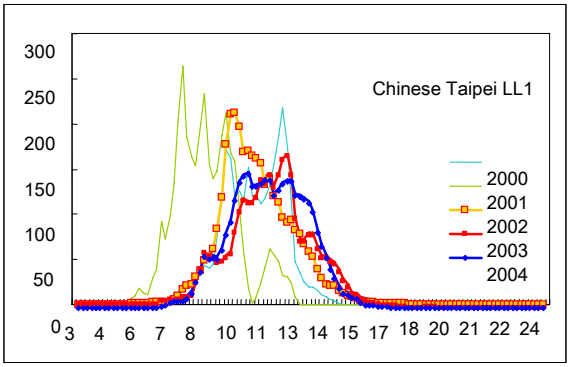
SBF-Figure 3. Total annual southern bluefin tuna catch (t) by flag, 1952 to 2004.



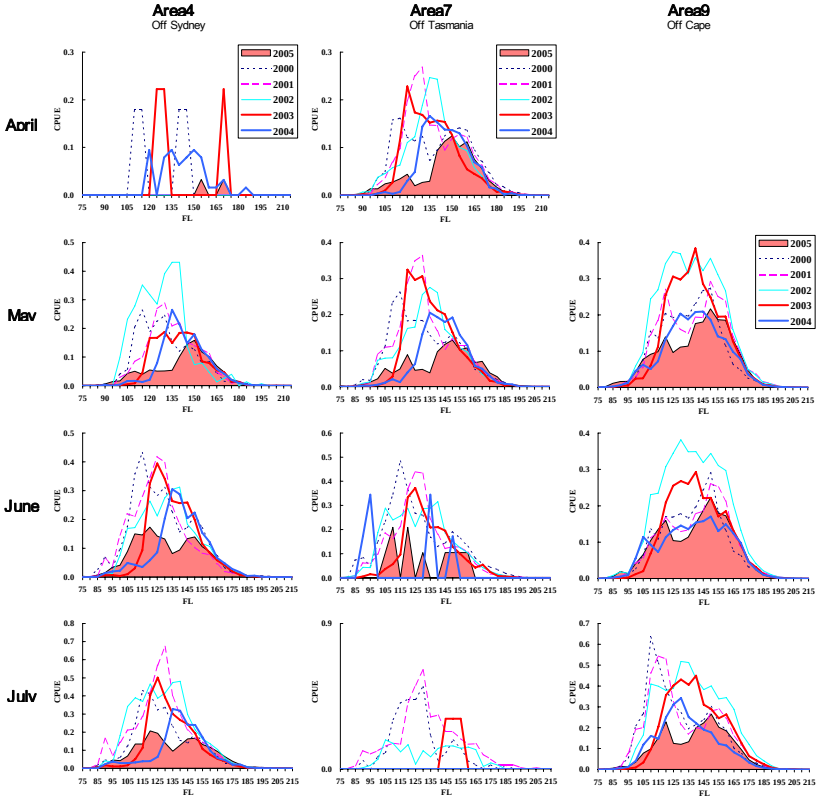
SBF-Figure 4. Geographic distribution of average annual southern bluefin tuna catches (t) by CCSBT members and cooperating non-members over the decades 1975-1984, 1985-1994 and 1995-2004 per 5° block by oceanic region. The area marked with a star is an area of significant non-member catch. Block catches averaging less than 0.25 tons per year are not shown.



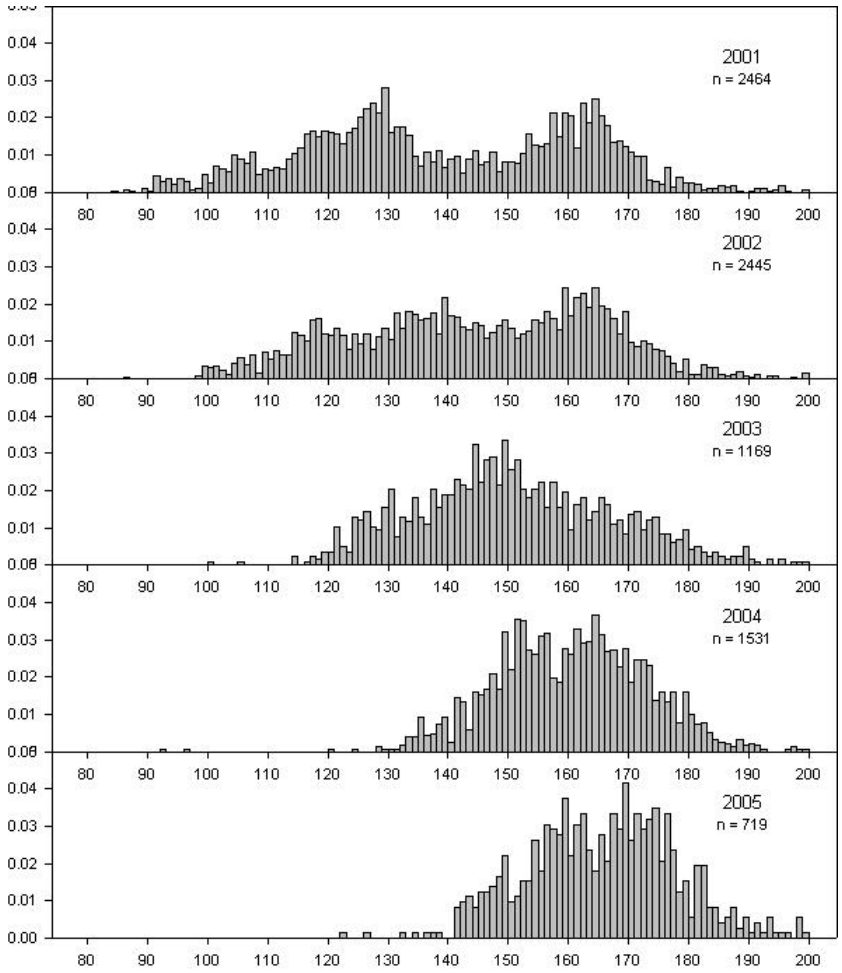
SBF-Figure 5. Trends in nominal catch rates (numbers per 1000 hooks) of southern bluefin tuna by age group (ages 3, 4, 5, 6-7, 8-11 and 12+) caught by Japanese longliners operating in CCSBT statistical areas 4-9 in months 4-9.



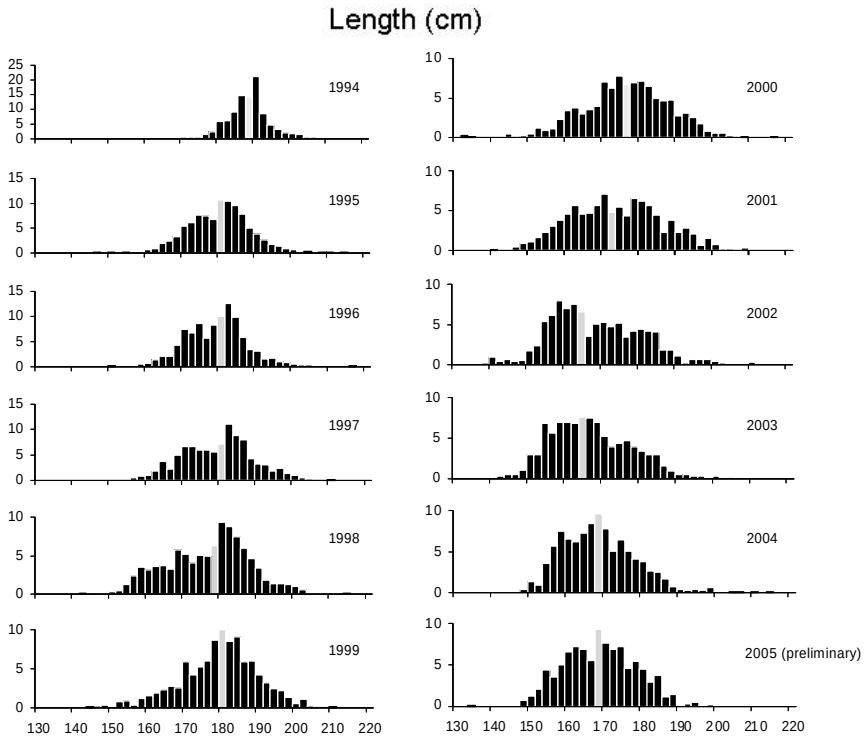
SBF-Figure 6. Changes in the size composition of the seasonal Chinese Taipei southern bluefin tuna longline target fishery (This figure may be revised in the future due to a new criteria for subdividing Chinese Taipei's catch into LL1 and LL2).



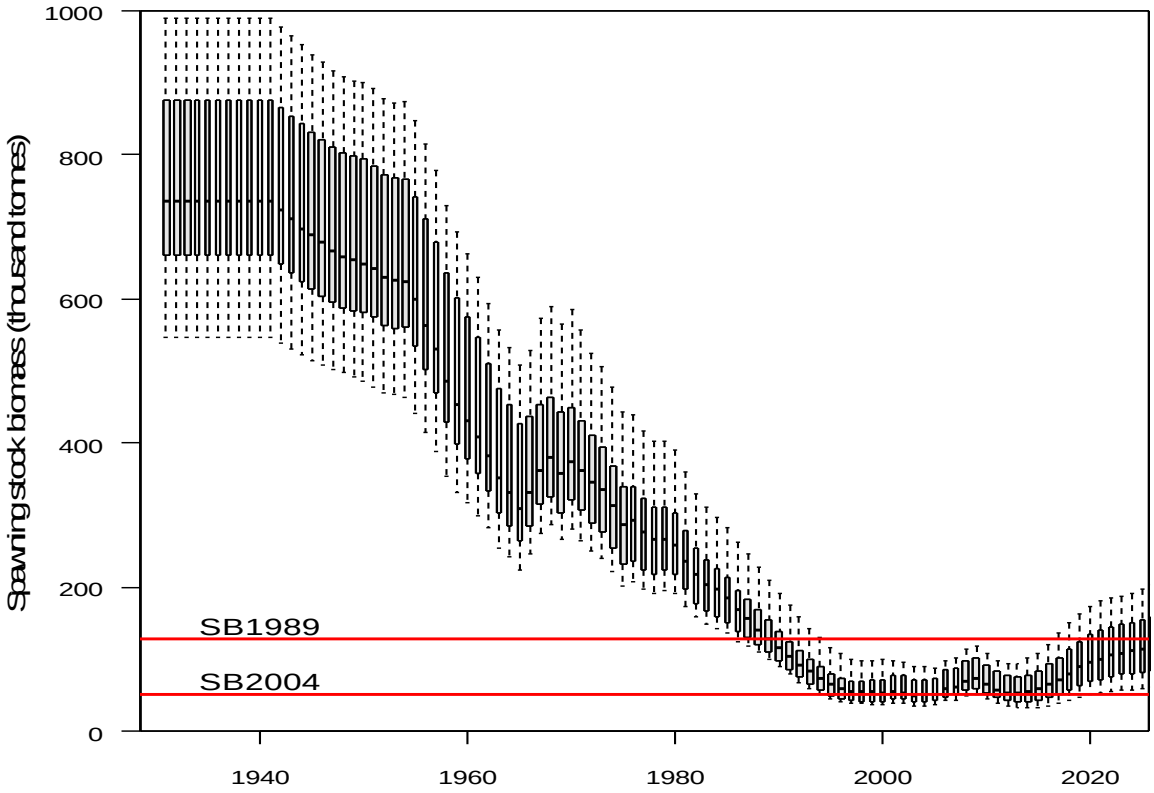
SBF-Figure 7. Size composition of nominal CPUE of Real Time Monitoring Program data for the Japanese longline fishery for five recent years by month and area.



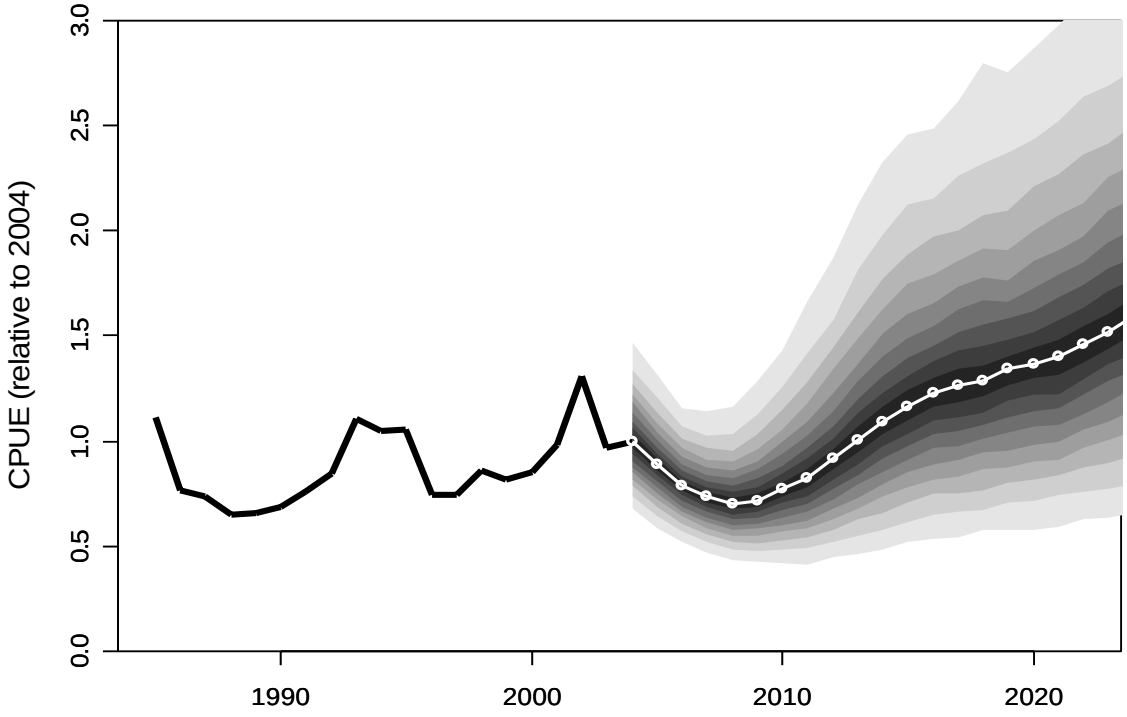
SBF-Figure 8. Proportion at length of southern bluefin tuna from the New Zealand charter fleet for 2001 to 2005. Data for 2005 are based on about 75% of the catch.



SBF-Figure 9. Length frequency (2cm intervals) of southern bluefin tuna by spawning season from the Indonesian spawning ground longline fishery. The grey bar shows the median length class. A spawning season is defined as July 1 of the previous year to June 30 of the given year. The pale bar represents the median length.



SBF-Figure 10. Historic and projected spawning biomass under the recommended southern bluefin tuna management procedure and implementation schedule. Lines indicate the median spawning biomass in 1989 and in 2004.



SBF-Figure 11. SBF Historical (solid line) and projected CPUE (relative to the median value in 2004) for the recommended southern bluefin tuna management procedure, implementation schedule and 5000t catch reduction in 2006.

8.12 SMT - SMALL TUNAS

SMT-1. Biology

Small tunas include the following species:

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

Knowledge on the biology of small tunas is very fragmented and not all the information available has been presented at this meeting. Furthermore, the quality of the knowledge is very different according to the species concerned. This is due in large part because many of these species are considered to have little economic importance to the Atlantic tuna fleets, and to the difficulties to conduct sampling of the landings from artisanal fisheries, which constitute a high proportion of the fisheries exploiting small tuna resources. The large industrial fleets often discard small tuna catches at sea or sell them on local markets mixed with other by-catches, especially in Africa. The amount caught is rarely reported in logbooks.

These species are widely distributed in the tropical and subtropical waters of the Atlantic Ocean and some even in the Mediterranean Sea and the Black Sea. They often form large schools with other small sized tunas or related species in coastal and high seas waters. They have a varied diet with a preference for small pelagics (e.g., clupeids, mullets, carangids and ammodytes), crustaceans, mollusks and cephalopods. The reproduction period varies according to species and spawning generally takes place near the coast, where the waters are warm. The growth rate currently estimated for these species is very rapid for the first two or three years, and then slows as these species reach size-at-first maturity.

New information has been presented on the catch composition of bonito in the Tyrrhenian Sea, the Straits of Sicily, Spanish Mediterranean and the southern coast of Portugal, including updated size-weight relationships. In the case of the Spanish and Portuguese area this information has also been presented for bullet tuna (*Auxis rochei*), Atlantic black skipjack (*Euthynnus alletteratus*), and bonito *(Sarda sarda)*.

As regards bullet tuna (*A. rochei*) in the southwestern Mediterranean, information was expanded on biological parameters, with preliminary estimates on fecundity.

At present no new information is available for the rest of species that comprise this group.

SMT-2. Description of the fisheries

Small tunas are exploited mainly by coastal fisheries and often by artisanal fisheries, although substantial catches are also made as target species and as by-catch, by purse seine, mid-water trawlers (i.e., pelagic fisheries of West Africa-Mauritania), handline and small scale gillnet. Unknown quantities of small tuna also comprise the incidental catches of some longline fisheries. Various species are also caught by the sport fisheries.

SMT-Table 1 shows historical landings of small tunas for the 1980 to 2003 period. This table does not include species reported as “mixed” or “unidentified”, as was the case in previous years, since these categories include large tuna species. There are more than 10 species of small tunas, but only five of these account for 86% of the total reported catch by weight each year. These five species are: Atlantic bonito *(Sarda sarda)*, frigate tuna *(Auxis thazard* which may include some catches of *Auxis rochei)*, Atlantic black skipjack *(Euthynnus alletteratus)*, king mackerel *(Scomberomorus cavalla)*, and Atlantic Spanish mackerel *(Scomberomorus maculatus)* **(SMT-Figure 2)**. In 1980, there was a marked increase in reported landings compared to previous years, reaching a peak of about 139,412 t in 1988 **(SMT-Figure 1)**. Reported landings for the 1989-1995 period

decreased to approximately 87,941 t, and then an oscillation in the values in the following years up to 2001 is observed, when the catch was 84,093 t. This decrease seems to be related to unreported catches, as these species generally comprise part of the by-catch and are often discarded, and therefore do not reflect the real catch.

A preliminary estimate of the total nominal landings of small tunas in 2003 is 65,941 t. The Committee pointed out the relative importance of small tunas fisheries in the Mediterranean Sea, which account for 26% of the total reported catch in the 1980-2003.

In order to improve statistics, cooperation with FAO has continued and FAO figures continue to be incorporated into the ICCAT database for small tuna species where no report is received by ICCAT. Notwithstanding, this procedure should be carried out with caution since in some fisheries the problem of mixed species has been detected.

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

SMT-3. State of the stocks

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

Generally, current information does not allow the Committee to carry out an assessment of stock status of the majority of the species. However, the information available for the major part of the stocks suggests that the majority of the stocks can be managed at the regional or sub-regional level.

SMT-4. Outlook

The results of an ICCAT questionnaire circulated in 1996 indicate that the small tunas fisheries are very diverse and complex, involving both artisanal and industrial fisheries that employ a large variety of gears, as well as different types and sizes of vessels. The results also indicate that data collection and research, including size sampling, age and growth research, and studies on maturity and tagging, are being conducted by several countries. However, the results of these studies are often not reported to ICCAT.

Catch and effort statistics for small tunas remain incomplete for many of the coastal and industrial fishing countries. There is also a general lack of available biological information needed to assess the stocks of most of these species. On the other hand, many of these species are of importance to coastal fishermen, especially to some developing countries, both economically and as a source of protein. The Committee therefore recommends that studies be conducted on some of these species due to the small amount of information that is available to the working group. The Committee reiterates it previous recommendations on carrying out studies to determine the state of these stocks and the best way to manage them. Probably, such studies would be more effective is they are carried out at the local or sub-regional level.

SMT-5. Effects of current regulations

There are no ICCAT regulations in effect for these species of small tunas.

SMT-6. Management recommendations

No recommendations were presented due to the lack of data and analyses.

SMT-Table-1. Estimated landings (t) reported to ICCAT for small tunas species in 1980-2004, by region and flag--Débarquements estimés (t) et déclarés a l'ICCAT de thonidés mineurs (1980-2004) par zone et pavillon -- Desembarques estimados (t) informados a ICCAT, de pequeños túnidos en 1980-2004, por región y bandera

			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
BLF TOTAL			1175	1973	1941	1738	1908	1403	2822	3462	3322	2834	3888	4202	4353	3535	2719	4051	4488	3027	3238	3185	2358	4034	4756	1303	1516
Thunnus atlanticus		Brasil	181	85	89	57	203	133	172	254	229	120	335	130	49	22	38	153	649	418	55	55	38	149	1669	1	118
		Combined NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		Cuba	0	721	622	558	487	157	486	634	332	318	487	318	196	54	223	156	287	287	0	0	0	0	0	0	0
		Dominica	0	0	0	0	0	0	0	0	1	4	19	10	14	15	19	30	0	0	0	79	83	54	78	42	25
		Dominican Republic	125	124	144	144	106	90	123	199	4	564	520	536	110	133	239	892	892	0	0	0	0	0	0	0	0
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	307	46	0	0	0	0	0	0	0	0	0	0	0
		EC.France	740	761	842	809	821	755	729	669	816	855	865	1210	1170	1140	1330	1370	1040	1040	1040	1040	1040	1040	1040	0	0
		Grenada	68	84	143	102	232	193	256	141	220	134	293	195	146	253	189	123	164	126	233	94	164	223	255	335	268
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148	0	0	0	0	0	0	0	0
		Liberia	0	0	0	0	0	0	0	0	229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	10	9
		Netherlands Antilles	55	55	55	55	55	55	60	60	70	70	70	60	60	65	60	50	45	45	45	45	45	45	45	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	19	15	38	11	7	53	19	20	18	22	17	15	23	24	24	0	0
		Sta. Lucia	0	0	0	0	0	0	0	2	1	1	17	14	13	16	82	47	35	40	100	41	45	108	96	169	96
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
		U.S.A.	0	139	41	7	0	11	32	44	154	87	81	112	127	508	492	582	447	547	707	617	326	474	334	414	264
		UK.Bermuda	6	4	5	6	4	9	17	11	7	14	13	8	6	5	7	4	5	4	6	6	5	4	5	9	0
		Venezuela	0	0	0	0	0	0	947	1448	1240	652	1150	1598	2148	1224	21	624	758	498	1034	1192	589	1902	1210	319	732
BLT TOTAL			0	0	0	0	0	0	2	0	357	723	3634	2206	814	394	177	100	0	0	28	579	1230	1577	950	1348	402
Auxis rochei		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	263	494	208	166	231	300
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	2171	814	70	100	100	0	0	0	0	420	1053	468	128	102
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Tunisie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	989	0
	*	Turkey	0	0	0	0	0	0	0	0	0	0	0	35	0	324	77	0	0	0	0	316	316	316	316	0	0
		U.S.A.	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.S.R.	0	0	0	0	0	0	0	0	357	723	3634	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BON TOTAL			31115	38927	41106	42386	21907	24905	21320	29712	46382	29721	28941	33561	22025	30584	21505	20841	24585	24511	39925	36128	28287	28298	25399	14099	7001
Sarda sarda	ATL total		12568	10760	12169	6840	6849	6946	5892	7395	22354	17766	6844	8306	6914	4587	5823	5652	7390	10433	10195	7958	6316	6062	9683	2982	2706
		Angola	377	196	253	124	225	120	101	144	180	168	128	102	4	49	20	9	39	32	0	2	118	118	118	0	0
		Argentina	2600	846	1775	310	2058	1399	699	1607	2794	1327	1207	1794	1559	434	4	138	0	0	0	0	0	0	0	0	0
		Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0
		Benin	19	32	36	16	25	30	6	3	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Brasil	0	0	0	0	187	179	523	345	214	273	226	71	86	142	142	137	0	0	0	0	0	0	0	0	0
		Bulgaria	75	8	23	46	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Cuba	0	0	0	0	0	0	0	23	173	26	28	0	0	0	0	0	0	0	230	0	0	0	0	0	0
		EC.España	220	589	434	414	173	398	145	41	91	57	18	8	39	5	3	2	2	1	0	12	12	10	5	23	9
		EC.Estonia	0	0	0	0	0	0	0	0	668	859	187	8	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France	508	502	587	547	569	492	431	331	395	427	430	820	770	1052	990	990	610	610	610	24	32	0	18	0	0
		EC.Germany	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	714	0	0	0	0	0	38	0	0
		EC.Greece	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
		EC.Latvia	0	0	0	0	0	0	0	0	1191	1164	221	7	4	0	3	19	301	887	318	0	416	396	639	0	0
		EC.Lithuania	0	0	0	0	0	0	0	0	1041	762	162	11	10	0	0	0	0	0	0	0	0	0	793	0	0
		EC.Poland	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0	0	0	0	0
		EC.Portugal	13	31	55	86	56	50	168	371	377	80	202	315	133	145	56	78	83	49	98	98	162	47	61	40	50
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	0
		Georgia	0	0	0	0	0	0	0	0	39	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Germany Democratic Rep.	288	440	146	274	26	40	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ghana	77	5	71	13	8	10	0	943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Grenada	52	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	6	14	16	7	10	10	0	0
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
		Maroc	312	477	535	561	310	268	251	241	589	566	492	794	1068	1246	584	699	894	1259	1557	1390	2163	1700	2019	928	989
		Mexico	271	408	396	567	744	212	241	391	356	338	215	200	657	779	674	1144	1312	1312	1632	1861	1293	1113	1032	1238	1066
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
		Rumania	64	81	249	192	8	32	71	3	255	111	8	212	84	0	0	0	0	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	948	29	0	0	0	0	0	0	0	0	574	1441	461	16
		Senegal	140	1327	202	497	200	495	510	463	2066	869	558	824	378	227	600	354	570	1513	1857	1441	1441	1441	1441	0	159
		Sierra Leone	57	30	5	5	5	10	10	10	10	10	10	4	6	0	0	0	0	0	0	0	11	245	44	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	18
		Sta. Lucia	0	0	0	0	0	0	0	0	1	0	3	3	3	4	1	1	1	0	0	0	0	0	0	0	1
		Togo	0	0	0	0	0	254	138	245	400	256	177	172	107	311	254	145	197	197	197	197	0	0	0	0	0

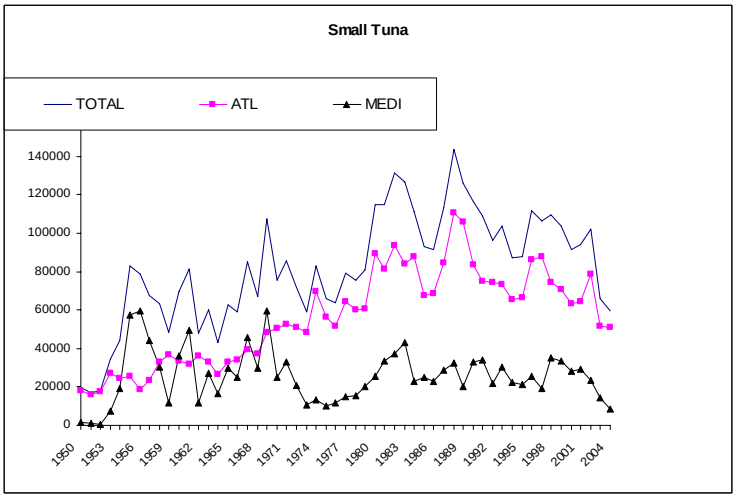
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	17	703	169	266	220	30	117	117	56	452	188	280
		U.S.A.	198	333	209	253	217	110	84	130	90	278	299	469	498	171	128	116	156	182	76	83	142	120	139	44	70
		U.S.S.R.	6433	4559	6329	2375	1290	2073	1085	1083	8882	7363	706	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	1385	985	0	0	25	0	0	0	342	2786	1918	1114	399	231	1312	30	0
		Uruguay	3	1	0	1	0	0	3	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0
		Venezuela	861	833	864	554	748	774	1401	1020	1153	1783	1514	1518	1454	5	1661	1651	1359	1379	1659	1602	2	0	61	13	0
	MED total		18547	28167	28937	35546	15058	17959	15428	22317	24028	11955	22097	25255	15111	25997	15682	15189	17195	14078	29730	28170	21972	22236	15716	11117	4295
		Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
		Algerie	640	740	860	867	874	880	459	203	625	1528	1307	261	315	471	418	506	277	357	511	475	405	350	597	0	609
		Bulgaria	13	191	4	24	1	1	0	13	0	0	17	17	20	8	0	25	33	16	51	20	35	35	35	0	0
		Combined NEI	295	274	276	452	694	359	359	537	561	342	311	311	311	300	300	300	300	75	0	0	0	0	0	0	0
		Croatia	0	0	0	0	0	0	0	0	0	0	0	49	128	6	70	0	0	0	25	120	0	0	0	0	0
		EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	10	10	6
		EC.España	480	710	990	1225	984	1045	729	51	962	609	712	686	228	200	344	632	690	628	333	433	342	349	461	544	272
		EC.France	0	0	0	33	16	0	0	0	10	0	1	10	5	6	0	0	0	0	0	0	0	0	27	0	0
		EC.Greece	809	1251	1405	1367	1732	1321	1027	1848	1254	2534	2534	2690	2690	2690	1581	2116	1752	1559	945	2135	1914	1550	1420	1538	1321
		EC.Italy	1180	1096	1102	1806	2777	1437	1437	2148	2242	1369	1244	1087	1288	1238	1828	1512	2233	2233	2233	4159	4159	4159	4579	2091	2009
		EC.Malta	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	2	1	0	0	0	0
		Egypt	3	2	23	14	48	62	68	35	17	358	598	574	518	640	648	697	985	725	724	1442	1442	1128	1128	0	0
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	71	70	0	0	0	0	0	0	0	0	0	0	0
		Maroc	62	309	71	92	75	57	51	127	108	28	69	69	31	25	93	37	67	45	39	120	115	5	61	85	78
		Tunisie	700	381	748	600	600	482	504	500	600	422	488	305	643	792	305	413	560	611	855	1350	1528	1183	1112	848	0
		* Turkey	14292	23174	23397	29034	7220	12281	10756	16793	17613	4667	14737	19151	8863	19548	10093	8944	10284	7810	24000	17900	12000	13460	6286	6000	0
		Yugoslavia (Ex.)	72	39	61	31	37	34	38	62	36	98	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	45	0	3	2	6	10	12	12	14	17	17	0	0	0
BOP TOTAL			698	1448	584	38	49	133	87	564	1482	1116	457	588	600	601	775	640	2136	476	159	844	1193	984	917	729	513
Orcynopsis unicolor	ATL total		698	1448	584	38	49	124	86	538	1474	1109	420	487	424	349	599	525	2004	249	29	627	1048	830	780	706	506
		Benin	1	2	2	1	1	1	3	1	2	1	1	1	1	1	1	1	1	3	1	1	0	0	0	0	0
		EC.Portugal	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Maroc	596	968	483	0	0	83	33	487	1422	1058	369	486	423	348	598	524	2003	246	28	626	1048	830	780	706	503
		Mauritania	101	478	99	37	40	40	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	MED total		0	0	0	0	0	9	1	26	8	7	37	101	176	252	176	115	132	227	130	217	145	154	137	23	7
		Algerie	0	0	0	0	0	0	0	0	0	0	0	87	135	198	153	92	119	224	128	216	135	145	128	0	0
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	40	40	0	0	0	0	0	0	0	0	0	0	0
		Maroc	0	0	0	0	0	9	1	26	8	7	37	14	1	14	23	23	13	3	2	1	10	9	9	20	7
		Tunisie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
BRS TOTAL			5617	5841	6019	6632	8129	3501	6549	6212	9510	10778	7698	8856	6051	8049	7161	7006	8435	8004	7923	5754	4785	4553	7750	5136	3410
Scomberomorus brasiliensis		Brasil	2826	3466	4342	4511	6259	1504	5011	4741	5063	5927	2767	1437	1149	842	1149	1308	3047	2125	1516	1516	988	251	3071	2881	814
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	571	625	1143	308	329	441	388	494
		Trinidad and Tobago	0	0	0	0	0	0	0	0	2704	2864	2471	2749	2130	2130	2130	1816	1568	1699	2130	1328	1722	2207	2472	1867	2103
		Venezuela	2791	2375	1677	2121	1870	1997	1538	1471	1743	1987	2460	4670	2772	5077	3882	3882	3609	3609	3651	1766	1766	1766	1766	0	0
CER TOTAL			604	628	687	677	680	574	500	392	219	234	225	375	390	450	490	429	279	250	250	0	3	5	1	2	1
Scomberomorus regalis		Dominican Republic	104	106	76	110	106	63	52	48	57	59	50	45	79	50	90	29	29	0	0	0	0	0	0	0	0
		EC.France	500	522	611	567	574	511	448	344	162	175	175	330	310	400	400	400	250	250	250	0	0	0	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	1	2	0
FRI TOTAL			20912	15913	25240	21690	25903	22876	20306	23407	25151	21416	23333	15425	8027	11210	10477	9861	17808	16513	14440	12608	12299	14457	15474	4871	6611
Auxis thazard	ATL total		16960	12235	19197	15870	19566	17636	15249	19667	19025	15029	14973	8854	3126	8183	5354	5560	11899	13449	12160	10548	9613	10223	10375	2421	2840
		Angola	256	351	515	212	256	90	21	115	20	70	28	1	0	4	6	21	29	12	31	2	38	38	38	0	0
		Benin	37	64	72	32	49	50	1	3	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Brasil	0	0	72	11	634	623	941	1260	1904	700	592	746	291	608	906	558	527	215	162	166	106	98	1117	860	414
		Bulgaria	3	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Cape Verde	0	0	0	0	0	0	0	2	86	105	75	135	82	115	86	13	6	22	191	154	81	171	206	0	0
		Combined NEI	0	0	0	333	46	0	0	17	381	155	237	1	4	32	68	62	180	120	309	491	291	420	186	69	1024
		EC.España	6260	5295	3128	2691	5746	3702	3164	4538	3938	1877	2240	541	228	362	297	386	947	581	570	23	17	722	438	635	34
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	198	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France	0	0	0	0	640	416	1904	3392	3392	3008	3872	0	121	63	105	126	161	147	146	0	91	127	91	0	168
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	290	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Portugal	0	0	0	0	14	30	32	2	2	4	26	3	0	0	0	0	0	1	31	5	9	28	5	4	6
		Germany Democratic Rep.	0	0	106	55	40	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			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	7566	2048	6062	5632	4530	4500	3256	4689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		Maroc	968	1267	1126	1271	198	424	302	465	194	599	1045	1131	332	274	122	645	543	2614	2137	494	582	418	441	184	542
		Mixed flags	0	1856	1984	2800	0	0	0	0	0	0	0	0	0	5174	0	0	5269	4458	4502	5772	6768	6768	6768	0	0
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590	1157	1030	1159	1122	989	710	507	0
		Panama	0	0	0	0	0	0	0	0	0	0	0	243	57	118	341	327	240	91	0	0	0	0	0	0	0
		Rumania	0	0	0	0	0	0	51	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	3249	1441	220	505	456	46	500	761	477	0	0	300	50	56
		S. Tomé e Príncipe	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	79	323	0	0	0	0	0	0	0
		Senegal	0	0	0	0	0	0	0	0	810	784	1082	311	201	309	309	309	0	0	0	0	0	0	0	0	0
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	56	199	368	127	138	245	0	0	0	414
		U.S.S.R.	694	407	5623	1655	5903	6055	3465	2905	5638	5054	2739	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	48	0	43	0	0
		Venezuela	1176	944	509	1171	1478	1746	2109	2264	2654	2670	3037	1762	368	886	2609	2601	3083	2839	2164	1631	215	444	32	113	182
	MED total		3952	3678	6043	5820	6337	5240	5057	3740	6126	6387	8360	6571	4901	3027	5123	4301	5909	3064	2280	2060	2686	4234	5099	2450	3771
		Algerie	0	0	0	0	0	0	0	0	0	0	0	174	270	348	306	230	237	179	299	173	225	230	481	0	391
		Croatia	0	0	0	0	0	0	0	0	0	0	0	24	21	52	22	28	26	26	26	26	0	0	0	0	0
		EC.España	2120	1700	1935	2135	2301	2047	1555	631	2669	2581	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493	495	1009
		EC.France	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	1	0	0	0	0	0	0	0	0	0
		EC.Greece	0	516	2192	1887	2060	1419	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120	246	226
		EC.Italy	1376	1193	1299	1494	1610	1344	1344	906	609	509	494	432	305	379	531	531	229	229	229	462	462	462	2452	1463	1819
		EC.Malta	18	4	9	11	4	1	13	5	8	18	21	20	11	10	1	2	3	6	6	3	1	0	0	0	0
		Maroc	10	14	77	57	52	48	175	178	811	1177	2452	1289	1644	170	1726	621	1673	562	1140	682	763	256	621	246	326
		Tunisie	409	237	517	218	294	367	538	606	588	660	985	985	35	20	13	14	13	26	87	38	7	2292	932	0	0
		Yugoslavia (Ex.)	19	14	14	18	16	14	32	14	41	42	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	13	1	0	0	2	6	6	6	7	8	8	0	0	0
KGM TOTAL			15656	18513	18149	14607	13182	9964	12187	11890	13038	10835	12232	11530	12439	14462	13868	14916	17775	19712	16392	17678	16161	15349	17277	15855	12667
Scomberomorus cavalla		Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		Brasil	1598	1612	1929	2695	2588	806	2890	2173	2029	2102	2070	962	979	1380	1365	1328	2890	2398	3595	3595	2344	1251	2316	3311	247
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	35	2	0	0	0
		Dominican Republic	0	0	0	0	0	0	0	0	20	29	33	34	47	52	0	0	0	589	288	230	226	226	226	0	0
		Grenada	25	30	43	40	19	0	0	0	0	0	0	0	0	0	0	0	2	4	28	14	9	4	5	0	0
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270	440	398	214	239	267	390	312
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0
		Mexico	1946	2740	4409	2874	2164	2303	2643	3067	3100	2300	2689	2147	3014	3289	3097	3214	4661	4661	3583	4121	3688	4200	4453	4369	4564
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	9	1	1	0	1
		Trinidad and Tobago	0	0	0	20	43	11	38	82	752	541	432	657	0	1192	0	471	1029	875	746	447	432	410	1457	802	578
		U.S.A.	10726	12565	9863	7068	7444	6011	5683	5628	5807	4363	5939	6502	7091	7747	6922	7345	7051	8772	7371	6414	6780	6592	6081	6983	6966
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		Venezuela	1361	1566	1905	1910	924	833	933	940	1330	1500	1069	1228	1308	801	2484	2558	2140	2139	340	2424	2424	2424	2424	0	0
KGX TOTAL			214	339	283	20	485	22	149	261	491	105	131	225	266	301	508	512	824	156	251	1	229	48	0	15	0
Scomberomorus spp		Barbados	0	0	0	0	0	0	138	159	332	68	51	45	51	55	36	42	49	0	0	0	0	0	0	0	0
		Colombia	73	160	80	20	485	22	11	102	159	37	25	7	12	21	148	111	539	0	0	0	0	0	0	0	0
		Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	0	0	0	0	0	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	145	79	0	0	0	0	0	0	0	0
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	0	0	44	48	0	0	0
		Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0	53	84	86	134	106	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	15	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	138	0	0	0	0
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	55	79	150	141	98	80	50	0	0	0	48	0	0	0	0
		Trinidad and Tobago	141	179	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	94	0	0	0	0	0	0	0	0	0	0	0	0	0
LTA TOTAL			19214	13847	15839	22214	20625	12896	8809	19741	25135	29855	14359	10910	21554	13682	11607	12026	14786	14147	14511	13340	13737	12994	16840	11060	11474
Euthynnus alletteratus	ATL total		16440	12401	13359	20653	18975	10856	6643	17317	22730	27820	11742	8587	19798	12416	10402	10124	12667	12543	11597	10465	10443	10131	14198	10377	11237
		Angola	1328	1171	1734	1632	1632	1433	1167	1345	1148	1225	285	306	14	175	121	117	235	75	406	118	132	132	132	0	0
		Argentina	0	0	36	0	0	11	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Benin	24	40	45	20	31	30	90	14	7	43	66	61	49	53	60	58	58	196	83	69	69	69	69	0	0
		Brasil	0	45	10	0	765	785	479	187	108	74	685	779	935	985	1225	1059	834	507	920	930	615	615	615	0	320
		Cape Verde	128	236	258	34	16	160	29	14	1	18	65	74	148	17	23	72	63	86	110	776	491	178	108	0	0
		Combined NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	8	20	0	0	0	0	0	0	0	33	2	0
		Côte D'Ivoire	177	0	0	0	0	0	20	5300	38	4900	2800	100	142	339	251	253	250	114	108	0	108	0	0	0	0
		Cuba	131	53	77	6	15	16	24	55	53	113	88	63	33	13	15	27	23	23	0	0	0	0	0	0	0
		EC.España	485	7	3	2	27	34	12	11	7	11	55	81	1	0	0	10	55	27	110	6	2	22	8	1	489
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0

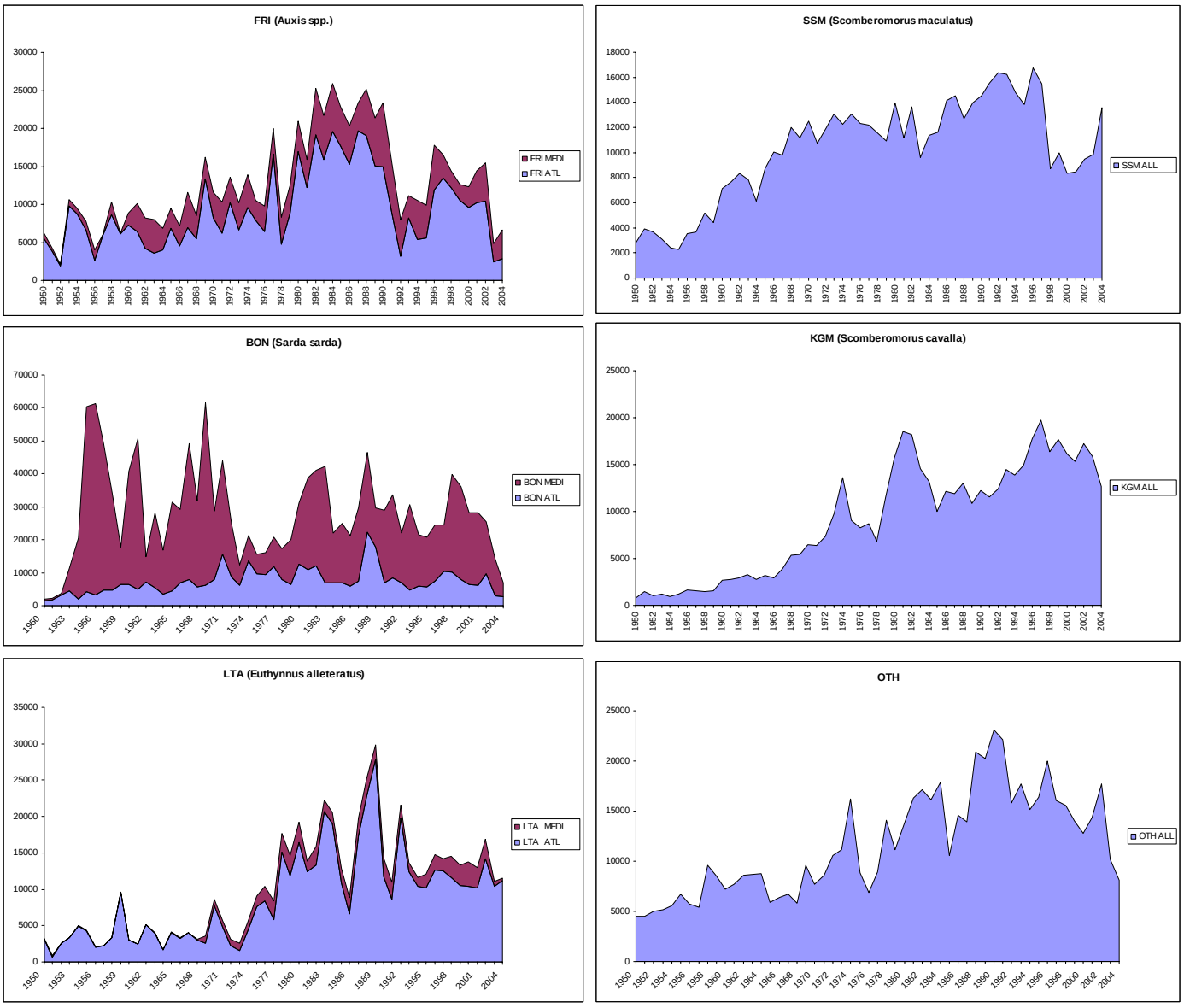
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		EC.France	0	1098	1120	0	0	0	0	0	0	195	0	74	13	8	54	59	22	215	21	696	631	610	613	0	10
		EC.Germany	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Poland	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Portugal	121	8	0	0	0	0	80	21	86	91	2	61	73	45	72	72	218	320	171	14	50	0	2	16	19
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	0	18	159	301	213	57	173	0
		Germany Democratic Rep.	0	0	397	543	99	40	10	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ghana	4134	3287	2141	5009	5966	901	649	5551	11588	12511	323	201	11608	359	994	513	113	2025	359	306	707	730	4768	8541	7060
		Israel	227	203	640	282	271	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Maroc	16	19	26	19	15	447	47	108	49	14	367	57	370	44	43	230	588	195	189	67	101	87	308	76	91
		Mauritania	31	86	77	54	60	60	50	50	50	50	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0
		Mixed flags	0	0	0	0	0	0	0	0	0	0	0	0	0	1975	0	0	2087	1766	1710	2352	2681	2681	2681	0	0
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
		Panama	58	36	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0
		Rumania	9	12	291	216	266	126	81	7	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	617	306	265	189	96	49	0	88	0	0	0	74	13	0
		S. Tomé e Príncipe	0	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	40	159	0	0	0	0	0	0	0
		Senegal	2444	1586	5017	5623	8408	4566	2392	2985	6343	6512	4775	3768	4088	4883	4072	4125	3773	2972	2936	1096	1097	1094	1094	0	1865
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	1	10	1	1
		U.S.A.	88	97	87	107	41	74	104	118	204	129	173	228	597	1286	1142	1312	2230	2015	1546	1623	1209	1451	1366	1492	1382
		U.S.S.R.	6307	3615	1085	6528	613	1040	271	61	1707	543	667	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK.Bermuda	11	11	4	5	5	7	13	13	17	14	8	10	11	5	6	6	7	6	5	4	2	1	5	4	0
		Venezuela	721	791	311	573	644	1050	1123	1467	1236	1374	1294	1963	1409	1889	2115	2115	1840	1840	2815	2247	2247	2247	2254	50	0
	MED total		2774	1446	2480	1561	1650	2040	2166	2424	2405	2035	2617	2323	1756	1266	1205	1902	2119	1604	2914	2875	3294	2863	2642	682	237
		Algerie	0	0	0	0	0	0	0	0	0	0	0	522	585	495	459	552	554	448	384	562	494	407	148	0	158
		Combined NEI	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0
		Croatia	0	0	0	0	0	0	0	0	0	0	0	2	3	2	15	15	0	0	0	0	0	0	0	0	0
		EC.Cyprus	17	22	33	17	31	32	13	25	41	20	23	25	21	11	23	10	19	19	19	16	19	19	19	0	0
		EC.España	800	6	705	0	32	12	5	0	5	0	0	0	0	0	0	15	18	9	15	0	8	82	32	0	41
		EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	0	0
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	24	38
		EC.Malta	0	0	0	0	0	0	0	0	0	0	0	8	1	8	8	8	3	3	0	0	0	0	0	0	0
		Israel	105	35	110	35	60	259	284	273	135	124	129	108	126	119	119	215	119	119	119	119	119	119	119	0	0
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	52	0	5	4	4	0	0
		Maroc	0	61	12	0	1	0	0	0	12	0	16	0	0	0	0	1	0	1	14	8	0	0	3	1	0
		Palestinian Territory, Occupied	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	59	61	60	60	60	129	0	0
		Syrian Arab Republic	80	73	90	80	96	95	73	121	99	121	127	110	156	161	156	155	270	350	417	390	370	370	330	0	0
		Tunisie	1772	1249	1330	1228	1224	1441	1590	1803	1908	1566	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	960	657	0
		* Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	750	750	750	750	0	0
		Yugoslavia (Ex.)	0	0	0	1	6	1	1	2	5	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	5	0	28	21	35	22	18	20	18	16	16	0	0	0
MAW TOTAL			4921	3156	5312	4716	4498	3989	3292	1799	3915	2934	5610	4025	1527	1775	1270	1264	1316	871	1108	727	748	727	1067	12	375
Scomberomorus tritor		Angola	70	68	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Benin	35	60	68	30	46	50	104	17	13	334	211	214	202	214	194	188	188	362	511	205	205	205	205	0	0
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	208	34	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	52	4	0	0	0	0	0	0	0	0	0	298	0	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0	0
		Germany Democratic Rep.	0	0	851	537	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ghana	4412	1983	2982	2225	3022	3000	1453	0	1457	1457	1500	2778	899	466	0	0	0	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	143	195	1032	242	0	19	0	0	44	0	0	0	0	0	0	0	0
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
		Senegal	404	1045	671	754	1174	732	1516	1754	2159	753	1419	656	332	1076	1076	1076	1076	509	512	522	522	522	522	0	375
		U.S.S.R.	0	0	602	1170	223	206	219	28	143	195	1240	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	21	0	42	12	0
SSM TOTAL			13945	11164	13633	9574	11362	11590	14117	14531	12712	13946	14500	15546	16346	16231	14777	13857	16725	15501	8723	9973	8336	8492	9461	9853	13582
Scomberomorus maculatus		Colombia	213	408	8	10	77	101	81	72	151	112	76	37	95	58	69	69	0	0	0	0	0	0	0	0	0
		Cuba	578	657	476	689	544	443	621	1606	803	746	665	538	611	310	409	548	613	613	0	0	0	0	0	0	0
		Dominican Republic	479	503	384	168	1058	1267	1271	1321	1415	1401	1290	728	735	739	1330	2042	2042	231	191	125	158	158	158	0	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	0	0
		Grenada	1	1	1	1	1	4	17	0	0	1	3	0	0	1	2	2	0	0	0	0	0	0	1	0	0
		Mexico	5908	5908	7799	5922	5777	5789	6170	6461	5246	7242	8194	8360	9181	10066	8300	7673	11050	11050	5483	6431	4168	3701	4350	5242	3641

		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
	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5330
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	27	0	0
	Trinidad and Tobago	1337	939	1218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	U.S.A.	5429	2748	3747	2784	3905	3986	5957	5071	5097	4444	4272	5883	5724	5057	4667	3523	3020	3606	3050	3417	4010	4632	4660	4611	4611
WAH TOTAL		610	2920	2280	2366	2159	920	1151	1235	1612	1507	1470	1687	1807	2571	2104	2362	2515	3085	2483	2943	2020	2296	2253	1658	1887
Acanthocybium solandri	Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Aruba	115	115	115	115	115	115	120	90	80	80	70	60	50	50	125	40	50	50	50	50	50	50	50	0	0
	Barbados	116	144	219	222	219	120	138	159	332	51	51	60	51	91	82	42	35	52	52	41	41	0	0	43	0
	Benin	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Brasil	1	1	0	0	0	21	141	133	58	92	52	64	71	33	26	1	16	58	41	0	0	0	0	405	519
	Cape Verde	24	2307	1464	1588	1365	142	205	306	340	631	458	351	350	326	361	408	503	603	429	587	487	578	552	0	0
	Dominica	0	0	0	0	0	0	0	0	0	0	38	43	59	59	59	58	58	58	58	50	46	11	37	10	6
	Dominican Republic	0	0	0	0	0	0	0	0	1	3	6	9	13	7	0	0	0	325	112	31	35	35	35	0	0
	EC.España	0	0	0	0	0	4	9	9	32	18	23	28	32	22	20	15	25	25	29	28	32	38	46	48	305
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Grenada	25	23	41	94	50	51	82	54	137	57	54	77	104	96	46	49	56	56	59	82	51	71	59	44	0
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
	Netherlands Antilles	215	215	215	215	215	245	250	260	280	280	280	250	260	270	250	230	230	230	230	230	230	230	230	0	0
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	52	52	52	52	52	52	0	0
	Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6
	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	4	4	28	33	33	41	28	16	23	10	65	52	46	311	17	40	60
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	77	79	150	141	98	80	221	223	223	310	243	213	217	169	232
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	118	1	0	0	0	0	1	1	1	2	1	9	7	6
	U.S.A.	0	0	0	0	0	13	13	57	128	110	82	134	203	827	391	764	608	750	614	858	640	633	846	789	710
	UK.Bermuda	46	24	40	49	46	46	65	43	61	63	74	67	80	58	50	93	99	105	108	104	61	56	91	87	0
	UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK.Sta Helena	10	12	9	16	23	15	15	18	18	17	18	12	17	35	26	25	23	0	0	0	0	0	0	0	0
	UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Venezuela	57	77	175	66	125	147	113	106	141	101	159	302	333	514	542	540	487	488	360	467	4	17	13	9	7

* Turkey reported during the Plenary the following catches. BON 5701 (t) - BLT 284 (t) - LTA 560 (t)
La Turquie a communiqué les prises suivantes durant la Séance Plénierè. BON 5701 (t) - BLT 284 (t) - LTA 560 (t)
Turquía comunicó las siguientes capturas durante las Sesiones Plenarias. BON 5701 (t) - BLT 284 (t) - LTA 560 (t)



SMT-Figure 1. Estimated landings (t) of small tunas (combined) in the Atlantic and Mediterranean, 1950-2004. The data for the last years are incomplete. The continuous line represents the total, the line with squares represents the Atlantic, and the line with triangles represents the Mediterranean.



SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2004. The data for the last years are incomplete.

8.13 SHK - SHARKS

The last assessments for Atlantic blue and shortfin mako sharks were conducted in 2004. This document focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Atlantic blue and shortfin mako sharks should consult the report of the 2004 SCRS meeting. Within the Detailed Report of the stock assessment session (Col. Vol. Sci. Pap. ICCAT, 58(3): 799-890) is a complete discussion of the uncertainties about stock structure, movements, life history and characteristics of some of the fisheries affecting these stocks.

Other information relevant to Atlantic sharks is presented elsewhere in Section 16 of this SCRS Report: Responses to Commission on (1) shark fin ratios (see section 16.5) and (2). Recommendation for management alternatives (see section 16.6).

SHK-1. Fishery indicators

Previous reviews of the shark data base resulted in recommendations to improve the data reporting for sharks, but a large improvement in the quantity and quality of the overall shark catch statistics data base has not yet resulted. Reported catches are presented in **SHK-Table 1**. This information is considered very incomplete and inadequate for stock assessment purposes. In view of the very incomplete nature of the catch reporting to the Secretariat, the 2004 Committee attempted to construct a more accurate picture of shark catch and mortality in the Atlantic tuna fleets based on ratios of shark to tuna landings from fleets reporting both types of data to ICCAT, and using these ratios to reconstruct an example catch history by major gear type. Although this might provide a somewhat more realistic picture of the catches of blue and mako sharks, this approximation was done with little guidance from scientists with expert knowledge about several important fleets which catch these species. The estimates thus obtained (**SHK-Figure 1**), although highly uncertain, were used as a tentative basis for stock assessment model applications that require information on both catch and effort.

The Committee reiterates previous recommendations for all Contracting and non-Contracting Parties to provide estimates of historical catches and dead discards of sharks from both by-catch and directed shark fisheries to the Secretariat. Both landed and dead discarded shark catch need to be monitored, especially considering that many sharks have been finned and not kept on board vessels.

Considering the limitations on the quantity and quality of the information available to the Committee, the following results should be considered as being very preliminary.

SHK-2. Blue shark

For both North and South Atlantic blue shark, the current biomass appears to be above the biomass that would support MSY. In many of the model runs conducted, stock status appeared to be close to unfished biomass levels. The results are highly conditional on the assumptions made. Those assumptions include (i) estimates of historical shark catch, (ii) the relationship between catch rates and abundance, (iii) the initial state of the stock in 1971, and (iv) various life-history parameters. A full evaluation of the sensitivity of model outcomes to these assumptions was not possible at the meeting and such studies should be carried out before drawing stronger conclusions.

SHK-3. Shortfin mako shark

The North Atlantic shortfin mako shark stock is likely to have historically experienced some level of stock depletion as suggested by the historical CPUE trend and model outputs. The Committee cannot rule out the possibility that the current stock size is below the biomass that can support MSY, as trends in CPUE suggest depletions of fifty percent or more. For the South Atlantic, the stock may have decreased since 1971, but the magnitude of decline appears to be less than in the North Atlantic. The current stock biomass may be above the biomass at MSY, but due to the lack of a clear signal from the catch rates, there is a wider variety of possible historical stock trends: from virtually undepleted, to fully exploited. The assessment of shortfin mako stocks is also highly conditional on the assumptions listed above for blue shark. In particular, life history parameters of shortfin mako shark are more uncertain than for blue shark. A full evaluation of the sensitivity of model outcomes to these assumptions to shortfin mako shark was also not possible at the meeting and such studies should be carried out before drawing stronger conclusions.

SHK-4. Management Recommendations

The Commission directed in [Rec. 04-10] that in "2005, the SCRS shall review the assessment of shortfin mako sharks (*Isurus oxyrinchus*) and recommend management alternatives for consideration by the Commission." This review was undertaken and as the Committee cannot rule out the possibility that the current shortfin mako shark biomass in the North Atlantic is below the biomass that can support MSY. Should the Commission wish to improve the status of this stock, measures to reduce fishing mortality should be taken. Shortfin mako sharks are taken in a broad range of fisheries, both as targeted catch and as bycatch, and our knowledge of overall catch levels is inadequate. As such, there is no basis for recommending catch limits for this stock .Although technical measures such as modifications to fishing gear, restrictions on fishing areas and times, minimum or maximum sizes for allowable retained catch might prove beneficial, without more detailed information gathered through research programs designed to estimate the potential benefits of such measures, the Committee recommends that reductions in fleet capacity and effective effort could provide the most direct benefit to shortfin mako sharks.

Table 1a BSH Task-I Nominal catch (t) of Blue shark reported to ICCAT

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL			204	9	613	121	380	1162	1467	867	832	2348	3533	2343	7879	8310	8422	9036	36895	33211	34208	33464	34315	31424	34550	34580
Longline	Landings	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	743	1103	0	179	1689	2173	1966	2160	1568
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	275	12	10	4	53	18	0	5	6	0
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750	420	600	0
		EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	3	6
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29917	28137	29005	26046	25110	21037	22601	24682
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
		EC.Portugal	0	0	0	0	0	0	0	0	0	1387	2257	1583	5726	4669	5569	5710	3966	3318	3337	4220	4713	4602	6926	3586
		* Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	2596	1589	1044	996	850	893	494	532	742	830	1473
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2213	0	1906
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177	22	0	0	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	21	0	82	63	232	128
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	2
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	8	8	4	6	1	3	0	1	3	0	1	7
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0
		Uruguay	0	0	0	0	0	0	0	0	0	0	8	84	15	93	64	252	286	242	126	119	59	159	620	492
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	Discards	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	526	421	480	741	772	184	1136	572	618	609	185	173	97	137	105	68	0	63
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
Other surf.	Landings	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	27	0	0	0	0	0
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	99
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0
		EC.Denmark	0	0	0	0	0	0	0	0	2	2	1	1	0	1	2	3	1	1	0	2	1	13	0	0
		EC.France	0	9	8	14	39	50	67	91	79	130	187	276	322	350	266	278	213	163	0	395	207	109	0	98
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	9	66	11	0	0
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	561	302
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12	0	0	1	0	12	9	6	0	0
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	456	0	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		U.S.A.	204	0	605	107	341	1112	874	355	271	87	308	214	672	21	19	277	210	252	217	291	39	0	0	0
	Discards	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0	22	4	0	0	0	0	1
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0

* SCRS/2005/074 provided slightly revised estimates for the 2000-2004 period which will be incorporated into the ICCAT data base

Table 1b SMA Task-I Nominal catch (t) of shortfin mako shark reported to ICCAT

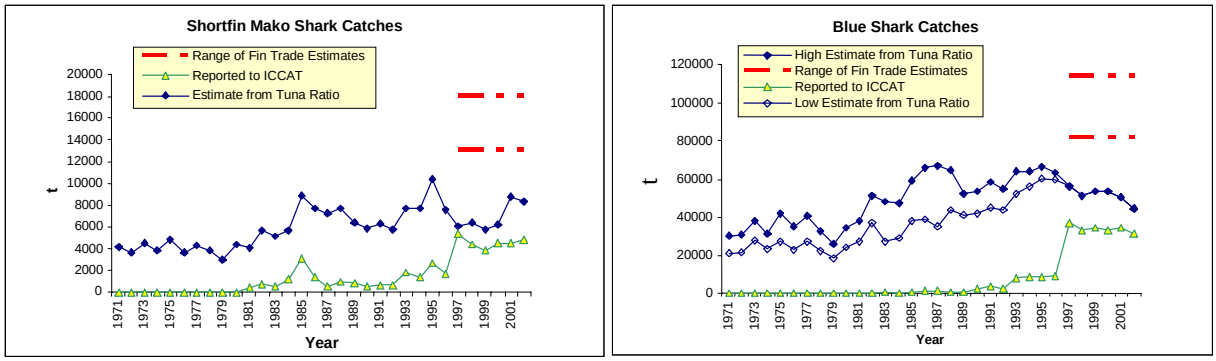
			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL			406	705	488	1131	3065	1344	501	819	688	486	538	511	1824	1352	2646	1680	5300	4105	3731	4366	4522	4794	6275	4790
Longline	Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	190	0	27	219	409	226	283	177
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	56	99	55	54	59	60	61	63	69
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	34	45	23	27	19	74	126	306	22	208	260	0
		* EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3777	3347	2895	2679	2921	2859	3226	2791
		EC.Portugal	0	0	0	0	0	0	0	0	0	193	314	220	796	649	749	785	519	424	446	706	523	471	1781	411
		** Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	248	0	0	0	0	0	0	0
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	16	0	10	6
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	459	0	509
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	13	0	77	19	138	126
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	278	310	281	233	244	0	0	2	181	167	142	0
		Uruguay	21	92	120	202	118	48	39	24	18	25	14	15	29	12	21	24	28	21	43	63	70	58	239	275
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
	Discards	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	26	20	18	28	0	0	0	0	0	0	0	0	0
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Other surf.	Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	11	11	15	17	20	10	17	10	10
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	10	9	15	0	30	0
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	74
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	1	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
		U.S.A.	385	613	368	929	2947	1296	462	795	670	268	210	250	667	317	1422	232	164	148	69	290	215	248	0	221
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0

* SCRS/2005/059 provided information on an estimated time-series of catch which has yet to be incorporated into the ICCAT data base

** SCRS/2005/074 provided slightly revised estimates for the 2000-2004 period which will be incorporated into the ICCAT data base

Table 1c POR Task-I Nominal catch (t) of porbeagle reported to ICCAT

		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
TOTAL		1594	1370	584	1141	706	664	706	813	957	971	1282	1944	2588	1889	2676	2121	1548	1859	1468	1143	1449	974	791	297	710
Longline	Canada	1	0	1	9	20	26	24	59	83	73	78	329	813	919	1575	1351	1045	1322	1055	956	899	491	224	130	220
	Chile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	27	0	0	0	0	0	0
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	10	101	54
	Faroe Islands	425	344	259	256	126	210	270	381	373	477	550	1189	1149	165	0	0	0	0	0	0	0	0	0	0	0
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	18	0	0	0	0	0	0	0
	Norway	0	0	0	0	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	0	0
	U.S.A.	0	0	0	0	0	0	0	1	0	1	1	4	4	50	108	35	78	56	9	0	1	0	1	0	1
	UK.Falklands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	14	3	4	0	8	34	8
Other surf.	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0
	Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	12	15	9	3	8	12	13	12
	Chile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Denmark	176	158	84	45	38	72	114	56	33	33	46	85	80	91	93	86	72	69	85	107	73	76	42	0	0
	EC.España	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	31	0	0	0	0	0	0	0	0
	EC.France	896	768	199	791	411	254	260	280	446	341	551	300	496	633	820	565	267	315	219	0	410	361	461	0	228
	EC.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1	3	0	0
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	6	3	0	0
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	EC.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	EC.Portugal	0	0	0	0	0	0	0	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Sweden	8	5	6	5	9	10	8	5	3	3	2	2	4	3	2	2	1	1	1	1	1	1	0	0	0
	EC.United Kingdom	3	2	1	2	5	12	6	3	3	15	9	0	0	0	0	0	0	0	1	6	8	12	10	0	0
	Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	44	8	9	7	10	0	0	0	0	0
	Iceland	1	0	1	0	1	0	0	0	0	0	0	0	1	3	4	6	5	3	4	2	2	3	2	0	0
	Japan	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
	Norway	84	93	33	33	0	80	24	25	11	25	43	32	41	24	24	26	28	17	27	32	22	6	6	19	0
	Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	U.S.A.	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	4	3	0	1	0	0	0
	UK.Falklands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0



SHK-Figure 1. Comparison of shark catch reported to ICCAT with estimates resulting from tuna to shark ratios and from fin trade data for shortfin mako (left) and blue shark (right) in the Atlantic. An approximate range is also presented from a recent study of the Hong Kong shark fin trade.