出國報告(出國類別：其他)

參加北太平洋鮪類國際科學委員會(ISC)第八屆年會暨各工作小組會議報告

服務機關：[1]行政院農業委員會漁業署
[2]國立中山大學海洋事務研究所
姓名職稱：[1]鍾國南代理科長
[2]張水鍇助理教授
派赴國家：日本高松
出國期間：97 年 7 月 14 日至 7 月 28 日
報告日期：97 年 8 月 30 日

摘　要

一、　統計議題：由於某些非 ISC 國家也會捕撈 ISC 研究物種，決議由工作小組主席向該國家或 RFMOs 要求提供漁獲資料。另要求各會員國要有資料聯絡人，而資料聯絡人應參加工作小組會議。

二、　已進行評估之魚種資源狀況

1. 北太平洋黑鮪：本年度所進行之資源評估認爲若漁獲死亡率可以維持目前水準，且自然環境狀況良好，未來補充量應足以維持目前漁獲量，但其中不確定因素仍高，故當前漁獲死亡率不應再增加。
2. 北太平洋長鰭鮪：本年度檢視資源狀況結果認爲與現在狀況相比較，2006 年評估時所採用之親魚資源量（SSB）可能低估，且 2007 漁獲死亡（F）值也可能低於之前評估的結果（代表現在資源狀況傾向較樂觀）。

三、　即將進行之資源評估魚種：決定明（2009）年將進行劍旗魚資源評估、2010 年進行北長鰭鮪及紅肉旗魚資源評估、2011 年進行黑鮪資源評估。

四、　明年會議日期及地點：明年的全席會議日期爲 7 月 15 日至 20 日，其他各工作小組會議則於 7 月 8 日陸續展開，我國將接辦明年會議。

五、　ISC 整合性生物研究：爲解決資源評估上之不確定因子，決議成立多魚種生物研究任務小組，ISC 主席指定由我國張水鍇助理教授擔任 Leader，並由加拿大協助，於明年五月召開會議完成計畫規劃，並向全席會議報告。

六、　主席及副主席選舉：選舉結果由現任美籍主席 Dr. Gary Sagakawa 獲得連任，並由墨西哥籍 Dr. Michel Dreyfus-Leon 獲選爲副主席。

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壹、 目的

「北太平洋鮪類國際科學委員會(ISC)」原名爲「北太平鮪類暫時科學委員會」，是以北太平洋鮪類科學評估及研究合作爲目的之政府間科學性國際組織，目前會員國包括美國、日本、加拿大、中國、韓國、墨西哥、台灣等 7 國，觀察員包括「太平洋共同體秘書處(SPC)」、「美洲熱帶鮪類委員會（IATTC）」。ISC 原由美國及日本於 1996 年所發起成立，其目的爲對北太平洋有關之鮪類及類鮪類進行經常性之分析與評估，對該些魚種之資源狀態，如系群豐度趨勢、漁業發展與保育需求等提供其發現及結論報告供管理者參考，並對該等魚種建議研究項目進行國際性及國家研究計畫之協調。

我國在北太平洋之鮪漁業船隊及漁獲量僅次日本及美國，漁獲統計資料是該委員會進行相關資源評估工作重要的依據，身爲委員會之一員，有義務派員參加會議，提供漁獲統計資料，並提報我國漁業概況，同時關注北太平洋長鰭鮪、黑鮪資源評估之結果。

貳、 會議時地、代表

本次ISC會議自7月15日開始，第一週爲工作小組會議，第二週爲全席會議。7月15日及16日先召開長鰭鮪小組會議，由新任美籍主席Ray Conser主持，共有台、日、韓、美、加等五國19位科學家參加（不含行政人員）。

黑鮪工作小組會議接續自7月17日開始，由日籍主席主持，共有台、日、韓、美、墨等五國23位科學家參加（不含行政人員）。會中大都討論五月黑鮪會議未定案之會議報告，其中又主要爲模式評估上之問題。

統計工作小組會議於自7月18日至21日召開，由日籍主席主持，共有

台、日、韓、美、加、墨等六國25位科學家參加（不含行政人員）。

ISC第8屆全席會議則於7月22日至27日召開，共有我國、日本、韓國、美國、加拿大及墨西哥等六個國家參加。會議主要內容爲聽取各國之國家報告、各工作小組報告、各魚種資源概況報告、未來工作計畫及行政事務等。

本屆會議由農委會漁業署遠洋漁業組鍾國南代理科長率團，並由中山大學海洋事務研究所張水鍇助理教授及中華民國對外漁業合作發展協會王識鈞參加。

參、 工作紀要

<u>7/15-7/16 長鰭鮪工作小組會議</u>

一、確定下次資評會議目標

(一) 第一天會議在確認議程並自我介紹後，由於美國數位代表未到，故先開始討論下次資源評估會議相關事宜。會中粗略討論要採用何種評估模式及 reference points，並如何評估造成最近高補充量的原因。在評估模式上，除了長鰭鮪小組擬逐步以 SS2 取代傳統 VPA 模式之外，美國提出最近在很有名期刊發表的新模式，但日本似乎很在乎出現他們不熟悉的模式，陸續提出資料準備困難、新模式有其特性或結果傾向，因此反對直接採用。

(二) 下次完整資源評估會議預計在 2010 年 2 月（2/16-23），之前將於 2009 年 3 月召開評估方法會議，及 10 月召開資料準備會議。評估方法會議目前是由在評估方法較有研究的美、日、加三國輪流，明年在日本；資料準備會議則尚未有主辦國，希望台灣及墨國能

有興趣。

二、長鰭鮪資料議題

(一) 新任資料管理員指出，今年 2 月 ALBWG 會議上指認 6 項資料問題，其中最大的 2 項問題與台灣有關。首先是台灣提供 1964-2003 全新 categories I, II & III data，但未經 ALBWG 確認，需要再和台灣方面確認。我代表要求確認該資料是在 2 月會議提供的或之前提供的。渠及主席表示，是在之前提供，但因仍有疑義，因此列爲未解決議題。

(二) 針對前述問題，我代表瞭解後解釋，我國曾於 2006 年提交 Category I 資料（1997-2004）修正報告，該報告業經討論並被接受；我國也有提供 Category II data 的修正，而該修正曾在 IATTC 會議說明（主席及前任 ISC 資料管理員在場），也曾在 WCPFC 會議說明，與前任資料管理員也曾透過通信說明過，主要修改的理由是蒐集到額外的 1964-2003 年作業報表資料（美國提供），我們經過比對及討論後最後定案的。這些問題都已解決，不應是 issue，而我們從未要求修正 Category III data。

(三) 主席表示記得我代表曾在 IATTC 會議說明過，既然也已與前任 ISC 資料管理員討論過，渠認爲沒有問題，可以接受，並抱歉他們沒弄清楚我們修改的資料內容。

(四) 至於第 2 個問題爲在產量表中有一欄爲「other longline」，紀錄的是台灣的 FOC 船產量，從 1996 年開始，至 2002 年後就沒有數字，但 ISC 一直以 2400 噸的估值來取代，底下則註明有可能與台灣產量 duplicated。主席表示這有點 IUU 問題，我代表表示當初這欄是因台灣有 FOC 產量，而爲與台灣的產量有分別，所以另外創造出

來，但我瞭解近幾年已經沒有 FOC 船作業，之前的 FOC 船有些也已回籍或轉籍，因此已經不存在。主席說明這問題已問過幾次，希望我方能儘快確認，以在 final report 中釐清。

(五) 我代表另問起，我國每年都有提交體長資料，爲何報告中只列我國有提供 Categories I&II data，卻沒有列我國有提供 Category III data。美方解釋是因爲他們認爲我們的資料有問題，因此自上次來台討論資料後，就沒有把台灣資料包括在資料庫中。我代表回應，依規定各國都要提供資料，我國也提供了，就應列入資料庫，這是責任，與資料品質是兩回事。主席同意，應列於資料提供紀錄中，但可小註因技術問題，而未於資源評估模式中應用，並表示台灣長時序體長資料品質一直是個遺憾，希望能儘快解決。我代表表示現已決定明年十月將有資料準備會議，我們已蒐集一些觀察員資料，會儘可能在那之前進行資料分析比對完成並提供說明。主席表示肯定，希望下次完整資源評估時也能使用台灣資料。

(六) 美國接續報告其觀察員資料所測量的鮪釣體長，日本代表補充說明，因爲台灣資料未被接受，故在資源評估時，係假設美國鮪釣與台灣鮪釣近似，而以美國資料取代台灣資料。我代表即詢問美國體長範圍，渠表示約在 90-110 公分之間。我代表舉例 2004 年觀察員約量測 4000 尾長鰭鮪，體長集中在 80-100 公分，2005 年量測 8000 尾，體長集中在 75-100 公分，2005-07 年作業報表量測 15 萬尾，體長集中在 70-100 公分，顯示資料一致性，但都比美國小，我代表認爲以美國資料取代我國資料並不宜。

(七) 針對我代表上述說法，主席表示同意及我國蒐集之資訊相當寶貴，且已有觀察員資料，認爲應再檢討台灣資料。美國代表也同意再檢討，以考慮 2010 年資源評估是否採用我國資料，希望我國

能提供更多資訊。

三、長鰭鮪漁業新資訊

(一) 美、日、加等國有提供漁業新資訊的書面報告，都是更新 2 月 ALBWG 會議有關資料蒐集之資訊。在主席要進行其他議程時，我代表提問這個議程是否也要詢問其他會員有無漁業資訊。主席表示抱歉，只注意到有交報告的會員國。

(二) 之後由我國說明大概漁業狀況。在說明之前，我代表先詢問，到底北太平洋長鰭鮪是以那裡爲界？我們統計人員有點迷惑該以赤道、10 度、或 20 度爲界。主席及日本表示這的確是個問題，在一番討論後，日本說依照「ISC 議事規則」，ISC 要關切的是赤道以北，主席因此決定應都以赤道爲界。

(三) 我代表依據國家報告內容及漁協提供資訊，從漁獲量、CPUE、及體長分佈等三方面簡要說明漁業概況，其中漁獲量 2007 年較 2006 年降低，主要係因減船及高油價停船。主席感謝我國提供之有用資訊，美國表示這些最新資訊有助於比較現在資源狀況與 2006 年評估結果。接續日、美、主席詢問有關努力量降低、大釣/小釣體長差異、標準化等共約 7 個問題。

(四) 日本利用新資料，更新 2006 年評估結果，結論認爲新資料顯示資源狀況（SSB）比之前樂觀，最適漁獲死亡也比 2006 年評估結果樂觀。日本之另一位科學家表示，這個結果可能只反應最近高補充量的結果，可能不適用於長期趨勢。美國認爲至少也反應現在的狀況，資源狀態是比 2006 年評估結果好。

四、長鰭鮪生物研究計畫

(一) ISC 主席說明爲何要有這樣的計畫。ISC 過去太注重在數學模式計算，對於一些生物參數的缺失一直都沒有研究計畫在進行，因此很難實際解決問題。爲此，ISC 主席希望從今年起，能有一些具體的研究計畫，可以透過各國的合作一同完成，或可能向北方委員會要經費（渠認爲要到經費的機率很高，雖然不一定能一次到位）。

(二) 首先由美國說明其提出的長鰭鮪性成熟研究計畫，因爲這是目前資源研究最缺的，渠已取得一些經費可以進行研究，需要的是各國的協助採樣。部分代表認爲既然要採樣，應該一併作其他研究，因此主席列出大家有共識的 7 項研究，但考慮可行性，決定以性成熟、大魚性別、及年齡成長等三項爲優先項目，一次採樣即可取得。

(三) 日本表達支持。我代表考慮長鰭鮪爲我國在 ISC 最重要的魚種，對此系群我們很難從數學模式上貢獻但可以在生物研究上貢獻，及讓北太平洋觀察員有國際研究目標與正面貢獻，故亦回應認爲這個計畫很重要，能提供資源評估最重要且缺乏的生物參數，如果最後決定要推動這個研究計畫，我方有可能可以透過觀察員計畫蒐集一些樣本，在經費上，可以採用類似我國與澳洲的合作模式，由 ISC 出買魚的經費，由我方觀察員蒐集。日本表示這是很好作法，主席表示歡迎。

(四) 美國提出之計畫，原先包括全太平洋，因爲南、北都有類似問題，與會者認爲我們可能沒有立場研究南方系群，ISC 主席則建議分兩階段來考慮，先著重在北方系群，未來再考慮是否和 SPC 合作，進行南方系群研究。

(五) 在主席邀請下，日本指定兩位科學代表參與此計畫之草擬，並表示日本將有研究船出海蒐集、及內部經費計畫進行類似研究；韓國暫不參與此計畫；加拿大指定一位；美國指定兩位；我國，我代表建議負責北太平洋長鰭鮪研究之陳志遠教授及本人。

五、其他

(一) 會議第一天邀請韓國新代表便餐，瞭解其背景。渠兩年前剛從加拿大訓練一年回韓，原先負責底棲魚類研究，現在調至洄游魚種研究。渠表示韓國新任總統上台，有可能在下半年對基層有人事變動，所以不清楚以後是否會繼續負責此研究。

(二) ISC 主席於第二天到達，渠詢問我方主辦下屆全席會議之意願。我代表回應國內已在處理，要等團長來到才能確定，並詢問我方若主辦需要準備那些事項，渠提供一份本次於日本之全席會議準備事項，其中有經費需求的，主要包括主會場及 2 個小會議室、影印等文書處理設備與秘書、一次小聚餐（ice-break party）及一次大聚餐（welcome party）等。

(三) 我代表另詢問主席選舉事宜，並詢問我國是否有機會擔任副主席。渠先解釋，主席、副主席不是國家代表，而是個人，因此沒有國家輪流問題，各會員國推派之對象也必須是大家所認識並常參加 ISC 會議。渠在 IATTC 會議時曾對我代表表明不再續任，但美國找不出合適的支持對象，故要求渠再續任，並著手培養未來的主席，因此下屆副主席的工作可能會比以前重。主席選舉將在下週五舉行，屆時各會員國代表提出名單，當場投票；選出主席後，第二輪再選副主席。

7/17 黑鮪工作小組會議

一、更新資源評估結果測試

(三) 第一天會議在確認議程並自我介紹後，主席請日本代表說明自從今年五月黑鮪會議後，新的分析結果。日本代表主要是作一些測試，最重要的點是發現 2005 年的高補充量可能是錯誤的，模式的測試及體長資料的分析均顯示不確定性很高，尤其 EPO 的圍網黑鮪幼魚產量可能高估，另外以 2006 年爲起點之資源預測結果可能過度悲觀，並沒有在 SS2 模式中反應出來（因漁具選擇性問題）

(四) 爲此，日本代表建議（一）EPO 之圍網黑鮪應增加體長資料採樣數量，並確定量測準確性；（二）要改善模式的性能；（三）應該開始監看黑鮪年級群強度的變化，才能更瞭解補充量變動。

(五) 墨國代表表示，其漁民的確有時會高估產量，最近幾年的產量可能有問題。墨國（正發展黑鮪養殖）已從去年頒佈新黑鮪管理計畫，漁民必須提供資料及協助研究，所以預期未來情況會改善。

二、黑鮪漁業狀況

(一) 因爲我國未參加五月黑鮪會議，主席請我代表說明我國 2006 年至今年的黑鮪漁業概況。我代表提供 2006 及 2007 年漁獲量及體長範圍，並說明今年漁獲量狀況（比 2007 年少將近一半）的可能原因（油價高而減少出海次數與活動範圍）。日本詢問漁獲率變動、體長變動等問題，皆已回復。會後日本私下表示，今年我國漁場變小可能也與菲律賓有關，此與協會訪查小釣業者之結果相符。

(二) 韓國代表接續提供漁業資訊，渠先表示他發現韓國資料有許多錯誤，現已在重整資料，並持續與日本溝通，希望資料能有一致性。傳統上韓國黑鮪只是鯖鯵圍網的混獲，但近幾年開始有些季節性

的捕捉，雖然比例仍不高。其產量、作業位置及體長（每天 200 尾）資料是根據港口觀察員蒐集的，回收比例約 90%。目前有 29 艘在作業，2006-07 年漁獲量爲 949、573 噸。

(六) 會中有許多對韓國資料的問題，包括提報一致性及月別產量加總不符等，我代表則詢問是否曾比對作業報表與市場觀察員產量的一致性，韓原先說有作業報表，後來表示沒有。我代表另表示，從業者瞭解韓今年黑鮪產量很高，曾有一艘船一天捕 7000 尾（40-80 公斤），韓證實今年漁獲量特別好、且魚體較大。日本主席亦表示今年也捕到不少比以往還大的魚，產量也大，但日本團長有點制止性的表示這些都是新聞，大家都可以找到很多新聞資訊。另韓也回應，韓國的確有私下在研究發展黑鮪養殖，日本業者表示應不久了。

三、資源狀況

(四) 有關我代表說明之今年漁業狀況，日本代表特別關切有關 CPUE 的狀況，在會議紀錄檢視時，有不少討論。日本代表先私下表示，因我國漁獲對象爲母族群，我國 CPUE 下降將代表母族群的下降，也代表資源過漁的先兆，故必須相當謹慎。雖然我國今年漁獲量下降，但 CPUE 可能會因高油價造成之作業型態改變，而變得不適合作爲標準化指標，故會議紀錄特別作此說明。

(五) 資源評估結果相當複雜，因不確定性高，日本、美國對於文字的表達也相當謹慎，因此會議中有相當多爭論。結論大概爲：若以一般之管理目標來看（target reference point），漁獲壓力過高，但尚未超過補充量過漁（recruitment overfishing）的參考點；而補充量似乎未受高漁獲壓力的負面影響，2005 年級群補充量可能也有被

低估，而似乎補充量受水文環境的影響，比受母族群資源量的影響更大。

(六) 評估結果建議，若維持現在的漁獲壓力及繼續合適的水文環境，補充量應可支持目前的產量水準，若能降低，未來可持續產量將可增加，但至少不應再增加漁獲壓力。

四、下次會議日期

(一) 有關下次會議日期，主席表示：ISC 主席希望下次資源評估會議延至 2011 年，以避免每年有太多評估會議。與會員者雖有些不解，但同意會議紀錄中建議不能晚於 2011 年，但也希望在今年 12 月召開評估結果之檢視會議，日本將於琉球主辦。

(二) 我代表要求主席說明召開 12 月會議之理由，因爲我們政府一直覺得 ISC 會議太多了。主席回應，渠個人也覺得 ISC 會議太多，而 12 月再召開會議的目的，係因 IATTC 希望在其明年召開全太平洋黑鮪資源狀況檢視會議前，ISC 能先完成資源狀況檢視，以避免因資訊不足而產生矛盾。

7/18-7/21 統計工作小組會議

一、ISC 資料庫

(一)主席提供目前資料庫中之資料項目列表，供會議討論。我代表提問，爲何表上我國提供之資料只有 4 年，既然如主席所說這是會員國的義務，在資料處理上應更謹慎。主席回應可能係因爲我國提供之資料有一些欄位欠缺（如分區），所以沒有進資料庫。我代表回應，我國過去都如期提供資料，如果資料有欠缺，請儘快通知我們，以便補足。主席回應會重新檢視資料提供實況。

(二)我代表另提問我國其他漁業別資料爲何沒列上、我國沒有 sport fishing 但表上卻出現、年代錯誤問題（可能其資料庫程式有誤）等，並詢問 ISC 資料處理流程，因爲我國在各工作小組中都有提供相當完整的資料，各工作小組也檢視過，但到統計小組手上，資料變得很欠缺，似乎 ISC 之內部資料處理程序未一致。此問題引起相當多討論，ISC 主席認爲細部資料蒐集及驗證，應是各工作小組之責任，最後將資料提供統計管理員（現爲統計小組之日籍主席），因爲各工作小組最瞭解研究所需資料。對此會中有些爭論，特別是黑鮪小組日籍主席及長鰭鮪小組美籍主席。最後維持 ISC 主席之看法，但何時各小組主席應提供資料給統計小組（各小組不一定在全席會議前有召開會議）仍未明確，但流程已確定。

(三)有關前項議題，我代表提供其他組織之作法供參，其實日本代表參加過各國際組織會議、且統計小組主席 Miyake 也曾是 ICCAT 資料庫的主要負責人，但似乎對此議題的討論相當冷淡，而 ISC 資料庫及聘用之資料管理員都在日本，資料庫的處理結果卻相當混亂且錯誤多，令人很難理解日本之態度。

(四)我國代表另提問既然已繳交資料給各工作小組，又爲什麼還要提給統計小組一次，是否交給工作小組就可以了？ISC 主席表示重覆提的部份只有 TASK II，而提給統計小組的時候也可以核對確認資料的正確性。

(五)我國代表建議可請 SPC 提供萬那杜的資料，旗魚小組主席也提出有些國家不是 ISC 成員但在北太捕撈 ISC 的魚種，這部份應該可以向其他組織索取。ISC 主席表示他會記得去交涉資料問題，也提醒各小組主席應該積極參與統計小組會議，以確認知道各項資料如何變動。

(六)日本代表另說明其所規劃的 ISC 資料上傳及下載網頁(ISC Researcher’s Web Page)，未來各國將透過網頁提供及下載資料。其中，有關該資料提供網站之使用介面，已於去年由我國資料連絡人試用過，且本年度所提出之介面並無大幅修正。在資料提供格式部分，檢視其報告，發現我國所提之料有部分未符合，但各國提報格式未獲統一，故在會中並未進行檢討，然未來我國所提資料應儘量配合該格式以做因應。

二、 ISC 網站

(一)ISC 網站重新設計案由副主席 Honda 負責，將提供會議時間、報告等等資訊，並在首頁增設 ISC 主席給全體會員的重要資訊。網站內另設一區可供會員國上傳正式的意見，讓各國意見可在網站上送出。另主席說明因爲現在進入網站後的第一頁太複雜，因此有必要設計一個簡單的首頁。

(二)各國對於首頁之表現方式覺得太單調，希望能多增加一些代表性圖片，使之更美觀。主席請各國能提供圖片，網站暫時將不定案。

三、去年工作計畫執行進度

(一)19 日開始之議程爲討論去年訂定之工作計畫執行進度或有新增計畫。共有 18 項，完成了 7 項，其他未完成或尚未有進展。主要討論部份如下：

1. 已完成的工作包括：資料 Category II 及 Category III 應該直接提交給統計小組、確認韓國圍網船的太平洋黑鮪漁獲量、在網站中設計一個空間讓主席的建議可放上去、發展所有旗魚類 Category I 至 III 的資料架構、資料格式標準化並去除季別資料、確認各小組的資料聯繫人、要求各國資料聯絡人應該參加統計小組會議、發展

一套程序讓 ISC 資料品管經理提供資料給工作小組並參加評估會議以掌控資料變動情形等。

2. 大部份完成但必須繼續進行的項目包括：原決定要調查 ISC、IATTC 及 WCPFC 三個組織之資料庫差異的工作、發展後資料（metadata）收集與存放程序、資源評估及工作文件之建檔、增加資料庫處理其他資料如觀察員及作業報表中丟棄漁獲及混獲物種資料等的功能等、在資料封面上增加後資料形式或新資料代碼的資訊、執行 ISC 有關工作文件不放在網站上而以文件表顯示之政策等。

3. 尚未完成的工作包括：（1）指派全職的資料庫行政人員及資料品管經理。日方表示要聘請專業人員又無法提供永久性職務使得招聘工作特別困難，但日方會繼續努力希望有所突破；（2）有關要求日本修正其資料至 2004 年部份（有些資料只有尾數沒有重量）由於人力有限，還在進行中，然而在會議紀錄討論時，與會者認爲不僅日本，應該是所有國家都應努力提供歷史資料，故修正爲全部國家；（3）混獲物種的資料收集部份，ISC 主席表示該小組的工作內容會在全席會議上討論，目前該小組已開始運作、（4）有關發展一套程序讓工作小組的資料能轉移到統計小組的部份，爭議最多且無法達成共識。

(二)其中有關要求各國提供資料蒐集、處理流程，至今只有我國、日、韓、美提供，其他國家都未提供，因此將繼續列爲工作項目。

(三)我國另外提及希望與其他組織或國家索取資料的部份（如萬那杜的長鰭鮪及 IATTC 國家的旗魚等），ISC 主席表示由於研究領域相近，應由工作小組主席向其他組織要資料，如果不行再由統計小

組和 ISC 主席出面去索取。

(四)ISC 主席說明未來資料品質經理的權責及工作項目都會有明文規定，如果各會員國對此有意見，請隨時向統計小組主席或 ISC 主席反應。

(五)下一次的統計小組會議將在第九屆全席會議之前舉行。

四、全席會議之團長會議

(一) 20 日上午召開團長會議，由各國團長及各工作小組主席參加，共計有我國、美國、日本、加拿大、墨西哥、韓國等六個國家、各小組主席統計人員及行政人員 19 人與會。

(二) 與會人員自我介紹之後，ISC 主席首先說明本組織的性質與初衷，指出本會議是一個科學性會議，不涉及政治與執法，因此座位不按字母順序排，也不會掛出各會員的國旗。主席的任務是促使會議順利進行，所以不會涉入議題內容的討論，如果討論無法達成共識，可將各自意見清楚表述後作成紀錄，各會員國的意見都會受到尊重。

(三) 其次由主席逐項說明會議議程，確認只有 WCPFC 秘書處會派兩名人員參加，是唯一出席的觀察員，並提醒與會者如果有其他非政府組織參加，應該要讓主席知道。會議開幕後將由各國家報告、各工作小組報告、各工作小組報告主要魚種資源狀況及次要魚種（東西太平洋黃鰭鮪及大目鮪）資源狀況，最後會由會議記錄作成草稿，經各與會者審視修正後定案。

(四) ISC 主席提供其報告內容，並對於各工作小組報告尚未完成表示歉意。另外特別說明去年通過的報告釋出政策，主要指各工作小組的工作報告（working paper or document）不會放在網站上，只有清

單和作者的信箱資訊，主要是顧慮此報告可能也是研究者未來投稿學術期刊的材料，不應該被視爲已發表的報告而影響作者的權益。此舉的另一個目的是避免未討論通過的報告資料遭其他團體引用，造成斷章取義或片面解讀的結果。另外全席會議的工作報告則會放在網站上，可供下載。

(五) 主席最後提醒大家應事先閱讀或準備好相關文件，以便會議能順利進行。

7/22-27 全席會議(一)

一、開幕

(一)ISC 第 8 屆全席會議於 7 月 22 日上午開始，會議地點在日本香川縣高松市之地標大樓國際會議廳，由美籍主席 Gary Sakagawa 主持，共有我國、日本、韓國、美國、加拿大及墨西哥等六個國家參加，與會之代表團及科學家共約 50 人（不含行政人員）。

(二)與會者包括日本代表團 20 人、美國團 12 人、韓國團 1 人、加拿大 1 人、墨西哥團 2 人及我國代表團 3 人，出席之觀察員爲 WCPFC 秘書處 2 人，缺席者爲中國、IATTC、SPC 及 PICES。本次會議不論在出席人數會會議場地規格上均較以往盛大，另大會亦安排日本記者訪問日本水產廳及大會主席。

(三)各國代表團自我介紹後，由日本水產廳副廳長 J. Yamashita 及香川縣長 T. Manabe 致詞，強調鮪魚資源的重要性及 ISC 工作的重大意義，並歡迎與會貴賓蒞臨香川。大會於確認議程、指派記錄及檢視會議時間表之後進入議題討論。

二、各國報告

(一)加拿大報告

該國 2007 年北長鰭鮪（北長）漁獲量爲 6,040 噸，較 2006 年增加 3.6%，作業海域包括 FAO 第 67 號統計海域，即透過美加雙邊協定進入之美國與加拿大之經濟海域，自 2005 年之後就沒有船進入公海作業。2007 年共有 196 艘曳繩釣船，較 2006 年增加 11%。2007 年之努力量爲 7,062 天，較前一年增加 13%，但強調加拿大的努力量符合從 2000-2002 年間逐步下降的趨勢。2007 年之 CPUE 爲 855 公斤/船天，爲 1995 年後之第二高，整體而言，漁獲量及 CPUE 之趨勢都增加。

由於加國報告中提及電子工作報表先趨研究計畫（electronic log-book pilot program），日本與我國都對此提出問題，ISC 主席亦表示未來統計小組可考量增加此部份的研究與討論。

(二)我國報告

我國報告在 2006 年至 2007 年間，我國的大型延繩釣船從 117 艘減爲 97 艘，我國的長鰭鮪漁獲量從 1997 年的 9,000 噸減爲 2007 年的 2,465 噸，主要原因是減船及高油價所造成之努力量下降。劍旗魚漁獲量也持續下降，在 2005-2007 年只有 350-450 噸。我國的小型延繩釣船長鰭鮪漁獲量在 2003-2005 年間爲 300-500 噸，黑鮪漁獲量爲 1150-1140 噸，劍旗魚爲 3600-4000 噸。大、小釣長鰭鮪的體型分別爲 86 公分及 98 公分，劍旗魚則分別爲 161 公分及 135 公分。另外我國家報告中也說明爲提升小釣報表回收及資料品質所採取的改善計畫。

日本詢問我國劍旗魚在 2001 年出現劇增，2003 年後又明顯下降的原因，我國答以 2001 年我國開始發展大目鮪漁業，產量因而上升，後來因減船計畫而下降。旗魚小組希望我國提供國外基地的各種旗魚漁獲量及詢問我國所提觀察員計畫是否爲長鰭鮪專業船，我國表示願

意提供該項資料，另因我國北太只有長鰭鮪專業船，所以目前北太觀察員計畫主要針對北長專業船。旗魚小組另詢問小釣 logbook 涵蓋率只有 5%是否爲我國的目標，我國表示 5%是目前水準，而我國正推動小釣資料改善計畫以提高報表回收率，但沒有設定回收目標。日方另發問如果按照我國大釣長鰭鮪體長資料換算成體重，全部採樣數的總重量已經相當於我國的漁獲量，因此採樣數是否有誤，我國回應提醒該圖是三年的採樣總合，相對於三年總漁獲量，採樣比例並沒有日本所提的過高現象。日方提及我國報告小釣努力量分佈圖中有些努力量落在很靠近中國大陸和泰國的區域，詢問我國是否有與此兩國合作，我方回應我國漁民可能有透過某種形式的安排進入該區域作業，但詳細情形還要再去瞭解。ISC 主席提醒去年已要求我國報告中要加入各漁業及魚種的資料，但今年並未照辦，希望明年要確實作到。此節我方在出發前審視去年會議報告時已注意到，唯去年與會者並不認爲此節重要，因此對是否要改變國家報告格式並未作成決定，然已準備相關資料與會，故此我國回應會在會議期間依要求補足相關資料。

(三)韓國報告

韓國 2007 年之遠洋沿繩釣（DWLL）總漁獲量爲 14,477 噸，黃鰭鮪、大目鮪及長鰭鮪等三種主要漁獲總量爲 12,822 噸，圍網總漁獲量爲 22,004 噸，北太平洋圍網的主要漁獲爲正鰹及黃鰭鮪，此兩種漁獲總量分別爲 18,368 及 3,636 噸。韓國所捕的黑鮪大部份是體長爲 20-167 公分的小型個體，主要漁法爲鯖圍網，其漁獲量的變動可能跟海況及年級群有關。另韓國自 1998 開始派遣觀察員上沿海漁船，2002 上遠洋漁船，在 2007 年有 6 位觀察員執行 12 航次的遠洋漁業觀察任務。

日本提問圍網的型態，韓國回答其小型圍網與日本使用的很相似，主要是登記爲鯖圍網，資料所指的也是鯖參圍網。我國提問報告

中所謂涵蓋率達九成是指什麼，並建議作港口訪查量與漁船卸售量的比較，會較容易掌握確實產量，並詢問黑鮪體長變大是否爲漁業型態改變。韓國答覆指有九成的漁獲量被掌握，而非報表回收率，並同意未來會作比較，至於黑鮪體長變大趨勢可能係因採樣數太少之誤差。美國與日本都問到如何估算漁獲量和作業地點，韓國回答其圍網沒有作業報表，漁獲量是市場卸售量而作業地點是港口觀察員訪查所得。日方另要求確認韓國所報產量爲未放大值，韓國回應對，所報給 ISC 的僅爲九成的產量。主席要求韓國應該提交全部漁種的資料，由其被列入「其他」項下的各種旗魚及鯊魚。

(四) 日本報告

日本 2006 年太平洋鮪魚之總漁獲量（不含正鰹）爲 154,000 噸，其中旗魚爲 16,000 噸，正鰹爲 310,000 噸，鮪旗魚和正鰹之漁獲量降低是因爲努力量降低的緣故。延繩釣、圍網及鰹竿釣佔鮪類漁獲的九成，其他漁業如曳繩釣、刺網及定置網則佔少數。

大部份國家的提問都集中在標誌放流、體長頻度及圍網型式等，日本回答已與 SPC 合作標誌放流計畫，未來還在尋找預算進行該計畫。有關我國提問之港口體長量測數量的種間顯著差異問題，日本說明是因爲不同科學家進行的不同計畫，就報告者負責之劍旗魚，其考量重要性且體長範圍較大，故採樣數量較多，至於長鰭鮪部分，由於體長範圍小，故不需採樣這麼多，但長鰭鮪負責科學家表示，實際其也有不同體長範圍的資料，但因其體長資料庫並不集中，導致涵蓋率不完全，無法涵蓋全部體長資料。另我國提問之遠洋漁業體長資料蒐集問題，日方表示目前遠洋船已沒有提供體長資料，都是藉訓練船和研究船蒐集。最後日本也說明其圍網船有 70%是鯨豚及浮木群，只有 30%是素群。

(五)墨西哥報告

墨西哥表示該國漁業是在 1980 年代宣佈 200 海浬經濟海域後才大幅成長，主要捕獲黃鰭鮪，少部份爲正鰹，1996 年之後由於黑鮪開始被養殖，所以也捕撈黑鮪。主要漁法爲 363 噸以上的圍網船，大部份都有觀察員在船上，數據是由作業報表及觀察員收集而來。2007 年黑鮪的漁獲量有 4,005 噸，全部都作爲養殖魚。劍旗魚的漁獲量佔捕鯊船總漁獲量的 24%，所有大型延繩釣船都有科學觀察員，可提供 ISC 旗魚小組良好的數據。

大部份的提問都針對黑鮪養殖，我國詢問養殖黑鮪的上市體型爲何？養殖期間多久？墨國回答上市體型並不清楚，但捕獲供養殖的黑鮪體型約 80-120 公分，養殖期間可能需 8-9 個月或更久。另外墨國以前並沒有限制黑鮪養殖場的數量，現在新設的箱網養殖場則必須政府核准。

(六)美國報告

美國漁業包括沿岸的小型的刺網、鏢魚、鰹竿釣、熱帶曳繩釣及手釣等，遠洋及經濟海域內之漁業則以延繩釣、大型圍網及遠洋曳繩釣爲主。2007 年美國的漁獲量增加主要由於圍網船從 11 艘增加到 23 艘，因此儘管油價高漲，正鰹之漁獲量仍然增加至 8,889 噸。由於部份旗魚船因爲海龜保育措施禁漁而轉爲鮪延繩釣，大目鮪漁獲量增至歷史新高爲 6,665 噸，作業船數也增至 130 艘。在熱帶島嶼雖然有上千艘的小型曳繩釣船，但漁獲量只佔很少的一部份。長鰭鮪曳繩釣比 2006 年多了 24 艘，達 625 艘但漁獲量比 2006 年還少。

部份國家提出有關在墨西哥海域的黑鮪釣遊漁船問題、海龜混獲減少及鯊魚避忌措施。美墨對於釣遊漁船的黑鮪漁獲量如何收集和如

何彙整資料還沒有想法，但同意此爲一重要議題，應該想辦法來解決。有關鯊魚避忌措施係使用負電金屬溶解，讓鯊魚不會就餌，又能防止漁民觸電，但美方代表對此新的研究所知不多。對於海龜問題，美方表示由於沒有完整的證據顯示海龜避忌措施是有效降低海龜混獲的方法，這三年的混獲率降低可能是因爲鉤型和餌料選擇的組合而有此效果。

三、主席報告

主席 Gary Sakagawa 對一年來的工作進行報告，指出這一年來會務有相當的進展，但也有部份令人失望。主席表示本年中透過各工作小組作爲資源評估結果資訊交流的平台，並進行準備輸入的評估模式資料、模式運算、資源評估、分享觀點及分析資料之詮釋等工作。去年黑鮪已經完成資源評估，完成劍旗魚資料收集並準備於 2009 年進行資源評估，及開始準備 2010 年紅肉旗魚的資源評估。另外，長鰭鮪也已準備在 2010 年以 SS2 進行資源評估。

令人較爲失望的部份主要是在本年度中沒有進展的項目，包括（1）ISC 資料庫發展及網站的重建進度落後，（2）會員國支持研究及資料提供上的落差沒有改善，希望會員國能夠儘量改善這種狀況。主席並提示明年的目標將是讓資料庫完全運作以符合 ISC 的需求，建置適於會員國使用的網站，另外也希望能啓動數個生物研究計畫以補足資料不足和生物參數不確定處。

主席表示此爲他三年任期的最後一年，將在今年重新選出主席及副主席，感謝所有的參與者使 ISC 機制得以運作，也特別感謝各工作小組、工作小組主席及各代表團團長對主席及工作小組主席的支持。

7/22-27 全席會議(二)

一、各小組工作報告

(一)黑鮪工作小組報告（22 日下午）：由黑鮪小組主席報告 2007 年 12 月及 2008 年 5 月之工作小組會議情況，並已完成 ISC7 所交付之工作計畫，提出完整的黑鮪資源評估報告。其中工作計畫完成的兩個事項分別是：下瀨環透過耳石研究更新年齡成長參數，以及由工作小組透過 SS2 更精確地估算資源潛在信賴區間並提出生物參考點之百分比界限。大會主席表示所有的黑鮪小組的工作報告都將提供給 WCPFC SC4，上述兩篇報告的簡報也應一併提供。

(二)旗魚工作小組報告（22 日下午）：旗魚小組主席報告對於某些會員國沒有參與資料收集及工作小組會議感到失望，要求部份國家補足資料並積極參與各工作小組會議，而並非只參加全席會議。報告中提及有些國家承諾太多卻做不到，或者漠不關心，而台灣及日本最支持工作小組的工作。

(三)長鰭鮪工作小組報告（23 日上午）：長鰭鮪工作小組主席報告 2010 年三月將進行北太平洋長鰭鮪完整資源評估，並將評估方法由 ADAPT-VPA model 改爲 SS2，另外將在 2009 年應北方委員會要求訂出參考點 Reference point。明年二月在 Shimizu 有評估模式討論會議，十月還有資料準備會議，然後在 2010 年三月開始資源評估會議，會期都預定爲 8 天。主席表示該工作小組的困難在於太少資源評估的科學家參加工作，由於這些科學家都要參加其他工作小組或其他 RFMOs 的會議，還有 NC 及 IATTC 在管理上的要求也會花去許多科學家的時間，如果沒有改善可能影響後年資源評估

的工作。

(四)混獲小組工作報告（23 日上午）：混獲工作小組美籍主席 Chris 說明目前工作小組碰到的困難主要是混獲小組的目標不明，對於未來究竟要不要進行資源評估？要不要將重點放在鯊魚研究（有困難）？或應該進行避忌措施的研究等，希望聽到大家的意見。由於各方意見分岐，主席請各國代表逐一發言，我方表示既然各 RFMO 的科學委員會都有進行混獲研究，而與會者也都同意資源評估將耗費太多人力，應該捨棄無法進行的部份，僅針對各組織正式與非正式的混獲資料進行檢視即可。最後討論決議，混獲小組將工作項目列優先次序，並以有關海鳥及海龜的忌避措施研究爲優先項目。

二、各魚種資源狀況報告

(一)黑鮪資源評估報告（23 日上午）：

自 2006 年 1 月資源評估後，此次提出的評估報告是第一次採用 SS2，採用資料期間爲 1952 至 2005，以 10 個漁業的季別漁獲量、4 個延繩釣 CPUEs(包括 3 個日本的及 1 個台灣的序列)，以及 1 個曳繩釣 CPUE，並以基於耳石基礎的成長曲線參數進行評估工作。工作小組主席說明我國已提供新的 LL 資料並在表格備註欄中說明，本次資源評估是第一次使用 SS2 進行資源評估。日本漁獲量通常佔黑鮪總漁獲量的一半以上，雖然 1980 年之後美國有時會超過一半，2000 年之後墨西哥也加入捕撈黑鮪的行列，目前日本的漁獲量仍占六成以上。資源評估顯示近年的補充量都被低估，但很難評估被低估的程度如何。目前的漁獲死亡率 F 可維持 SSB 在目前的水準，但如果 F 增加 20%將影響長期的 SSB。總結最後的結論是不應增加漁

獲死亡率 F。資源保育建議：

i. 2008 年 5 月到 6 月的資源評估主要關注相對於潛在資源及限制參考點的當前漁獲死亡率，而其中不確定的部分在於關鍵的模式參數，然重點是當前漁獲死亡率不應再增加。

ii. 若漁獲死亡率可以維持目前水準，且自然環境狀況良好，未來補充量應足以維持目前漁獲量。

iii. 降低漁獲死亡並配合良好自然環境狀況，應可使 Y/R 及 SPR 變高並使持續生產量隨之提升。

iv. 若增加漁獲量使高於目前水準，且自然環境狀況變差，可能導致補充量水準不足以支撐目前的資源生產力。

爲使評估結果讓管理者容易看得懂，主席認爲不必修改會議附件，但可以引用一張圖在會議記錄中，此部份經與會者同意使用簡報圖關於資源評估的 key factors 的描述，各國無意見。另外對於目前資源狀況的保育建議共四條，經詳細的討論，最後決定增修部份文字，並將主要結論放在第一條。

(二)旗魚資源狀況報告（23 日上午）：

旗魚明年開始資源評估，現在的 catch table 漏列墨西哥資料。工作小組提供一篇報告證明紅肉旗魚爲北方魚種，及確認其生物量有一半以上在 20N 以北。雖然日本對於該報告的研究方法仍有部份意見，我方發言認爲在資源評估進行之前，能夠用較簡單的統計方法作出資源分佈就很有價值，最後與會者都同意該篇報告提交 WCPFC/SC4。主席說明該報告並非供同儕審查，而是 ISC 的背景報告，以證明該魚種是屬於 ISC 研究範圍內的北方魚種。

(三)長鰭鮪資源評估報告（23 日上午）：

今年沒有進行長鰭鮪評估，各會員國同意應延用原來之評估建議，然而對於長鰭鮪小組兩項新的分析結果：1.產卵群生物量(SSB)可能低估、2. 2007 年實際漁獲死亡率應比之前評估結果所提之 current F 還低；此應一併列入保育建議。工作小組主席說明長鰭鮪 2006 年的資源評估認爲 F 只有 0.75，由於 2007 年的漁獲量有下降的趨勢，估計 F 應該低於 0.75。本年度工作小組沒有作出新的保育建議， ISC 主席認爲目前這樣的資源評估提供給 NC 運作的很好。長鰭鮪工作小組主席回答如果有更多資料，下一次進行資源評估可以做得更多，日本表示長鰭鮪由於有好幾種漁業在捕撈，資源量可能非常不穩定，建議應該加緊監視北長的資源量動態。長鰭鮪工作小組主席同意這樣的觀點，不過認爲之前的評估已將這種特性納入考量。資源保育建議：

重申至 2010 新的評估結果提出之前，ISC7 所列保育建議仍然維持，並提出三點需關注事項：

1. 2006 評估報告採用之 SSB 參考點所估算之 SSB 百分比是稍有低估的。
2. 由於 2007 的實際魚獲量是低於模式假設值，2007 漁獲死亡 F 值可能是低於前評估結果($F_{current}=0.75yr^{-1}$)。
3. 強化生物參考點之選擇及應用以精進保育建議，尤其是清楚的時間框架及明確的生物參考點型式將可使之提出更好的建議。

(四)東太平洋次要魚種報告（23 日下午）：

由墨西哥代表 IATTC 報告東太黃鰭鮪及大目鮪資源情況，漁獲主要來自大型圍，隨著正鰹捕獲黃鰭鮪爲主漁獲，次要者包含大

目、長鰭及黑鮪。

黃鰭鮪部分：2007 之平均重增加到 8.3kg，以 A-SCALA 模式評估東太黃鰭鮪，結果指出產卵親漁量已回到接近平均最大生產量(AMSY)，顯示資源狀況似乎比前一年好，努力量水準也降低至足以支撐 AMSY，近期補充量亦已回到長期平均。

大目鮪部分：於 1993 年以前東太大目鮪多爲延繩釣所捕獲，之後主要是使用 FAD 作業於 10°N-20°S 之圍網漁業，2007 之平均重爲 5.3kg，基於 SS2 模式之評估結果，顯示漁獲死亡率高於 AMSY 水平，若不降低努力，總生物量及產卵群生物量將持續枯竭，三次最近期的估計亦顯示已經過漁。

(五)西太平洋次要魚種報告（23 日下午）：

由 Dr.Soh 報告去年 WCPFC 之黃鰭鮪評估結論，評估結果顯示自 1999 年後漁獲死亡率明顯增加，尤其是少於一歲之小魚，第三區(20°N-10°S、170°E 以西)呈現最高的開發率，消耗率達到未開發生物量的 51%，漁業衝擊率爲 49%，在 2002-2005 印尼及菲律賓的國內漁業是最大的衝擊來源。報告中認爲雖然黃鰭鮪有很好的捕充量，但也有很大的不確定性。總生物量是回升的，漁獲死亡率也增加，但總結是目前的狀況很接近 Overfishing。以 Kobe 圖檢視資源狀況 $B/B_{MSY}=1.10$，顯示中西太平洋之黃鰭鮪資源未過漁，$F/F_{MSY}=0.95$ 顯示高漁獲死亡率，建議不應再增加開發率。

三、資料檢視（23 日下午）

由各國檢視各魚種工作小組提交大會之 Catch Table，確認數值並予更新，我國檢視漁獲量表後發現我國旗魚漁獲量表格式與過去不同，被細分爲過多之漁業別，故建議大會採用過去格式，主席決議往後魚種小組之資

料需求若需細分亦請各國配合，但大會之漁獲量表應明朗清楚，故採納我國之建議。

由於我國參與魚種小組多由學者代表參加，故資料提供管道並未完全統一，此常造成數值之誤植，未來應建立單一之資料提供窗口。

7/22-27 全席會議(三)

一、生物研究成果報告（24 日上午）

(一)長鰭鮪：由長鰭鮪工作小組主席 Dr. Ray Conser 綜合整理長鰭鮪的年齡成長相關研究成果，顯示長鰭鮪的成熟年齡爲 5 歲，其性比約爲 1:1。由於報告中顯示南長鰭鮪大約在 5 歲左右，體長超過 90 公分後成長速率就降低，而北長鰭鮪則持續長大超過 100 公分後成長速率才降低，此種差異究竟是統計上的偏誤或系群生物的差異引起熱烈討論。工作小組認爲許多漁法都有大小體型的選擇性，因此可能造成採樣上的偏誤，因此採樣設計時應將此種偏誤考量進去。

(二)黑鮪：本次日本一共提供四篇研究報告，除了資源研究外也包括繁殖及仔稚魚研究。近畿大學從 1970 年開始研究黑鮪，於 1979 年成功作出黑鮪繁殖。蓄養種魚的箱網直徑爲 40 米，深 13 米，內灣養殖區的深度約 30 米。黑鮪的產卵期從 5 月初到 10 月底，主要集中在 6-7 月和 9-10 月，母魚兩歲性腺就成熟，養殖鮪魚三歲可開始產卵。產卵時由數尾公魚與一尾母魚追尾後產卵，追尾的活動可能在表層或底層。如果當年水溫不夠高，母魚也可能不產卵，例如近畿大學的黑鮪繁殖場的種魚在 1992、1993、1997、1999 就沒有產卵，推測主要原因是水溫高過 24 度的天數不夠。2001-2004 年共有 19 尾母魚透過基因辨識有產卵，其中 2001 年有 8 尾產卵，但全部母

魚中只有 4 尾連續 4 年都產卵。產卵時間都在夜間 1700-2300 間，水溫越高越晚產卵，且水溫越高孵化後的仔魚的存活率越低。利用表層或中層浮游生物網於海中採得 40MM 左右體長的仔稚魚，發現黑鮪產卵的最適水溫應該是 25-27 度，推測產卵區在台灣正東海域，（約在 123-126E、22-24N 範圍），在台灣附近的仔稚魚最早在 5 月被發現。

(三)旗魚：旗魚工作小組主席 Gerard DiNardo 報告 ISC 旗魚研究情形，指出旗魚研究的困難在於魚種較多（共六種旗魚）、漁法多樣（包括延繩釣、圍網、表層刺網、鏢魚及曳繩釣）、體型的性別差異以及沒有形成大型洄游魚群等。旗魚的基礎生物資料也不足，如生活史的數據、年齡與體長的關係、50%的成熟體型年齡體長等等。如果要進行第一階段最基礎的年齡體長研究，預計每一個種類需要 3.5-4 年時間，預算大約 90 萬美元，而且需要多國的合作才能達成。

(四)多魚種整合採樣計畫任務小組：各魚種工作小組都認爲必須有一個生物研究計畫，以解決目前資源研究上仍欠缺或需更新的參數。其中，各小組同意「年齡成長」及「成熟度」研究的重要性最大，因此將列爲優先研究項目。然而考量（1）這些研究需要大量且廣範圍的生物樣本（包括年齡形質及性腺）；（2）各漁業有其特定的漁獲體型，必須皆蒐集到才能使研究完整；（3）生物採樣不易，有必要設計一次同時採樣各魚種之計畫，以減少重複。基此，各魚種工作小組都同意應該要有一個多魚種的大規模整合採樣計畫。本議題最後做成建議爲：

「爲了進行『年齡成長』及『成熟度』的研究，同意發展一任務小組，以便設計一個多魚種的大型生物採樣計畫。各工作小組將先發展其所需之採樣計畫，俾能最終形成單一多魚種的生物性採樣

計畫。」

二、統計小組工作報告（24 日下午）

由統計工作小組主席 Naozumi Miyabe 報告統計小組工作情形。資料部份除墨西哥與中國外，各國資料均已交齊，墨西哥說明將在會議期間補交。工作小組完成或已有相當進展的事項包括：資料提交流程、網站修改並建置上傳功能、發展旗魚類資料架構、資料格式標準化、確認各小組的資料聯繫人並要求各國資料聯絡人應參加統計小組會議、發展後資料收集與存放程序、資源評估及工作文件之建檔、增加後資料形式或新資料代碼的資訊。未來還要進行的工作重點包括（1）補足非 ISC 國家但有捕撈 ISC 魚種的漁獲資料，以及（2）擴大資料的收集到更小的 1 度方格資料和範圍更大的資料。

會中針對資料提送流程有不少討論，許多代表認爲 ISC 的資料提送流程重複，且易造成資料不一致，我國則舉 ICCAT 資料管理流程爲例，說明既然 ISC 要聘資料管理員，可以仿 ICCAT 模式，就不會有爭議。ISC 主席同意，但先決條件爲日本同意聘的管理員爲全職的，在還沒有確定之前，暫時仍採用目前會員國同時向魚種工作小組及每月 7 月向統計小組提報資料的模式。統計小組另確認我國之詢問，未來 ISC 資料提報網頁開始運作後，就不需再向統計小組重複提報資料。

主席對於統計小組之工作進度，表示不滿意，特別是中央資料庫的建構及網頁的重新建置。對於資料管理人員的聘用，主席雖然已經訂出其權責及主要工作項目，且日本承諾將由其聘用，但對於該人員的素質要求及定位（資料經理或聯絡人？專職或兼職？）仍

未能確定。美國認爲既然已經決定要聘請資料管理人員，也許可考慮裁掉現行之統計小組，對此主席詢問各國意見，我國表示資料收集整理尚未臻完善，仍然應該維持該小組運作，最後經多數同意繼續維持該小組運作。

三、行政事務（25 日上午）

(一)其他事項討論及會議記錄草稿確認：主席表示今天必須完成所有議題討論，並提醒會員國應該依照操作手冊提交資料。另討論至今未完成之議題如下：

1. 全席會議及各工作小組成員：主席要求各國代表團確認各國全席會議及工作小組之聯絡人（correspondent），此節由於尚未經本署討論，我代表回覆統計小組爲鍾國南技正與王識鈞，全席會議聯絡人希望有兩位：一位爲政府代表未定（TBD）、另一位爲科學代表張水鍇助理教授，至於其他工作小組成員暫時註明待決定（TBD），俟我代表團回國討論後儘快通知 ISC，主席表示同意。

2. 網站修改及網頁設計：主席表示由於沒有實體的秘書處，網頁設計需要大家幫忙，美國及加拿大都表示願意幫忙設計及建置網頁。主席另外強調網站系統應該能夠讓會員國上傳國家報告，讓會員國方便使用最重要。美國強調目前網站最主要問題是使用不方便，應該儘快改善。韓國則建議在地圖上標示所有會員國的國名，不應只有中國、日本及美國，主席解釋該圖只是爲了說明 ISC 的區域，不過如果各國有此要求也可以加上標示。

3. 關於黑鮪資源狀況圖示的建議文字：主席認爲黑鮪資源狀況報告中的圖示顯示出的資源狀況與報告文字上之結論不一致，雖然對這敏感文字結論同意不再修改，但必須在兩者間新增一段文字說

明圖示內容不確定性高，以降低兩者之不一致性，並給予 12 月黑鮪小組會議一個召開之正當理由。若缺乏這一段文字，會使 ISC 的專業被質疑。對此日本代表團（本日改爲水產廳 Inomata 發言）指出該段結論爲日本經過相當長時間討論才定案，不能輕易修改。主席一再強調沒有要修改結論或圖表，但應該要加上一段文字說明兩者間的關係。由於雙方爭論無法獲致共識，主席最後逐一詢問各國意見，包括我國在內之其它五國都同意由主席新增文字，於午間休息後提供檢視後定案。

4. 有關多魚種生物研究整合任務小組：依照 24 日上午研究報告討論之建議，各國都同意應該發展一任務小組，以便設計一個多魚種的大型生物採樣計畫。主席直接指定由我國張水鍇助理教授擔任工作小組召集人，並由加拿大代表協助推動該小組工作，此項指派獲各國無異議通過。

(二)明年全席會議日期及地點

主席宣佈明年的全席會議日期爲 7 月 15 日至 20 日（19 日休會），接著詢問我國是否願意舉辦明年全席會議，我代表團答以樂意接辦明年會議並歡迎與會國家代表蒞臨。有關地點問題主席另說明由於 ISC 係一科學性質的會議，依慣例應避免在首都舉辦。

(三)未來各工作小組會議時間地點

經討論確認各工作小組及全席會議未來會議時間如下：

i. 長鰭鮪（ALBWG）：2009/0224-0303 模式發展會議（日本）

2009/1006-13 資料準備會議（TBD） 2010/0302-09 資源評估會議（TBD）

ii. 黑鮪（PBTWG）： 2008/1210-17 參考點檢視會議（日本）

2009/10 模式發展分析會議（TBD）

iii. 旗魚（BILWG）： 2008/1111-14 SWO 系群結構會議（美國）2009/0113-21 SWO 漁業分析會議（台灣）2009/04 SWO 資源評估會議（TBD）

iv. 混獲（BC WG）：2009/01（美國）

v. 統計（STAT WG）：2009/0712-0714 年度工作會議

vi. 生物研究整合任務小組：2009/04 劍旗魚資源評估會議之後接續召開。

vii. 全席會議（Plenary）：2009/0708-14 先召開 ALBWG、BFTWG、STATWG 等工作小組會議，接續召開全席會議 2009/0715-20，

viii. 各魚種完整資源評估之期程如下（每年專注一魚種）：

1. 長鰭鮪：2006、2010
2. 黑鮪：2008、2011
3. 劍旗魚：2009、2012
4. 紅肉旗魚：2007、2010

(四)大會主席及副主席選舉（25 日下午）

首先舉行主席選舉，由於團長會議及非正式場合均已得知現任主席同意留任，選舉結果由現任主席 Dr. Gary Sagakawa 獲得連任。

副主席人選由於本團出發前已請示若情勢發展有機會，可考慮提名孫志陸教授參選副主席，唯會議期間透過私下探詢，各國對孫教授之支持度及認知度並不高。另原先有意連任之日本副主席，後因水產廳之要求轉支持墨西哥，以使墨國之參與度增加（考慮墨國

之黑鮪產量劇增），因此雖然美國及韓國支持我國張水鍇助理教授，但最後選舉結果由墨西哥代表 Michel Dreyfus-Leon 獲選爲副主席。日本則有意爭取下一屆之主席。

四、報告確認（26 日晚及 27 日上午）

全席會議會議記錄草稿於 26 日晚間印出，由各代表團取得後檢視，我代表團逐項檢視後僅要求部份非實質部份的文字修正，並於午夜之前寄交會議記錄人員。

27 日上午開始會議記錄總檢視，主席逐段檢視記錄文字，由於不涉實質內容之修改，各國提出修正部份不多。有關我國討論文字部份，經加拿大建議，在會議記錄中說明我國已完成補提完整資料之國家報告。

我國最後針對各魚種產量表提出意見，主因爲主席不同意我國修改 2005 年旗魚產量，要求我國先向旗魚小組報告並確認。我國說明我國去年依程序提送 2005 年 final 產量，但統計小組並未將 final 值反應在產量表上，接著我國也曾於去年會議上要求修改，但最後也未修改，因此雖然產量變動不大，但不能因此歸責我國而不同意。主席表示瞭解但說明由於之前旗魚評估已用原數值，且旗魚小組主席已先回國，因此希望我國同意維持 ISC 既定程序，不修改兩年前的數值。考量實質影響不大，因此我國表示同意，但要求往後我們提送的資料，統計人員必須仔細檢視並反應在產量表上，主席同意並感謝。

主席最後表示感謝各方支持讓會議順利進行，逐一感謝工作人員、日本政府及地方政府的支援與貢獻。日本水產研究所所長亦以官方代表身份表達感謝之意。

五、其他事項

(一)郭副組長於 24 日抵達，加入我代表團並參與會議討論。

(二)長鰭鮪工作小組主席 Dr. Ray Consor 會議後來洽，謂長鰭鮪將於 2010 年進行資源評估，而將在 2009 年 10 月 6-13 日召開資料準備會議，由於我國資料相當重要，希望有機會能在此次會議重新檢視我國資料，因此詢問該會議台灣是否願意主辦？若我國感覺明年舉辦會議太多，可否考慮主辦後（2010）年的長鰭鮪完整評估會議？我代表團覆以會將此資訊帶回國內討論後儘速回覆。

肆、 心得建議

一、 統計議題：由於某些非 ISC 國家也會捕撈 ISC 研究物種，決議由工作小組主席向該國家或 RFMOs 要求提供漁獲資料。另要求各會員國要有資料聯絡人，而資料聯絡人應參加工作小組會議。各國除依規定於 7 月期限繳交資料之外，另仍應依工作小組要求期限繳交資料。

二、 已進行評估之魚種資源狀況

1. 北太平洋黑鮪：本年度所進行之資源評估認爲若漁獲死亡率可以維持目前水準，且自然環境狀況良好，未來補充量應足以維持目前漁獲量，但其中不確定因素仍高，故當前漁獲死亡率不應再增加。

2. 北太平洋長鰭鮪：本年度檢視資源狀況結果認爲與現在狀況相比較，2006 年評估時所採用之親魚資源量（SSB）可能低估，且 2007

漁獲死亡（F）值也可能低於之前評估的結果（代表現在資源狀況傾向較樂觀）。

三、 即將進行之資源評估魚種：決定明（2009）年將進行劍旗魚資源評估、2010 年進行北長鰭鮪及紅肉旗魚資源評估、2011 年進行黑鮪資源評估。

四、 明年會議日期及地點：明年的全席會議日期爲 7 月 15 日至 20 日，其他各工作小組會議則於 7 月 8 日陸續展開，我代表團依會前陳報之立場同意接辦明年會議。

五、 ISC 整合性生物研究：爲解決資源評估上之不確定因子，決議成立多魚種生物研究任務小組，ISC 主席指定由我國張水鍇助理教授擔任 Leader，並由加拿大協助，於明年五月召開會議完成計畫規劃，並向全席會議報告。

六、 主席及副主席選舉：選舉結果由現任美籍主席 Dr. Gary Sagakawa 獲得連任，並由墨西哥籍 Dr. Michel Dreyfus-Leon 獲選爲副主席。

伍、 附件

ISC8 全席會議紀錄（原文）

REPORT OF THE EIGHTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

PLENARY SESSION

22-27 July 2008
Takamatsu, Japan

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Takamatsu, Japan
Plenary Session, 22-27 July 2008

Highlights of the ISC8 Plenary Meeting

The ISC8 Plenary, held in Takamatsu, Japan from 22-27 July 2008, was attended by delegations from Canada, Chinese Taipei, Japan, Korea, Mexico and the United States. The Plenary endorsed several key products prepared by the species working groups over the past year. A Pacific bluefin tuna stock assessment, involving a complex application of the Stock Synthesis 2 (SS2) model and several major advancements in parameter specification and model development, was completed. Further development of biological reference points and production of "Kobe" diagrams were accomplished for North Pacific albacore. An assessment of the geographic center of stock abundance for striped marlin was produced for use in deciding whether to designate striped marlin as a northern stock under the WCPFC. During ISC8 a special seminar on biological research needs was held to facilitate discussion of how data gaps hindering assessments can be filled. In looking ahead,

1 INTRODUCTION AND OPENING OF THE MEETING

1.1 Introduction

The ISC was established in 1995 through an intergovernmental agreement between Japan and the United States of America (USA). Since its establishment and first meeting in 1996, the ISC has undergone a number of changes to its charter and name (from the Interim Scientific Committee to the International Scientific Committee) and has adopted guidelines for its operations. The two main goals of the ISC are to 1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes which inhabit the North Pacific Ocean during a part or all of their life cycle; and 2) to establish the scientific groundwork, if at some point in the future, it is decided to create a multilateral regime for the conservation and rational utilization of these species in this region. The Committee is made up of voting Members from coastal states and fishing entities of the region and coastal states and fishing entities with vessels fishing for highly migratory species in the region, and non-voting members from relevant intergovernmental fishery and marine science organizations, recognized by all voting Members.

The ISC provides scientific advice on the stocks and fisheries of tuna and tuna-like species in the North Pacific to the Member governments and regional fisheries management organizations. Data tabulated by ISC members and peer-reviewed by the species Working Groups are generally available through 2005; in many cases preliminary data are available for 2006 and some data are available for 2007. The total landed amount reported thus far for 2006 was 104,148 metric tons (t) of the major species of interest to ISC (albacore – *Thunnus alalunga*, Pacific bluefin tuna – *T. orientalis*, swordfish – *Xiphias gladius*, striped marlin – *Tetrapterus audax*). This amount represents an increase of about 2% relative to 2005 catches, with slight increases in reported albacore, swordfish and striped marlin catches, and a slight decrease in reported catches of Pacific bluefin tuna.

1.2 Opening of the Meeting

The Eighth Plenary meeting of the ISC was convened at Takamatsu, Japan at 0945 on 22 July 2008 by the ISC Chairman, G. Sakagawa. A role call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea,

Mexico and the USA (*Annex 1*). A Western and Central Pacific Fisheries Commission (WCPFC) representative attended as an Observer. Representatives of China, the Inter-American Tropical Tuna Commission (IATTC), the Secretariat for the Pacific Community (SPC), the Food and Agriculture Organization (FAO), and the North Pacific Marine Science Organization (PICES) sent their regrets for being unable to attend.

Jun Yamashita, Deputy Director General of the Japan Fisheries Agency, delivered the opening greeting to the participants. In expressing his wishes for a successful and fruitful meeting, he noted the increasing awareness in Japanese society and abroad, of the need for sustainable management of tuna resources. He noted that this awareness is reflected in the government of Japan's continuing strong support for the ISC, and he thanked Chairman Sakagawa for his valuable contributions over the years. The Hon. Takeki Manabe, Governor of Kagawa prefecture, welcomed participants to Kagawa describing its rich maritime history and encouraging participants to fully enjoy its excellent facilities and cuisine.

2 ADOPTION OF AGENDA

After some brief logistical announcements, the agenda for the meeting was tabled (*Annex 2*). The ISC Chairman highlighted the addition of a seminar on biological research needs to this year's meeting which will allow a discussion of how data gaps hindering assessments can be filled. Noting that the agenda had been circulated prior to the meeting and receiving no requests for amendments, the agenda was adopted. S. Clarke was assigned lead rapporteur duties. A list of meeting documents is contained in *Annex 3*.

3 DELEGATION REPORTS ON FISHERY MONITORING, DATA COLLECTION AND RESEARCH

3.1 Canada

J. Holmes presented a summary of catch, effort, and catch per unit of effort

(CPUE) data for the Canadian tuna fishery in 2007 (*ISC/08/PLENARY/04*). The Canadian tuna fishery in the North Pacific is a troll fishery using tuna jigs targeting north Pacific albacore. All Canadian vessels must carry logbooks while fishing for highly migratory species in any waters. Detailed analysis of a combination of sales slips, logbooks, hailing and transhipment records are undertaken to report fisheries statistics for the Canadian albacore fishery.

In 2007, 196 Canadian vessels operated in the north Pacific ocean and preliminary estimates of catch and effort are 6,040 t of north Pacific albacore in 7,062 vessel days (v-d) of fishing effort, respectively, for a CPUE of 0.855 t/v-d. All but 5 t of catch and 0.2% of the fishing effort occurred within 200 miles of the North American coast. By-catch of other tuna or billfish species, sharks, sea turtles and sea birds was not reported by the Canadian fishery. Approximately 70% of the Canadian fishing effort and 80% of the catch occurred in the coastal waters of the United States through access to these waters governed by a binational Canada-United States treaty. The largest proportion of the albacore caught by the Canadian troll fleet were 2-year old fish (64 cm, 5.5 kg), but some 3-year old fish (75 cm, 8.8 kg) were also sampled from catches landed in U.S. ports in 2007. Albacore were caught further north in the Canadian Exclusive Economic Zone (EEZ) waters (Queen Charlotte Islands 51-54 °N) in 2007 as compared to 2006. However, Canada does not have a domestic biological sampling program at present so information on the size composition of catches in these northern waters is not available. Both catch and CPUE have followed an increasing trend over the period 1995-2004 and then dropped in 2005. Catch and CPUE have risen since 2005 despite a decline in fishing effort from 8,565 v-d to 7,062 v-d during the same period. The 2006 CPUE (0.93 t/v-d) is the highest CPUE in the time-series.

Canadian research activities were limited in 2007, consisting of the publication of a technical report (http://www.dfo-mpo.gc.ca/Library/327827.pdf) describing the Canadian catch-effort database that captures trip log, sales slip and vessel hailing data. The major change in 2007 was the retirement of Max Stocker from Fisheries and Oceans Canada, after finishing his term as Chair of the Albacore Working Group (ALBWG) in March 2008, and his replacement on the ISC by J. Holmes. An electronic log-book pilot program involving 10-15

vessels is occurring during the 2008 fishing season.

Discussion

Participants asked several questions reflecting an interest in the electronic log-book pilot program. J. Holmes clarified that fishermen are required to report daily catch, effort and location information and that the electronic pilot program simply allows these data to be transmitted by email. The pilot program is being implemented among fishermen who volunteered to keep paper records and use the electronic system during the pilot period. The ISC Chairman noted the development of electronic logbook systems is becoming more common and asked that an action item be placed on the Statistics Working Group (STATWG) to monitor this development.

3.2 Chinese-Taipei

The national report for Chinese Taipei was presented by S.J. Wang (*ISC/08/PLENARY/07*). Distant water longliners (DWLL, >=100 GRT) and offshore longliners (OSLL, <100 GRT) are the two major tuna fisheries operated in the North Pacific by Chinese-Taipei.

The number of DWLL vessels operating in the entire Pacific Ocean in 2005 was 133, but in 2006 and 2007 this number was reduced to 117 and 97, respectively. Catches of the major target species for these fisheries, i.e. albacore, gradually declined from a level of 9,000 t in 1997 to 2,465 t in 2007. The decline in albacore catches is mainly due to the decline of fishing effort under a fleet reduction program, and for 2007, the high fuel price worldwide and the low market price in the US. Catches of swordfish were more than 1,000 t during 2001-2003 due to the development of the bigeye tuna fleet but declined to the level of 350-450 t in 2005-2007 due to declines in fishing effort.

The OSLL vessels generally target bigeye and yellowfin tunas with considerable swordfish and marlin bycatches. Catches of albacore were generally low (300-500 t) during 2005-2007. Catches of Pacific bluefin tuna were at a low level (1150-1400 t) in recent years with an increase in 2007. Swordfish catches

were at the level of 3,600-4,000 t during 2005-2007, including the catches by foreign-based OSLL that were landed in foreign ports.

Size data from the DWLL fleet were obtained from logbooks, and data from the OSLL fleet were collected through a sampling program. The average sizes of albacore are 86 cm and 98 cm for DWLL and OSLL, respectively, and for swordfish, average sizes are 161 cm and 135 cm for DWLL and OSLL, respectively. A pilot port sampling program was launched in foreign ports like Pago Pago, Suva and Levuka in 2005. An observer program was continuously conducted with an increasing number of observers from 2 in 2005 to 7 in 2006 and to 8 in 2007 (including albacore and bigeye tuna observation trips). To improve logbook coverage and data quality for the OSLL fleet, a data improvement program was launched in late-2007. Long-term contract staff have been dispatched to 5 domestic fishing ports under the program.

Discussion

In response to a question, it was clarified that the reason for the reduction in swordfish catch in 2004 was a fleet reduction program which decreased the number of vessels by 50 between 2003 and 2007. Chinese Taipei was encouraged in its efforts to report foreign landed catches and asked to provide marlin data if possible. K.N. Chung responded that these data are available and will be reported. It was confirmed that the observer program is focused on vessels targeting albacore because Chinese Taipei vessels in the North Pacific only target albacore. Although Chinese Taipei is working toward increasing the coverage rate for logbooks in the offshore longline fishery, there is no specified target level for coverage. In response to a question about the presence of Chinese Taipei vessels close to the Mainland China and Thailand coastlines, it was explained that there may be informal arrangements between fishermen to cover such operations. However, the data in these two areas, which derived from one vessel in each case, may require further verification.

The ISC Chairman called attention to the fact that ISC delegation reports should reflect only those data necessary to understanding the status of stocks in the North Pacific, but should provide data on all fisheries taking tuna and tuna-like

fishes in this area. He noted that Chinese Taipei had been specifically reminded of this point in last year's Plenary and that this year's submission should have accounted for a wider range of fisheries and species, particularly billfishes. In response, K.N. Chung committed to re-submitting the national report and providing additional data during ISC8 and this was accomplished.

3.3 Korea

S.D. Hwang presented the national report for Korea (*ISC/08/PLENARY/10*). Annual catches of fishes captured in the North Pacific Ocean by the Korean distant-water longline fleet ranged from 60 to 34,080 t (average 13,865 t) from 1972 to 2007. In 2007, the annual catch was 14,477 t. Major species caught by longline in the North Pacific from 1971 to 2007 were bigeye tuna (49%), yellowfin tuna (30%) and albacore (6%). In 2007, the annual catches of these three species were 12,822 t (10,208 t of bigeye tuna, 2,523 t of yellowfin tuna and 91 t of albacore).

Annual catches by the distant-water purse seine fishery from 1980 to 2007 ranged from 550 to 110,933 t (average 51,665 t). Annual catches tended to increase with year and were 22,004 t in 2007. Major species caught by purse seiners in the North Pacific were skipjack tuna (79%) and yellowfin tuna (21%) for the 1980-2007 period. In 2007, the annual catch of skipjack tuna and yellowfin tuna was 18,368 t and 3,636 t.

Most Pacific bluefin tuna caught in Korean waters were small individuals of 20-167 cm FL caught by domestic purse seines targeting mackerels. The 30-80 cm FL size class dominated in 2007. The annual catch of Pacific bluefin tuna by 29-48 purse seiners and 4 trawlers ranged up to 2,141 t during the 1982-2007 period. Inconsistencies in Pacific bluefin tuna catches are attributed to the fact that Pacific bluefin tuna is not a target species. The distribution of Pacific bluefin tuna catch may be related to the distribution of target species of the fishery fleet, the degree of association among Pacific bluefin tuna and oceanographic conditions, and the strength of year classes.

An observer program has been in place for distant-water fisheries since 2002 and

for domestic fisheries since 1998. In 2007, six observers were deployed 12 times on Korean distant-water fishing vessels. To reduce by-catch of sea birds and sea turtles guidebooks and posters have been distributed to fishing boats.

Discussion

Several questions were posed with regard to the bycatch of Pacific bluefin tuna by mackerel fleets. It was clarified that the vessels in this fleet are very similar to Japanese small purse seines. Another question involved whether these vessels are limited to certain species and catch levels. S.D. Hwang explained the mackerel catches are limited by TAC but there is currently no TAC in place for Pacific bluefin tuna. In Korean statistics, fishing effort for this purse seine fishery is currently reported on a unit fleet basis: each 'fleet' refers to one main vessel, two light vessels and five delivery vessels. Catch data as reported represents unraised figures, therefore the estimate that coverage is 90% means that 90% of vessels' catches are known. Information on spatial distribution of Pacific bluefin tuna catches was derived from fishing vessels' reports to their cooperatives and by observers interviewing vessels in port. Although length frequency data may suggest that the size of Pacific bluefin tuna is increasing, Korean scientists believe this result is likely due to size selectivity in the samples since the sampling is conducted on an opportunistic basis and bigger tunas have recruited into this area recently.

Korea's progress in supplying data for the Pacific bluefin tuna assessment was acknowledged, but progress with other species was also requested. Specifically, questions were raised about what species might be classified in the "Other" category and about providing more detailed explanations of estimated catches of black marlin, sailfish and sharks. S.D. Hwang responded that supplying improved data on other species will be the focus of the coming year's work. He also stated that efforts are being made toward providing effort for longline fisheries in terms of hooks. It was confirmed that bigeye tuna catches are reported for the entire North Pacific as there is no clear boundary between western and eastern areas.

3.4 Japan

K. Yokawa presented the national report for Japan (*ISC/08/PLENARY/08*). The total landing of tunas (excluding skipjack tuna) caught by Japanese fisheries in the Pacific Ocean in 2006 was 154,000 t and the total landing of swordfish and billfishes (striped marlin, blue marlin and black marlin) was 16,000 t. The landing of skipjack tuna was 310,000 t. Total Japanese catch in 2006 for tuna (including skipjack tuna) and billfish decreased from 2005, mainly due to a decrease in effort. Japanese tuna fisheries consist of the three major gears, i.e., longline, purse seine, pole-and-line, and other miscellaneous gears such as troll, drift-net, set-net fisheries. These gear types account for about 90% of the total tuna and tuna-like species catch of Japanese fisheries in recent years. Japanese research activities on tuna and tuna-like species in 2007 and early 2008 were also briefly described.

Discussion

The discussion covered issues of tagging, length frequency data and the type of purse seine sets. In response to a question regarding the need for a coordinated international tagging program, K. Yokawa responded that Japan is cooperating with the SPC tagging program and that additional ways need to be found to overcome budget limitations for tagging research. With regard to sampling designs for length frequencies it was clarified that sample sizes vary from species to species for several reasons including: a) the use of different sampling program designs by different lead scientists; b) the range of sizes expected varies by species; c) there are different contractual arrangements for sample collection; and d) length frequency databases are not fully centralized resulting in incomplete coverage over the full range of sizes when all relevant data are not linked. There are often gaps in length frequency measurements in far seas areas since a limited number of commercial vessels provide length frequency data. Purse seine sets in the Japanese fishery were explained to be 70% on whale sharks or floating objects, and 30% on free-swimming schools.

3.5 Mexico

M. Dreyfus presented the national report for Mexico (*ISC/08/PLENARY/09*).

The tuna fishery of Mexico developed to its present size in the 1980s after Mexico implemented its 200 mile EEZ. Catch is dominated by yellowfin tuna, and to a lesser extent skipjack tuna. Since 1996 when Pacific bluefin tuna farming started on the west coast of the Baja California peninsula, this species is also an important target of the fisheries. The fleet is mainly composed of purse seine vessels, most of them with observers on board (vessels above 363 t carrying capacity). Data is obtained from observer programs and logbooks. In 2007 the catch of Pacific bluefin tuna was 4,005 t, practically all devoted to farming. A management plan for Pacific bluefin tuna has been developed by the Instituto Nacional de Pesca (INAPESCA) with a review of the fishery, its constraints, goals, research priorities, obligations and management measures. It is being reviewed by the fishing authority before implementation.

In the case of the swordfish fishery, data comes from logbooks and observer programs (1998-2000 and 2006 to present). Catches of swordfish are in the order of 24% of total catch with the majority of the catch dominated by sharks. The fleet based in Ensenada was composed of 17 vessels in 2007 using gillnets and longlines. Billfishes within a zone of 50 miles from the coast are reserved for the sport fishery so the gillnet and longline fleets operate 50 miles or more offshore. There is 100% coverage by scientific observers aboard all the large commercial Mexican tuna ships (50% from the Mexican National Program (PNAAPD); remaining trips covered by the IATTC international observer program). In the case of swordfish, the observer data will allow Mexico to improve the quality of the data for the ISC Billfish Working Group (BILLWG), in particular with respect to size composition data, seasonal abundance, and species composition.

Discussion

Several questions were raised pertaining to Pacific bluefin tuna farming activities. It was clarified that the earliest established farms do not have limits on the numbers of fish they can raise other than the limits imposed by the sea area available to them. New farms do have a limit on the number of fish but a small increase is allowed each year. Pacific bluefin tuna are 80-120 cm FL when caught and can require 8-9 months (or longer) to reach marketable size. The

total capacity of farms has been estimated and is available from other sources.

M. Dreyfus stated there is no recreational catch of Pacific bluefin tuna in Mexican waters by the Mexican sport fishery of which he is aware. In the case of swordfish, a question was raised as to whether the effort presented in the national report of Mexico reflected total effort of the fleet. F. Marquez commented that sharks are the majority of the catch despite the fact that the vessels are licensed for swordfish. Development of an observer program database is in progress and will allow a proper response to this question and other issues. The ISC Chairman noted that it is essential to provide full catch and effort data for each fleet rather than try to provide separate data for different presumed targeting periods.

3.6 United States of America

C. Boggs presented the report on USA fisheries and research (*ISC/08/PLENARY/05*). U.S. fisheries harvest tuna and tuna-like species in the North Pacific from coastal waters of North America to the archipelagoes of Hawaii, Guam and the Commonwealth of the Northern Mariana Islands (CNMI) in the central and western Pacific Ocean. The small-scale gill net, harpoon, pole-and-line, and tropical troll and handline fisheries operate primarily in coastal waters, whereas the large-scale purse seine, distant-water troll, and longline fisheries that account for most of the catch operate both within U.S. Exclusive Economic Zones and on the high seas. The increase in the total USA catches in 2007 was primarily a result of increased numbers of active purse seine vessels, up by 11 to 23 in 2007, with the industry responding to improved skipjack tuna prices, catching 8,889 t in 2007 despite higher fuel costs. Longline landings also increased in 2007 after decreasing in 2006, due to a partial closure of the fishery sector targeting swordfish to limit the bycatch of sea turtles. Bigeye tuna landings by longliners reached an all time record high of 6,665 t in 2007, while active vessels increased by two to 130, in 2007. The thousands of trollers and handliners operating in the tropical Pacific Islands represent by far the largest number of vessels but contribute a small fraction of the catch. Trollers fishing for albacore numbered 625 in 2007, up by 24 from 2006 but they caught a little less than in 2006.

Fisheries monitoring and economics research conducted by the U.S. included a continuing survey of billfish anglers, indicating improved catch rates in recent years. Improvements were made to the integration of fisheries statistics from fishermen's reports with data from fish sales, and monitoring of the retail fish market in Honolulu was initiated that will address consumer choices with regard

to carbon monoxide treatment of raw tuna products. Stock assessment research was conducted almost entirely in collaboration with member scientists of the ISC and other international Regional Fisheries Management Organizations (RFMOs). Biological and oceanographic research on tunas, billfishes, and sharks addressed fish movements, habitat choices, post capture survival, feeding habits, and age and growth. Salient results include model analyses of bigeye tuna habitat depth from archival tag studies that predicts the high CPUE found in the fourth quarter in the Hawaii-based longline fishery, and a finding that jumbo squid (*Dosidicus gigas*) are an increasingly important component of the mako shark (*Isurus oxyrinchus*) diet off California. Research on sea turtles focused on developing an advisory for avoiding sea turtle habitat in the North Pacific Subtropical Frontal Zone, and testing of circle hooks. Turtle bycatch in the frontal zone was very low in 2008. A promising technique using electronegative metal attachments to fishing gear as shark repellants for fishing gear was also studied.

Discussion

The issue of recreational take by US vessels of Pacific bluefin tuna in Mexican waters was raised. USA and Mexico participants were not clear about whether there might be Pacific bluefin tuna catch by USA recreational fisheries in Mexican waters, and if so how these data would be reported to the ISC. The ISC Chairman noted the importance of resolving this matter and both the USA and Mexico participants agreed to look into the issue. The USA indicated that such catches are included in Table 2 of its report under "unclassified, other or recreational". In 2006, the catch was 96 t and in 2007 it was 14 t.

C. Boggs explained that electronegative shark repellent metals, in addition to serving their function as shark repellents, may also be able to replace the current 60g line weights being used to sink branch lines quickly and avoid sea bird bycatch. Since the electronegative metals dissolve, they would not pose a danger to fishermen on haulback as the currently-used weights do.

Regarding sea turtle bycatch, C. Boggs clarified that there is not yet any evidence to indicate the oceanographic advisory for sea turtle bycatch avoidance was responsible for the very low turtle bycatch in the Hawaii-based swordfish fishery

in 2008. For four years running the rate of sea turtle encounters in this fishery has been kept low due to mandatory use of a combination of large circle hooks and fish bait.

4 REPORT OF THE ISC CHAIRMAN

The ISC Chairman reported that the Committee had another year of significant progress in achieving ISC objectives and in implementing decisions of the 7th Plenary meeting, but with some disappointments. The year started with workshops organized by the Pacific Bluefin Tuna Working Group (PBFWG), the BILLWG and the ALBWG soon after ISC7 in July 2007 and ended with meetings of the ALBWG, PBFWG and STATWG prior to this ISC8 Plenary meeting. These ISC intercessional meetings serve as platforms for exchange of stock assessment research results, preparing input data for assessment models, running the models and sharing views on analysis and interpretation of the results. During the past year, significant progress was made in completing a comprehensive review of Pacific bluefin tuna fisheries data and an up-to-date stock assessment, compiling fishery data on swordfish in preparation for a stock assessment in 2009, developing information on striped marlin with respect to its geographic center of stock abundance in the North Pacific Ocean, and preparing for a full stock assessment of albacore in 2010 with the SS2 model. Progress was also made in investigating the use of minimum spawning stock biomass as a biological reference point for albacore and in review of future research focus for the Bycatch Working Group (BCWG).

Tasks that were disappointments with respect to lack of significant progress during the year include a) development of the ISC central database and reworking of the website; and b) membership support of research to close information gaps that contribute to uncertainties in stock assessments. Members need to redouble their efforts to makeup for lost opportunities and progress with these tasks. ISC's objectives for 2009 should include further development of a fully functioning database that meets the needs of the ISC, implementing a user-friendly website, and initiating one or two collaborative research projects in order to begin closing information gaps.

The ISC Chairman indicated that his 3-year term as leader of the ISC will end at the conclusion of this session (ISC8) and an election of officers for the next term is scheduled at this meeting. He noted that the three years went by quickly and much progress was made in implementing the operational structure of the organization and executing research plans designed to determine resource status and the effects of fishing. He thanked participants for their support and contribution to this progress and urged them to continue active participation and support of ISC in the years ahead. He also acknowledged the special contribution of members of the species Working Groups (WG) and the WG Chairs. He extended his thanks to the Delegation Leaders for supporting his and the Working Group Chairs' appeals for member scientist participation in the activities of the Working Groups and in attending intercessional meetings.

5 INTERACTION WITH REGIONAL ORGANIZATIONS

5.1 Interactions between ISC and IATTC

The IATTC holds non-voting member status within ISC. Earlier this year, the IATTC indicated, however, its desire to be classified as an observer to the ISC for several reasons including that its scientific staff are not in a position at ISC meetings to speak on behalf of IATTC member governments, particularly on matters related to conservation and/or management recommendations. The ISC Chairman noted that matters before the ISC Plenary, with the exception of the election of officers, are not put to a vote. The larger issue is that if the IATTC's level of current participation in ISC meetings as an observer is to be continued, it will require clearing with all ISC members before each meeting in order for the IATTC to participate.

It was agreed that ISC members who also hold membership in IATTC and with an interest in this issue would consult with the IATTC Secretariat with regard to this issue. In the meantime, the ISC Chairman will undertake exploration of potential Memorandum of Understanding (MOU) vehicles which could be used to formalize IATTC's involvement in the ISC in a way that strengthens

cooperation between the organizations and meets the concerns of the IATTC. Depending on the results of the consultation, either an MOU will be prepared for consideration at ISC9 or the matter will be discussed at ISC9 for an appropriate action. In the meantime, the IATTC's participation in ISC activities will be treated as a non-voting member.

5.2 Interactions between ISC and the Western and Central Pacific Fisheries Commission (WCPFC)

S.K. Soh presented a summary of cooperation between the ISC and the WCPFC over the past year. The key activities of the ISC, including its scientific information and advice, will be presented at the annual meetings of the WCPFC, including the Scientific Committee (SC) and the Northern Committee (NC). To support such activities of the ISC, the WCPFC will, if requested, provide data necessary for the scientific analysis, in addition to routine exchange of fishery data. The Commission last year acknowledged with appreciation all conservation advice. Some issues requested by the NC include provision of conservation advice for Pacific bluefin tuna; ISC's view on maintaining the spawning stock biomass, provisional information and advice on data availability and the impact of any data limitations on the stock assessment, and a "Kobe" diagram for North Pacific albacore; further relevant information for the inclusion of North Pacific striped marlin on the list of northern stocks; and assistance to facilitate the activities of the working group on North Pacific striped marlin.

Discussion

The ISC Chairman noted that no requests were received from WCPFC over the past year to participate as an observer in any of the ISC species WG workshops. He encouraged WCPFC to become involved in WG workshops and to participate in the full sequence of events, from data preparation through to evaluation of modelling results, thereby having the opportunity to experience and contribute to the process used for ISC's stock assessments.

5.3 Interactions between ISC and PICES

In response to an invitation for ISC to participate in the PICES XVII meeting to

be held in Dalian, China on 23 October – 2 November 2008, C. Boggs agreed to represent ISC as he is already planning to attend part of the meeting for other reasons. While noting that ISC would not be able to cover any expenses associated with this participation, the ISC Chairman welcomed this offer. C. Boggs will report back to ISC subsequent to this meeting.

6 REPORTS OF WORKING GROUPS

6.1 Albacore

R. Conser reported on the activities of the ALBWG over the past year. The group met twice during the past year: a regular meeting held 28 February - 6 March 2008 in La Jolla, USA (*Annex 6*), and an update meeting held 15-16 July 2008 in Takamatsu, Japan (*Annex 9*). Terms of reference for both meetings were multi-objective in nature (see agenda in the respective Annexes). Some ALBWG objectives continue from meeting to meeting, e.g. the ALBWG preparation for the next stock assessment; annual update of national fishery statistics; etc. Other objectives focus on requests from the ISC Plenary and the WCPFC NC and are usually handled at a single meeting.

Accomplishments of the ALBWG over the past year include:

- An update of national fishery statistics (through 2007);
- Assessment model development for the next assessment (SS2);
- Development of "Kobe" diagrams using results from the last (2006) stock assessment;
- Consideration of recent NC requests for additional projections associated with the assessment;
- Development of work plans for 2008-2010 in preparation for the next stock assessment;
- Election of a new Working Group Chair (R. Conser);
- Provision of a qualitative update on stock status since the last assessment;
- Development of a biological research plan designed to improve albacore stock assessment;
- Review of IUU fishing & effects on stock assessment;

- Rescue of historical fishery data pertaining to albacore;
- Consideration of interim management objectives for North Pacific albacore ($F_{SSB\text{-}min}$ reference points);
- Quantification of fishery impacts by gear type using results from the last stock assessment.

A series of ALBWG meetings will be necessary to complete the next stock assessment including a regular meeting scheduled for 24 February - 3 March 2009, in Shimizu, Japan; an updated meeting scheduled for 8-9 July 2009 in Chinese Taipei (with ISC9); another regular meeting scheduled for 6-13 October 2009 at a location to be determined; and an assessment meeting scheduled for 2-9 March 2010 to be determined. The scheduled update meeting is tentative and may only be necessary should the NC make additional management-related requests of the ALBWG. All other meetings are required in order to complete the next assessment by March 2010.

Overall cooperation among ALBWG members, as well as progress on assigned tasks, has been good. However, the ALBWG would like to point out several issues to the ISC Plenary that may affect future work:

- ALBWG participation by ISC members is quite variable. Some members attend all meetings while others do not. Continuity of participation (preferably by the same scientists) is critical so that the consensus achieved from one meeting can be used as a building block for subsequent meetings.
- Competition for resources with other ISC WGs and RFMO WGs (people, time, travel funds, etc.) is increasing at an unsustainable rate. Members need to provide additional scientists and funding to ensure that the ALBWG will be able to continue to meet its mandates.
- NC and IATTC management requests may significantly increase the ALBWG workload and impede progress on the next assessment.

Discussion

In the brief discussion which followed R. Conser's presentation participants recognized and appreciated the diligent efforts of the ALBWG over the past year

in undertaking a transition from the previous VPA-based modelling methods to the new methods based on the Stock Synthesis 2 (SS2) model and in responding to various requests for conservation advice. It was highlighted that the next full assessment of albacore will occur in 2010.

6.2 Pacific bluefin tuna

Y. Takeuchi, Chairman of the PBFWG, presented the summary of the activities of the group since ISC7 (*Annexes 4* and *7*). The primary goal of the PBFWG was to complete the full stock assessment of the Pacific bluefin tuna stock. For this purpose, the PBFWG met in December 2007 and May 2008 at National Research Institute of Far Seas Fisheries (NRIFSF) in Shimizu, Japan. At the December 2007 workshop, 28 working papers were presented with participation of 27 scientists from US, Japan, Mexico and the IATTC. At this meeting, the PBFWG reviewed updated age and growth study results from otoliths. By May 2008, this was further updated and the results were used as basic input parameters for the stock assessment. The December 2007 PBFWG meeting also finalized the input data for the next stock assessment. In the May 2008 meeting, a full stock assessment for the Pacific bluefin tuna was conducted, updating the results of the last stock assessment in January 2006. In the May 2008 assessment the PBFWG fully implemented the long-awaited integrated stock assessment model Stock Synthesis 2 (SS2). This application of SS2 to Pacific bluefin tuna is one of the most complex applications of the software thus far. In the May 2008 PBFWG meeting, 19 working papers were presented with 25 participants from the USA, Mexico, Japan and the IATTC.

In addition to completion of the full stock assessment as required by the ISC7 Action Item Plan (*ISC/08/PLENARY/01*), two outstanding products of the PBFWG were introduced. The first one is the nearly completed update of age and growth parameters from otoliths by T. Shimose of NRIFSF. The other, by M. Ichinokawa, is the development of a capability for future stock projections using SS2 which allows more accurate calculation of confidence limits. It also allows calculating the probability of exceeding biological reference points (e.g. $F_{SSB\text{-}min}$).

Discussion

The ISC Chairman noted that, under standard ISC procedures, the titles and authors of the working papers produced by the PBFWG will be provided to the WCPFC SC4 for information. In addition, M. Ichinokawa's working paper, mentioned in the presentation, should also be provided in its entirety. Although it was noted that the scheduling of the next PBFWG appears to conflict with WCPFC5 meeting, there should not be a great deal of overlap in the attendance list for these two meetings and thus no problems are anticipated.

6.3 Billfish

G. DiNardo, Chairman of the BILLWG, summarized the working group's efforts since the last Plenary, including a synopsis of the two BILLWG workshops held during this period (*Annexes 5* and *8*). Workshop goals included the review and update of fishery statistics, development of a billfish biological research plan, estimation and agreement on standardized CPUE time series, and evaluation of the geographic center of striped marlin distribution in the North Pacific Ocean. In addition, the BILLWG assisted with the establishment of a special session on billfish stock structure and habitat requirements at the 5th World Fisheries Congress in October 2008, which was identified as an action item for the BILLWG at the 2007 Plenary. While significant progress was made to facilitate the goals, including the updating of Category I, II, and III data and standardization of CPUE time series, further improvements are still needed.

Administrative matters were presented including an increasing amount of work for the BILLWG Chair on data acquisition matters, the need for guidance on the role of observers at WG workshops, and the lack of WG commitment by ISC membership. A proposed assessment schedule was presented which included the completion of a North Pacific swordfish stock assessment in July 2009 and a Pacific-wide blue marlin stock assessment in July 2010. It was pointed out that a collaborative approach will be required to complete the blue marlin assessment and efforts are currently underway to establish the necessary collaborations. Proposed dates and venues for upcoming full intercessional workshops are

tentatively set for January 13-21, 2009, possibly in Kaohsiung, Chinese Taipei, and April/May 2009 at a location yet to be determined. It was also noted that a special session on stock structure has been scheduled for November 11-14, 2008 in Honolulu, Hawaii.

Problems impinging on the ability of the BILLWG to complete its goals were presented, including the lack of (1) sufficient data in the ISC database and (2) continued participation at BILLWG workshops by member countries. Possible solutions to the problems were presented and guidance from the Plenary sought. Finally, it was pointed out that many of the BILLWG's goals were achieved because of the dedication of scientists from the member countries and organizations.

Discussion

The discussion focused on providing guidance to the BILLWG regarding work prioritization and procedures. It was agreed that the swordfish assessment should be conducted as planned in 2009 as a priority. It is also necessary to begin early advance planning for the blue marlin assessment since it will require the involvement of a large number of new participants as compared to past assessments due to the broader geographical range of this species and capture by many fisheries.

In response to a question regarding the provision of striped marlin information to the NC working group on striped marlin, a list of documents pertaining to striped marlin from all previous BILLWG meetings will be compiled along with a checklist of fisheries which are known to take striped marlin in the North Pacific. These products will be provided directly to the NC for use in the NC's working group on striped marlin. Since these are products from existing BILLWG documents, they need not receive any further clearance from the BILLWG or Plenary. In addition, G. DiNardo is scheduled to make a presentation to WCPFC SC4 on the results of analyses completed on the geographic center of

stock abundance of striped marlin in the North Pacific Ocean.

With specific regard to the BILLWG Chair's call for more efficient communication and more responsive participation from WG members, it was acknowledged that while the current lines of communication between the WG Chairs and WG members do not always function optimally, there are few alternatives. Members were encouraged to review and amend, if necessary, the ISC Organizational Chart (*ISC/08/PLENARY/02*) which will be re-issued subsequent to ISC8.

6.4 Bycatch

C. Boggs, Chair of the BCWG, explained that the group has not met since its second meeting in May 2007. Only 2 members in addition to the USA indicated they could attend the scheduled May 2008 meeting, which was then cancelled. Slow progress has characterized this working group, which was established in 2004, but did not form or meet until 2006. No progress has been made towards the first-mentioned goal of the BCWG "to assemble data on...populations of animals considered to be by-catch species caught by fisheries capturing tuna and tuna-like species…throughout the range of these species" (Terms of Reference, *ISC/04/PLENARY/05*). Only the USA has presented estimates of its longline fishery bycatch to the BCWG, although Chinese Taipei, Korea, Japan, Mexico, the USA and IATTC have attended at least one BCWG meeting. The BCWG has critically reviewed published attempts to estimate ocean-wide bycatch and found them lacking, primarily due to inadequate or nonexistent fishery observer coverage of most members.

Much of the bycatch mitigation work on sea turtles, and to some extent sea birds, that has been reviewed by the BCWG has also been extensively reviewed by many other fora. The BCWG has shied away from discussing technical specifications regarding application of any of available mitigation methods to fisheries. Given the lack of BCWG progress in encouraging the collection of much needed bycatch data, in contributing to more accurate estimates of fisheries bycatch, or in making meaningful contributions towards the science of bycatch mitigation, the BCWG requested more guidance about its role from ISC7.

Some advice received was to shift away from sea turtles and sea birds and onto sharks, but with the terms of reference remaining the same. This guidance is appreciated, but it raises additional questions. The BCWG Chair, therefore, requested more guidance on this matter from ISC8. More active leadership, more active commitment by members, and more data submission is required for progress on sea birds, sea turtles or sharks. The membership of the BCWG was not organized for conducting stock assessment work although that appears to be the greatest need for shark research. On the other hand, impacts on sharks from fisheries comes from shark directed fisheries, shark finning, and shark bycatch. If stock assessment remains beyond the BCWG current capabilities, should the group limit its focus to estimation of shark discards, the extent of shark finning, or technical specifications for shark conservation measures? Or should a new shark working group be organized to focus on shark stock assessment? The current terms of reference for the BCWG were presented for reconsideration.

Discussion

The ISC Chairman summarized and supplemented the presentation by explaining that there are five key issues facing the BCWG:

- Requirement to estimate bycatch and assess the status of populations of bycatch species but an inability to do so in a robust way given the lack of data;
- Duplication of work with IATTC and WCPFC who also compile the same or similar data;
- Need to involve outside experts due to limited bycatch species expertise within the BCWG itself;
- Need for more gear-related expertise if the BCWG is to specify bycatch mitigation measures; and
- Requirement to implement a holistic approach to evaluating mitigation to bycatch populations, when some mitigation measures may lie outside the competency of ISC (e.g. beach habitat impact mitigation).

In the ensuing discussion, members acknowledged the need to avoid duplication of effort yet still make progress toward eliminating the data gaps which hinder

the ability to estimate bycatch and assess bycatch populations. Given the special characteristics of the fisheries in the North Pacific there was support expressed for focusing on research into what types of mitigation measures might be suitable for North Pacific fisheries in terms of reducing impacts to sea bird and sea turtle populations. This research would focus on testing of the effectiveness of these mitigation measures, including experimental design work. It could also include design of observer programs to address bycatch data needs and monitoring mitigation. It was considered that such work would not be duplicative and in fact would be considered a valuable contribution to the RFMOs' deliberations on which mitigation measures might need to be applied.

Some members expressed an interest in shark assessments, particularly as these are not being advanced by the RFMOs at this time. The delegation from Japan noted some progress, albeit protracted, on a blue shark assessment in the North Pacific.

It was thus agreed that the BCWG would retain their existing terms of reference but that the prioritization of work on elements relating to the science of mitigation for sea birds and sea turtles would be elevated over other areas of work. In addition a need for patient and incremental progress with data collection, for example, through gear trials and observer programs, was called for. Members were also encouraged to review and re-commit their participation in the BCWG by reviewing the ISC Organization Chart (*ISC/08/PLENARY/02*).

7 STOCK STATUS AND CONSERVATION ADVICE

7.1 Albacore

R. Conser summarized the recent work of the ALBWG (*Annexes 6* and *9*). The last albacore stock assessment was completed in December 2006 using fishery data through 2005. Stock status and conservation advice were provided to the ISC7 Plenary (July 2007) and to NC 3 (September 2007). The principal conclusions from the 2006 assessment were:

- SSB in 2006 was estimated at about 153,000 t; this is 53% above the time series average.
- Retrospective analysis showed a noticeable trend of over-estimating abundance.
- Over the last 15 years recruitment fluctuated around the long-term average of roughly 28 million fish.
- At present the population is being fished ($F_{2002\text{-}2004}$ = 0.75 yr^{-1}) at roughly $F_{17\%}$; similar to the 'pessimistic' scenario in 2004 assessment.
- Current F ($F_{2002\text{-}2004}$) is high relative to commonly used biological reference points.
- SSB is forecasted to decline to an equilibrium level of 92,000 t by 2015.
- There is concern about the substantial decline in total catch over the last few years.
- $F_{SSB\text{-}min}$ analysis indicated that at the 95% probability of success all of the threshold Fs would require reductions from current F.
- The ALBWG recommended that all countries support precautionary-based fishing practices.

No formal update of the stock status has been conducted. However, at its 15-16 July 2008 meeting, the ALBWG did undertake a qualitative update using available fisheries data from 2006 and 2007. This qualitative update found:

- Total catch in 2006 was slightly greater than in 2005. However, in 2007, catch increased substantially – returning to a level more typical of the past decade.
- Recent values of CPUE were either stable or higher than in 2005.
- Recent information regarding the magnitude of the 2003 year-class was mixed with some data sources appearing to be consistent with a strong 2003 year-class and other sources not.
- Results of the updated projections (using the now known 2006 and 2007 catch) indicated:
    - Estimated probabilities of the SSB remaining above the SSB reference points – as calculated in the last stock assessment (2006) – were modestly underestimated.

- Because the realized catch in 2007 was less than that assumed in the projections, the F in 2007 may have been less than "current F" (0.75 yr^{-1}).

The ALBWG concluded:

- Data updates and limited analysis since the last stock assessment provide a slightly more optimistic view of the SSB level and the probability of exceeding $F_{SSB-min}$ BRPs (than did the 2006 assessment).
- Any changes with respect to target BRPs (optimistic or pessimistic) are unknown.
- It was demonstrated that guidance resulting from future projections may differ depending on the projection horizon (i.e. short-term versus long-term).
- However, the ALBWG suggests that qualitative interpretation of only two years of additional data (2006 and 2007) should be viewed with caution until such time that another stock assessment can be completed to more fully understand recent stock trends.
- The ISC ALBWG offers no new conservation advice above and beyond that which was provided to ISC7 in July 2007.

Discussion

Members agreed that until a new stock assessment is undertaken and completed the conservation advice produced from the previous assessment should be maintained. However, the results of new analyses prepared by the ALBWG should be highlighted and considered along with the existing conservation advice. Therefore, two points concerning the assessment's underestimated probability that the spawning stock biomass (SSB) will remain above the reference point, and the actual fishing mortality (F) in 2007 being less than the "current" F used in the model, should be put forward.

In addition, since new information from the ALBWG indicates that estimates of $F_{SSB-min}$ are higher in short-term model projections versus long-term ones, it is clear that in some cases the timeframe of the projection is a critical factor

influencing the outcome. It was thus suggested that this point be brought to the attention of those requesting conservation advice from the ISC. There was consensus that it would be helpful for the timeframes to be used in the model projections to be specified in any such requests so that the results are appropriate to the existing management considerations.

Furthermore, it was acknowledged that to date there has been a lack of specificity regarding which biological reference points (BRPs) to use in simulations. Members agreed that more explicit guidance is needed concerning which BRPs to evaluate in order to limit modelling scenarios to a reasonable number. In particular, it was noted that the ALBWG had made progress with its use of the $F_{SSB\text{-}min}$ reference point but it was not clear whether this or other BRPs are of primary interest. Also, work thus far has focused on limit reference points but it is envisaged that eventually target reference points will also need to be developed. Therefore, guidance on both limit and target BRPs is desirable.

Finally, it was noted that in response to a request from the NC, the ALBWG provided "Kobe" diagrams covering the period 1966-2004 (*Annex 6, Figure 3*). Concern was raised over possible oversimplified interpretation of these plots. The annual ratios displayed in "Kobe" diagrams are a function of aggregate selectivity in the respective years. Aggregate selectivity can vary from year to year – in some cases, appreciably (as for albacore). The "Kobe" algorithm used for albacore fully accounts for changing selectivity. However, "Kobe" diagrams cannot be used to compare conditions in a given year to conditions that would have been optimal in that year (e.g. the selectivity that would have returned the maximum possible yield; perhaps by taking fewer small fish and more large fish). It was also explained that a good evaluation against a BRP may be achieved even when the fishing operations are sub-optimal (e.g. fishing on juveniles under low yield per recruit conditions). Since the "Kobe" diagrams are not capable of presenting information on how fishery yields may be improved by managing operations to attain a more efficient mix of gear types and catch, members cautioned against over-reliance on this one tool.

<u>Conservation Advice</u>

After discussion of the 2007 ALBWG' s assessment report and consideration of comments raised by Plenary members, the ISC offers the following conservation advice:

The advice provided by the ISC7 still holds pending the results of a new stock assessment currently scheduled for 2010. That is:

> "*Previous scientific advice, based on the 2004 stock assessment, recommended that current fishing mortality rate (F) should not be increased. It was noted that management objectives for the IATTC and WCPFC are based on maintaining population levels which produce maximum sustainable yield. Due to updating, and improvements and refinements in data and models used in the 2006 stock assessment, it is now recognized that* F_{cur} *(0.75) is high relative to most of the F reference points (see Table 5a in Annex 5 of the ISC7 Plenary Report). On the other hand, the same analysis indicates that the current estimate of the SSB is the second highest in history but that keeping the current F would gradually reduce the SSB to the long-term average by the mid 2010s. Therefore, the recommendation of not increasing F from current level (*F_{cur}*(2002-2004)=0.75) is still valid. However, with the projection based on the continued current high F, the fishing mortality rate will have to be reduced. The degree to which, when and how reductions should occur will depend on which reference points are selected and the desired probability and practicability of success of attaining these reference points in a timeframe to be agreed. The ISC requires additional guidance on these issues from the management authorities in a timely manner to work further on these issues.* "

However, based on analyses conducted by the ALBWG since ISC7, the following points are highlighted:

1. Estimated probabilities of the SSB remaining above the SSB reference points as calculated in the last stock assessment (2006) were modestly underestimated;

2. Because the realized catch in 2007 was less than that assumed in the projections, the F in 2007 may have been less than the "current F" (0.75 yr^{-1});

3. Further guidance on the selection and application of biological reference points (BRPs) and their conditions is requested in order to facilitate response to requests for conservation advice. In particular, clarification of the timeframe (e.g. short-term versus long-term) for projections; and the specific types of reference points to be used (e.g. limit and/or target and based on which parameters) would be useful.

7.2 Pacific Bluefin Tuna

Y. Takeuchi, Chair of the PBFWG, presented an overview of the Pacific bluefin tuna stock assessment WS held in May 2008 at National Research Institute of Far Seas Fisheries in Shimizu, Japan (*Annex 7*). This stock assessment was the first full stock assessment since the last stock assessment in January 2006. This was the first application of an integrated stock assessment model, Stock Synthesis 2 (SS2), to Pacific bluefin tuna. Before the stock assessment workshop a small working group met during May 21-27 for preliminary assessment work. Input data for the stock assessment (1952-2005), as well as the results of the updated age and growth studies were distributed to members of the PBFWG prior to the workshop.

Input data used for the stock assessment was 1) quarterly catch time series for 10 fleets, 2) four longline CPUE series (three from Japan, one Chinese-Taipei) 3) one troll CPUE series. Growth curve parameters were selected based on new otolith annuli data.

The base case model run was summarized as:

- SSB has fluctuated with several peaks and the highest around 1960;

- Current SSB is about 20,000 t, which is near the historical median level;
- Recruitment shows large variation without trends;
- Based on observed SSB and recruitment, there appeared to be no stock recruitment relationship;
- F on Age 1-3 has been generally higher than other age classes;
- F on Age 0-3 has an increasing trend in recent years; and
- Adult F has remained relatively low.

The results of future projections were summarized as:

- Short term prospects highly depend on the most recent year (2005) class strength;
- Long term prospects converge to the current SSB level with large variation, since recruitment is not SSB-driven;
- Current F levels will keep SSB at its current average;
- A 20% increase or decrease in F has large impacts in the long term; and
- Current F has a very small risk of resulting in stock declines to an historically low level.

Retrospective analyses suggest that the most recent year recruitment is always underestimated, but the degree of underestimation is difficult to evaluate.

The PBFWG Chair also summarized the results of calculation of the potential biological reference points (F_{max}, $F_{0.1}$, $F_{20\%}$, $F_{30\%}$, $F_{40\%}$, F_{med} and probability based reference points) as follows (Figure 1):

- Current F exceeds potential target reference points (F_{max}, $F_{0.1}$, $F_{20\%}$, $F_{30\%}$ and $F_{40\%}$); and
- Current F is less than or close to potential limit reference points (F_{med} and probability based BRPs similar to $F_{SSB\text{-}min}$ being evaluated by the ALBWG).

It was noted that the equilibrium biomass predicted when the F-multiplier (i.e. year component of F) of potential target reference points listed above was outside of the range of 0.8-1.2 was far beyond the range of historically observed biomass (Figure 1). Given that such values are unlikely, these scenarios were discounted by the PBFWG. The PBFWG Chair also displayed the variability of the BRPs calculated from the base case as well as 33 sensitivity runs calculated by the PBFWG using box-plots of the estimated BRPs.

The PBFWG Chair summarized three key uncertainties in the current Pacific bluefin tuna stock assessment identified by the PBFWG as follows:

- The assumed natural mortality rate;
- Recruitment strength (and F on recruits) in the terminal year (2005); and

- Short term projection results and the inability of both assessment/projection scenarios to adequately reflect the actual catch in 2005.

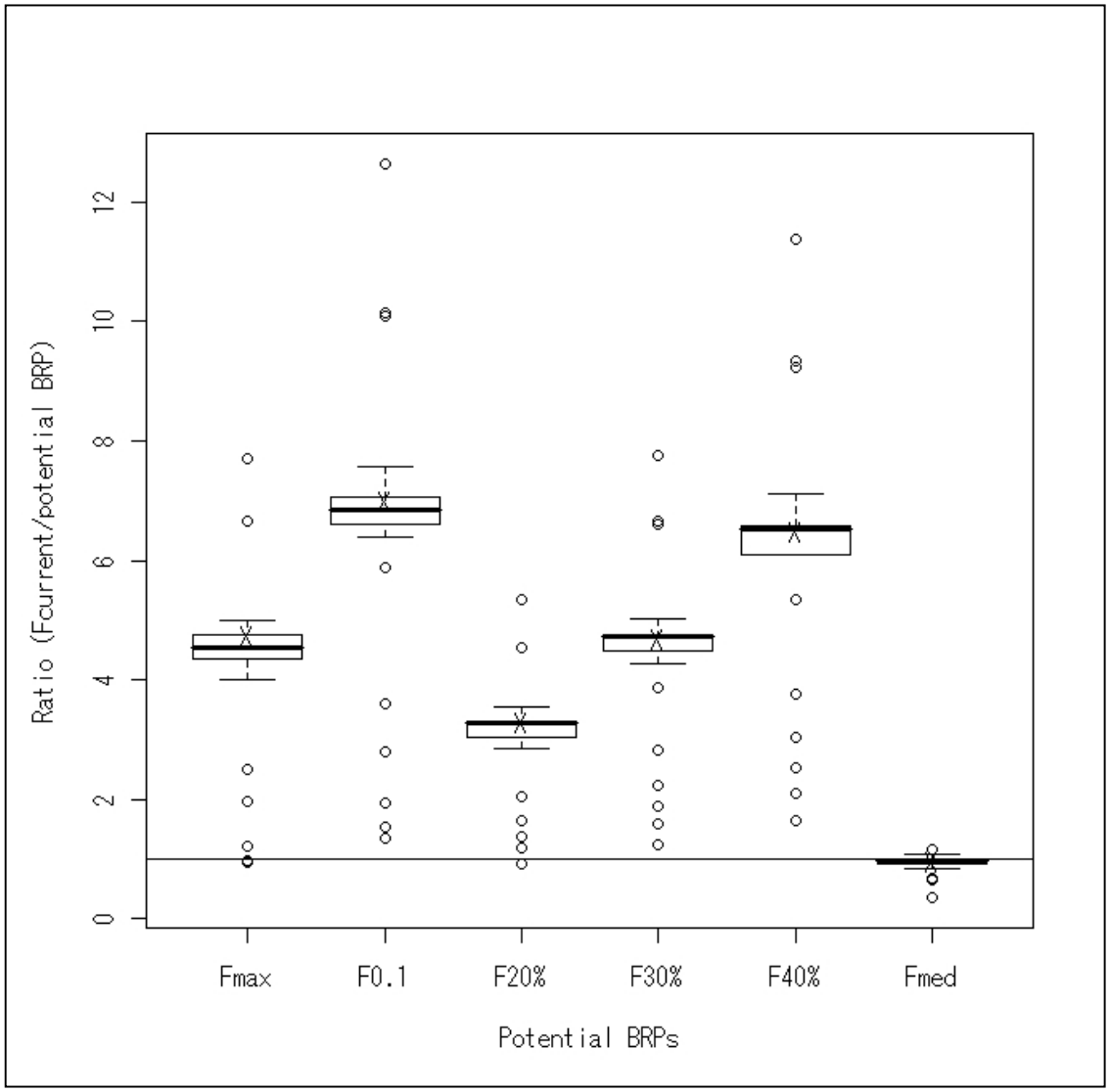

Figure 1. Box-plot of potential biological reference points (F_{max}, $F_{0.1}$, $F_{20\%}$, $F_{30\%}$, $F_{40\%}$ and F_{med}) deriving from a base case and 33 sensitivity runs considered by the PBFWG (*Annex 7, Appendix Table 8.1*). "X" indicates the point estimate from the base case model. The horizontal line at y=1 indicates where the ratio of the current F to the BRP=1.

Discussion

Members expressed appreciation for the efforts of the PBFWG Chair and members for their efforts in completing the Pacific bluefin tuna assessment on schedule. Figure 1, which was included in the PBFWG Chair's presentation, was considered to be a very useful summary of the results of the model sensitivity runs and it was agreed that it should be included in the Plenary report. The ISC Chairman clarified that these BRPs were selected by the PBFWG as proxies in the absence of any guidance regarding which specific BRPs should be used. Y. Takeuchi confirmed this was the case, noting that F_{max}, $F_{0.1}$, $F_{20\%}$, $F_{30\%}$, and $F_{40\%}$ are potential target reference points whereas F_{med} is a potential limit reference point.

In response to a question regarding the meaning of the term "environmentally-driven recruitment" in the PBFWG report, the PBFWG Chair replied that this simply means that the PBFWG could not find any apparent stock recruitment relationship.

Members agreed to endorse the conclusions of the PBFWG report as contained in *Annex 7* and excerpted here:

1. Recruitment has fluctuated without trend over the assessment period (1952-2004); and does not appear to have been adversely affected by the relatively high rate of exploitation. Recent recruitment (2005-present) is highly uncertain – making short-term forecasting difficult. In particular, the 2005 year class strength may have been underestimated in this assessment.

2. Spawning stock biomass (SSB) in 2005 is near the median level over the assessment period. If the future fishing mortality rate (F) continues at the current F level, the short-term outlook (2009-2010) indicates SSB will either (i) decline until 2010 or (ii) remain at approximately the 2005 level. In the longer term, SSB is expected to be at a level comparable to the SSB in 2005.

3. No relationship between SSB and recruitment is apparent over the range of "observed" SSB from the assessment. The assessment structure

tacitly assumes that at least over the SSB levels "observed," recruitment is more environmentally-driven than SSB-driven.

4. Current F (2002-2004) is greater than commonly used biological reference points (BRP) that may serve, in principle, as potential target reference points. This includes F_{MAX} – a BRP that given the assessment structure and assumptions is theoretically equivalent to F_{MSY}. But the magnitude by which the Fcurrent exceeds the target BRPs is variable.

5. Conversely, current F is less than commonly used BRPs that may serve, in principle, as potential recruitment overfishing threshold BRPs, e.g. F_{MED} and $F_{SSB\text{-}min}$ (probability based reference point) i.e. Fs above which, the likelihood of recruitment failure is high.

6. Fs on recruits (age 0) and on juveniles (ages 1-3) have been generally increasing for more than a decade (1990-2005). The catch (in weight) is dominated by recruits and juveniles (ages 0-3).

7. Total catch has fluctuated widely in the range of 9,000-40,000 t during the assessment time period. Recent catch is near the average for the assessment period (~22, 000 t). Over the entire catch history, annual catch has never attained the equilibrium catch at F_{MAX} (45,000 t).

It was noted that the modelling scenarios provide some output parameter estimates that have a low plausibility and thus the stock assessment results need to be interpreted with caution. For this reason it will be necessary to revisit the analysis in order to refine the scientific advice. Work necessary to improve the basis for parameter specification, as well as model refinement, will be pursued over the coming year, starting with a December 2008 workshop. Progress on these issues will be reviewed by ISC9 next year and at that time a timetable for conducting a new stock assessment will be set.

Conservation Advice

After discussion of the PBFWG's assessment report (*Annex 7*) and

consideration of comments raised by Plenary members, the ISC offers the following conservation advice:

1. Given the conclusions of the May-June 2008 stock assessment with regard to the current level of F relative to potential target and limit reference points, and residual uncertainties associated with key model parameters, it is important that the current level of F is not increased.

2. If F remains at the current level and environmental conditions remain favorable, then recruitment should be sufficient to maintain current yield well into the future.

3. A reduction in F, in combination with favorable environmental conditions, should lead to greater Y/R and SPR and, after some lag, greater sustained yield.

4. Increases in F above the current level, and/or unfavourable changes in environmental conditions, may result in recruitment levels which are insufficient to sustain the current productivity of the stock.

7.3 Billfish

G. DiNardo, Chair of the BILLWG, reported on the estimation of striped marlin biomass north of 20°N latitude in the western and central North Pacific Ocean. This was requested by WCPFC SC3 and NC3 in an effort to determine if striped marlin could be considered a northern stock. Assessment estimates of population number-at-age and selectivity patterns and CPUE catchability coefficients from the Japanese distant water longline fleet were used in the analysis. The Japanese distant water fleet was used because it was the most consistent data source that was spatially disaggregated and comparable by region. Results indicate that a majority (65-70%) of striped marlin in the western and central North Pacific Ocean occur north of 20°N latitude. This conclusion is consistent with the distribution of fishery catches.

G. DiNardo also reported on progress to facilitate completion of a North Pacific

swordfish stock assessment currently scheduled for July 2009. While significant progress has been made on the collection and review of fishery statistics, as well as standardization of CPUE for fisheries targeting swordfish, significant work remains. In particular, swordfish stock structure in the North Pacific is still unclear, and the 5th World Fisheries Congress special session on billfish stock structure and habitat requirements will likely not provide sufficient information to make an informed decision. To ensure sufficient time to thoroughly review the topic of stock structure and render a decision on stock structure for the pending stock assessment, an ISC Billfish special session is scheduled for November 11-14, 2008 in Honolulu, Hawaii.

Discussion

The ISC Chairman summarized that since there were no billfish assessments conducted since ISC7 the conservation advice from ISC7 is maintained. The main product of the BILLWG since ISC7 has been the provision of information, in the form of a paper for the NC (*ISC/08/BILLWG-2/01*), addressing whether striped marlin can be considered a northern stock. Upon endorsement by the Plenary, the paper will be provided to the NC4 and can be submitted to WCPFC SC4 as an information paper. The WCPFC will then decide whether to designate the striped marlin as a northern stock based on the advice of the SC4.

A question was raised regarding the catchability assumptions used in the analysis, in particular if catchability, in the form of gear selectivity, in more southern tropical waters is lower than in other areas, whether the results may be biased. It was pointed out that the catchability parameters in the analysis were selected based on all the information available to inform that choice. It was also noted that these assumptions are consistent with what is known about depth deployment in the northern and southern portions of this fishing ground. Although hook depth was accounted for the analysis through standardizing data for this factor, some members still felt that there may be differences in catchability which have not been fully addressed and could lead to underestimation of the ratio of the stock lying north of 20°N. There were also comments raised regarding the fact that the growth and maturity parameters used in the analysis may be outdated. Nevertheless, there was consensus that the

report of the BILLWG represented the best effort of the group to address the issue as requested. It was therefore agreed that the paper should be put forward to the WCPFC along with a brief mention of the residual concerns regarding potential biases due to spatial differences in catchability, and the currency of the growth and maturity parameters, which could not be fully addressed given the available data. It was acknowledged that the BILLWG would work toward resolving these issues in the future, but that it will take time to obtain sufficient data to address them fully.

In response to a concern raised by Chinese Taipei regarding an inability to disaggregate billfish catches in the different gear type categories in the BILLWG database, it was agreed that for the purposes of presentation the catch table could be collapsed to a more limited number of gear types. However, the maximum level of detail should be retained in the BILLWG database.

Conservation Advice

After discussion of the BILLWG report and comments raised by Plenary members, **the ISC maintains the conservation advice offered by ISC7. That is:**

"While further guidance from the management authority is necessary, including guidance on reference points and the desirable degree of reduction, the fishing mortality rate of striped marlin (which can be converted into effort or catch in management) should be reduced from the current level (2003 or before), taking into consideration various factors associated with this species and its fishery. Until appropriate measures in this regard are taken, the fishing mortality rate should not be increased."

7.4 Bycatch

C. Boggs informed the Plenary that since the BCWG has not met since ISC7 and no assessments have been completed, no conservation advice is offered.

8 REVIEW OF STOCK STATUS OF SECONDARY STOCKS

8.1 Eastern Pacific – Yellowfin and Bigeye Tunas

M. Dreyfus presented a review of the status yellowfin and bigeye tunas in the eastern Pacific based on stock assessment work by the IATTC for yellowfin tuna (*ISC/08/PLENARY/INFO/01*) and for bigeye tuna (*ISC/08/PLENARY/INFO/02*). The fishery is predominantly a purse seine fishery (with sets on dolphins, free-swimming schools and floating objects), with longlines being the next most common gear type. In the case of the purse seine fishery, fleet capacity in metric tons has recently reached a peak of over 200,000 cubic meters. The catch composition is usually led by yellowfin tuna with skipjack tuna in second place, but since 2005 catches of the latter have surpassed catches of yellowfin tuna which are at their lowest level in more than two decades. Catches of bigeye, albacore and Pacific bluefin tuna comprise a smaller proportion of the fishery.

Size composition of the catch varies depending on gear type. Longlines target adult tuna whereas the purse seine fishery captures smaller tunas particularly when setting on floating objects. The weight of yellowfin tuna in the purse seine fishery has been decreasing over time although a slight increase was observed in 2007 (8.3 kg).
For yellowfin tuna, based on the assessment model (A-SCALA), spawning biomass ratio is close to the level corresponding to average maximum sustainable yield (AMSY), thus the stock seems to be in better condition than last year. Effort levels are below the ones that would support AMSY. There were record catches in the early 2000s and recruitment was very high, but more recently recruitment has been similar to the long-term average.

Bigeye tuna catches have been predominantly from longline fisheries until 1993 when a FAD fishery in the southern part of the Eastern Pacific at 10°N and 20°S latitude was developed. At the present time catches are higher in the surface fishery that focuses on juvenile bigeye tuna. The mean weight of bigeye tunas

in the surface fishery in 2007 is 5.3 kg. Based on the assessment model (SS2), the recent fishing mortality rate is above that corresponding to the AMSY. As a consequence, if fishing effort is not reduced, total biomass and spawning biomass will eventually decline. Diagrams of stock size and fishing mortality rate relative to AMSY reference points show that overall the reference points have not been exceeded until recent years, but the three most recent estimates indicate the stock is overfished and overfishing is occurring.

Discussion

Members thanked M. Dreyfus for making this presentation on behalf of IATTC. Concerns regarding over-simplification of stock status based on an over-reliance on "Kobe" diagrams were again raised by some members (see Section 7.1 of this report). The ISC Chairman noted that there are as yet no conservation and management measures in place for this year for yellowfin or bigeye tuna in the IATTC area. Although another IATTC meeting will be held in October it is doubtful whether any measure approved at that time can be implemented effectively given that most of the fishing season will have already elapsed.

8.2 Western and Central Pacific – Yellowfin and Bigeye Tunas

S.K. Soh of the WCPFC briefed the Plenary on the results of the 2007 yellowfin tuna stock assessment that were presented at the WCPFC SC meeting in August 2007 (*ISC/08/PLENARY/INFO/03*). The total catch of yellowfin tuna in the Western and Central Pacific Ocean (WCPO) has ranged between 350,000-450,000 t since 1997. MULTIFAN-CL was used to fit catch and effort, size and tagging data. There were several changes from the 2006 assessment including the addition of new fisheries; separation of Indonesian and Philippine domestic fisheries; revision of the recent annual catch estimates from Indonesian domestic fisheries; spatial subdivision of the longline fishery data in the western equatorial region (Region 3); and reconsideration of the use of size data.

From the assessment, a strong increase in fishing mortality rates was noted since 1990, especially on juvenile fish and as a result catches (by number) were increasingly dominated by young (< 1 yr) fish. Highest exploitation rates (and impacts) occurred within Region 3 but there were lower impacts in other regions. The level of depletion reached 51% of

unexploited biomass (a fishery impact of 49%) in 2002–2005 and the Indonesian and Philippines domestic fisheries had the greatest impact. The status of the stock was summarized by a "Kobe" diagram, where B/B_{MSY} was 1.10, that is, the yellowfin tuna stock in the WCPO is not in an overfished state, and F/F_{MSY} was 0.95 with a high probability (47%) of $F > F_{MSY}$. Management implications are that the current exploitation rates are likely to be approaching the F_{MSY} level and any further increase in exploitation rates will not result in an increase in equilibrium yields from the stock.

Discussion

Members thanked S.K. Soh for presenting the information on behalf of SPC. S.K. Soh confirmed that bigeye tuna, skipjack tuna and South Pacific albacore assessments were conducted this year by SPC and a Southwest Pacific swordfish stock assessment is being conducted by CSIRO and the government of New Zealand. Questions were again raised regarding the use of "Kobe" diagrams by WCPFC and concerns were expressed that use of these plots in WCPFC meetings should be appropriately caveated. The ISC Chairman indicated that all RFMOs are grappling with this issue and it is useful for ISC to understand how the tools are being used in the various management bodies.

9 REVIEW OF STATISTICS AND DATA BASE ISSUES

9.1 Report of the STATWG

N. Miyabe presented the results of the STATWG activities over the past year. The 7th STATWG meeting was convened on 19-21 July just prior to the Plenary (*Annex 10*). All members were represented except China, IATTC, FAO, SPC and PICES.

The annual data submission deadline is July 1st. Data (Category I, II and III) were submitted by all members except China. Submitted data were shown in the form of summarized tables for different categories. However, the data presented in the tables did not match well with those data maintained by the species WGs. Unfortunately, these inconsistencies were not solved during the meeting since the newly submitted data were not yet verified by WG Chairs as

there was little time available prior to the meeting to accomplish this task.

The STATWG reviewed the current data submission protocol. Last year, the data submission protocol was changed in order to reduce duplication between the Database Administrator (DA) and species WG Data Managers. At present, the data flow for Category II and III data is from the members' Data Correspondents to the species WG Data Managers.

K. Uosaki demonstrated how to upload and download and delete data using the ISC Researcher's Web Page for data submission. This site was developed as a simple tool for the submission of data by national Data Correspondents. A User Manual was also distributed. A web page update was reported by H. Honda. This update was made to allow ISC officers to post documents or announcements. If an upload is made, the Webmaster will automatically receive an email from the system so that he/she can complete posting of the file on the appropriate window on the website.

Additional data requirements or gaps were raised with the species WG Chairs as well as concern with the progress of the STATWG. Several species WG Chairs pointed out that there might be some unreported catches by non ISC members held by other RFMOs. It was agreed that a data request should be made by the species WG Chair. If this is not successful, then STATWG Chair will send a blanket request to them. More active participation of data correspondents at the STATWG meeting was also discussed. Without an explanation of data quality and accuracy, it is very difficult to judge the reliability of the data in question.

National Data Correspondents and species WG Data Managers were reconfirmed. As a future work plan, 14 items were identified and priorities were set. Important items are listed below:

- Data request to other RFMOs (not covered by ISC);
- Check metadata including coverage info;
- Hire permanent Data Administrator;
- Rescue historical data;
- Provide oversight for archiving input, output, metadata and software;
- Monitor data reporting;

- Incorporate bycatch data (based on input from the BCWG); and
- Further development of the Website and ISC database.

Discussion

In response to a question, N. Miyabe clarified that even if data are submitted to the species WGs, they should also be submitted again on 1 July to the main database in their updated form, or the Data Administrator should be notified as to why they are not submitted. All types of data (Cat. I, II and III) should be submitted annually if possible. However, if data are submitted through the website interface, they do not need to also be submitted directly to the Data Administrator.

The ISC Chairman encouraged all species WG Chairs to review the action items arising from the STATWG meeting and to initiate activities as required. He noted there are many actions assigned to the Data Administrator.

9.2 Data Submission Report Card and Database Administration

In consultation with the Chair of the STATWG, N. Miyabe, the ISC Chairman stated that due to the continuing vacancy in the position of permanent Database Administrator no progress has yet been made on preparation of a data submission report card. H. Honda announced that as an interim measure K. Uosaki has been assigned Data Administrator responsibilities.

9.3 Data Administrator Role and Responsibilities

In introducing this item, the ISC Chairman noted that a position description for the Data Administrator is being developed and that members' input to this process is welcome. The goal is to finalize the position description by the end of this year. Eventually, the data administration roles and responsibilities will become part of the ISC Operations Manual. In brief, the responsibilities were summarized as follows (*Annex 10, Section 7*):

1. Managing end products from the species WGs and providing oversight for archiving and archived materials;
2. Managing catch data for all highly migratory species (HMS) and associated bycatch species in order to provide a benchmark for the productivity of the North Pacific Ocean with regard to these species; and
3. Supporting and maintaining a data submission and retrieval portal for the species WGs.

While members acknowledged the interim appointment of K. Uosaki as Database Administrator, they expressed strong support for the prompt appointment of a dedicated Database Administrator. There was a general consensus that even with improved user interfaces and additional centralized database functionality, the process could not be fully automated and human resources would be required to, for example, prompt members to submit their data.

Some members considered that once a Database Administrator was appointed there would be no clear need for the STATWG since there are few, if any, functions it performs which could not be handled by the Data Administrator. It was considered by some members that the STATWG could thus be abolished. Transferring the duties of the STATWG to the Data Administrator was seen by some as beneficial in reducing duplication of work, shortening the amount of time needed for ISC meetings, and increasing consistency in the data accessed by different species WGs.

Other members expressed support for continuing the work of the STATWG. These members noted that the STATWG could play a useful role in determining whether members are complying with data submission requirements, assisting with data requests, and improving data quality. One member suggested that this issue be referred to the STATWG for more detailed discussions.

Accounting for these differing perspectives, the Plenary decided that the administration of the ISC database is in a transitional phase in which the appointment of a dedicated Data Administrator is planned but not yet accomplished. For this reason a decision on this issue at ISC8 is premature. Once a dedicated Data Administrator is in place, it will be easier to determine

what functions remain to be served by the continued existence of the STATWG. Therefore, the following points were agreed:

- The ISC should prioritize progress toward appointment of a dedicated Data Administrator by a) completing the description of roles and responsibilities by the end of 2008; b) securing the resources to support the position; and c) recruiting the appropriate person.
- In parallel, the STATWG should, through consultation with all its members including the Chairs of the species WGs, the species WG Data Managers and the members' Data Correspondents, undertake a review of the essential ISC data management functions with specific reference to whether the STATWG is necessary to fulfil these functions or whether they can be filled by the Data Administrator or through other alternative arrangements.
- Based on the results of this review, the STATWG should consider whether it needs to continue to meet or whether it can be abolished, and should report the result of its consideration to ISC9 for a decision.

9.4 Rescue of Historical Data

The ISC Chairman stated that other than the efforts currently underway for Pacific bluefin tuna, there has not yet been sufficient progress in historical data rescue for other species. He urged that members re-double their efforts to make progress on this topic over the coming year. Despite concerns that these types of efforts might be less fruitful than similar efforts for groundfish stocks, it was considered important to learn as much as possible from historical data sets.

10 REVIEW OF MEETING SCHEDULE

10.1 Time and Place of ISC9

Provisional dates for ISC9 are 15-20 July 2009. Related working group workshops in conjunction with ISC9 will be held beginning 8 July 2009. These are provisionally scheduled to include meetings of the albacore, Pacific bluefin

tuna and statistics working groups. Chinese Taipei expressed their willingness to host the meeting and committed to providing further details as they become available.

10.2 Working Group Intercessional Meetings

A tentative schedule of ISC workshops and other highly migratory species' RFMO meetings was compiled for 2008-2010 (*ISC/08/PLENARY/06*). Members are encouraged to participate as fully as possible in the species WG workshops. The ISC Chairman will distribute the schedule to other RFMOs so that they will be aware of ISC meetings and workshops.

11 ADMINISTRATIVE MATTERS

11.1 Procedural Manual

The ISC Chairman called members' attention to a current version of the Operations Manual which is available to be freely distributed in hard copy format (*ISC/08/PLENARY/03*). This document represents a working version of the procedures which will evolve over time and will be updated periodically once a sufficient number of desirable amendments have accumulated.

It was requested that in future updates of the Operations Manual that each delegation's name be shown next to its geographical position on the ISC area map and that attention be paid to the fact that not all members use the same names for certain sea areas. It was also suggested that the map shading showing the ISC area be expanded to the northern extent of the figure since there is no northern boundary of the ISC. It was agreed that both changes would be incorporated in future revisions of the Operations Manual.

11.2 Organization Chart and Contact Persons

The ISC Organization Chart (*ISC/08/PLENARY/02*) was tabled and updated through discussion with members. In accordance with the earlier announcement of his appointment by the STATWG, it was agreed that K. Uosaki

would be listed on the chart as Data Administrator and Webmaster. K.N. Chung stated that they may be making some changes to the members on the chart but that these could not be confirmed at this time. In response to a question regarding the currency of the SPC representatives, the ISC Chairman committed to contacting SPC to confirm and/or update the listings.

11.3 Website Design

The ISC Chairman reminded members that the ISC website serves as the public interface for the organization and thus it needs to present a professional image. It is essential that the website convey that the ISC is an active, proficient and transparent organization. In this respect the ISC Chairman considered that accelerated progress in developing the website is necessary.

H. Honda reaffirmed Japan's commitment to continuing the website's development. Citing the urgent priority of improving the functionality of the website, the U.S. and Canada offered to contribute expertise if it would assist Japan in their efforts.

The ISC Chairman considered that members should be provided with an opportunity to review the content and structure of the website before it is loaded for public use. Therefore, it was suggested that non-essential pages of the current website be taken offline so that erroneous content can be corrected. In the interim, which is expected to last only 1-2 months, the content should be limited to the ISC8 Plenary report and its annexes. Other pages, which should be labelled as "under construction" in the interim, should be brought online gradually once the content is confirmed.

Some members were concerned that removal of information such as the lists of past working paper titles, authors and contact details just prior to WCPFC SC4 might be detrimental to the goal of appearing more transparent. At the same time it was acknowledged that the current structure of the website makes it quite difficult for unfamiliar users to locate this information and thus the current situation does not project transparency either.

It was decided that the best possible course at this time is to reduce the website to a minimum content site focused on the ISC Plenary Report and its annexes. The website should then be re-designed within the next few months, and once the interface is functioning efficiency and has been reviewed by members, more content can be brought online. In the short-term a notice should be posted stating that the website is "under construction" and that lists of titles, authors and contact details for past working papers are available by emailing the Data Administrator.

11.4 Glossary of Terms

The ISC Chairman indicated that preparation of a glossary of terms was still in progress. This work is being accomplished by selecting terms from existing technical definitions in use by other RFMOs and fisheries organizations. Further progress will continue over the coming year and will be reported upon at ISC9.

11.5 Collaborative Biological Studies

The results of a seminar on biological research needs which was held during a special Plenary session on 24 July were presented by K. Piner. The key conclusion of the seminar was that age and growth and maturity topics are the top research priorities but the details of such research will depend on the species involved and the amount of existing information. It was noted that the ALBWG has already developed a research plan and thus a foundation for initiating further work already exists. The PBFWG has made significant research progress already and has incorporated the results into its stock assessments. The BILLWG is proceeding with its research plan by collecting samples for ageing and maturity studies but more collaboration will be necessary. It therefore welcomed the offer by Korea to participate in the research program.

In order to promote opportunities for collaborative research between the species WGs, possibly in the form of a unified biological sampling program, it was agreed that each species WG would develop an individual research plan tailored to its needs. These research plans would then be coordinated by a Biological

Research Task Force to be led by S.K. Chang, assisted by J. Holmes. The Task Force should begin coordinating with the respective species WG Chairs by correspondence immediately. It will meet for two days immediately following the close of the BILLWG workshop scheduled for April/May 2009. The goal of the two-day Task Force meeting will be to develop a proposal for a multi-species biological sampling program for consideration by ISC9 in July 2009.

11.6 Preparations for Next Meetings

In noting the commitment of Chinese Taipei to host the next Plenary meeting, the ISC Chairman indicated that guidance and specifications for the meeting will be provided to the Chinese Taipei delegation for use in their preparations.

11.7 Election of Officers

Given the expiry of the three-year term of Chairmanship for G. Sakagawa, elections were held to appoint a Chair for a new three-year term (2009-2011). Based on balloting results, G. Sakagawa was elected for a new term running through July 2011 (ISC11). Elections were also held for Vice-Chair given the expiry of the one-year term filled by H. Honda after the resignation of J.R. Koh in 2007. M. Dreyfus was elected to the post of Vice-Chair for a three-year term.

11.8 Other Matters

C. Mees, a consultant from the Marine Resources Assessment Group (MRAG), extended thanks to the ISC for the opportunity to observe the proceeding and to those participants who provided input to independent review of the science structure and function of the WCPFC being carried out by his firm. S.K. Soh indicated that the Final Report of this study is scheduled for delivery to WCPFC in April 2009, contingent upon the decision of WCPFC5 concerning any additional work in 2009.

There was some discussion regarding support for the officers and activities of the ISC. The United States delegation indicated it would continue to fully support

its participation in ISC activities and workloads, including support for U.S. participants who serve in various leadership roles. The ISC relies on the other members to provide similar support. It was agreed that the role of the ISC in providing scientific advice to the NC of the WCPFC makes it appropriate to request financial support from WCPFC, and that this might be taken up by the ISC chairman at the next NC meeting.

12 ADOPTION OF REPORT

A draft Report of the Eighth Meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean was prepared based on input and comment from all participants, and circulated to all participants for review. The report was reviewed in its entirety, section by section and was endorsed by the ISC8 Plenary.

13 CLOSE OF MEETING

The ISC Chairman expressed his thanks for the efforts of the ISC8 support staff including H. Kiyofuji, H. Tominaga, H. Matsushima, S. Shoffler and S. Clarke. He also conveyed his deep gratitude to local government officials from Takamatsu City and Kagawa Prefecture for their generous hospitality and support of ISC8. The contributions of the Japan Fisheries Agency and the National Research Institute of Far Seas Fisheries were also greatly appreciated. The ISC Chairman recognized that the efforts of all participants were reflected in the smooth running and productive outcome of this year' s meeting.

Y. Uozumi highlighted the completion of the Pacific bluefin tuna assessment as one of the main accomplishments for this year as well as progress in the other species WGs. He acknowledged the strong leadership of G. Sakagawa and the cooperative spirit among members of the ISC not only displayed at this meeting but throughout the year. S. Clarke and S. Shoffler of the Secretariat staff were thanked for their role in preparing the ISC8 documents. Japan pledged to continue their scientific collaboration with ISC members under the re-elected Chairman and newly-elected Vice-Chairman, G. Sakagawa and M. Dreyfus.

After encouraging participants to continue the progressive and collective advances of the ISC, the ISC Chairman adjourned the meeting at 12:40 on 27 July 2008.

Table 1. Albacore (*Thunnus alalunga)* catches (in metric tons) in the North Pacific Ocean by fisheries, 1952-2007. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ).

Year	Japan							Korea		Chinese-Taipei		
											Longline	
	Purse Seine	Gill Net	Set Net	Pole and Line	Troll	Longline	Other	Gill Net	Longline	Gill Net	Distant Water	Offshore
1952	154		55	41,787	--	26,687	182					
1953	38		88	32,921	--	27,777	44					
1954	23		6	28,069	--	20,958	32					
1955	8		28	24,236	--	16,277	108					
1956	--		23	42,810	--	14,341	34					
1957	83		13	49,500	--	21,053	138					
1958	8		38	22,175	--	18,432	86					
1959	--		48	14,252	--	15,802	19					
1960	--		23	25,156	--	17,369	53					
1961	7		111	18,639	--	17,437	157					
1962	53		20	8,729	--	15,764	171					
1963	59		4	26,420	--	13,464	214					
1964	128		50	23,858	--	15,458	269					
1965	11		70	41,491	--	13,701	51					
1966	111		64	22,830	--	25,050	521					
1967	89		43	30,481	--	28,869	477				330	
1968	267		58	16,597	--	23,961	1,051				216	
1969	521		34	31,912	--	18,006	925				65	
1970	317		19	24,263	--	16,222	498				34	
1971	902		5	52,957	--	11,473	354		0		20	
1972	277	1	6	60,569	--	13,022	638		0		187	
1973	1,353	39	44	68,767	--	16,760	486		3		--	
1974	161	224	13	73,564	--	13,384	891		114		486	
1975	159	166	13	52,152	--	10,303	230		9,575		1,240	
1976	1,109	1,070	15	85,336	--	15,812	270		2,576		686	
1977	669	688	5	31,934	--	15,681	365		459		572	
1978	1,115	4,029	21	59,877	--	13,007	2,073		1,006		6	
1979	125	2,856	16	44,662	--	14,186	1,139	0			81	
1980	329	2,986	10	46,742	--	14,681	1,177	6	402	--	249	
1981	252	10,348	8	27,426	--	17,878	699	16		--	143	
1982	561	12,511	11	29,614	--	16,714	482	113	5,462	--	38	
1983	350	6,852	22	21,098	--	15,094	99	233	911	--	8	
1984	3,380	8,988	24	26,013	--	15,053	494	516	2,490	--	--	
1985	1,533	11,204	68	20,714	--	14,249	339	576	1,188	--	--	
1986	1,542	7,813	15	16,096	--	12,899	640	726	923	--	--	
1987	1,205	6,698	16	19,082	--	14,668	173	817	607	2,514	--	
1988	1,208	9,074	7	6,216	--	14,688	170	1,016	175	7,389	--	
1989	2,521	7,437	33	8,629	--	13,031	433	1,023	27	8,350	40	
1990	1,995	6,064	5	8,532	--	15,785	248	1,016	1	16,701	4	
1991	2,652	3,401	4	7,103	--	17,039	395	852	0	3,398	12	
1992	4,104	2,721	12	13,888	--	19,042	1,522	271	1	7,866	--	
1993	2,889	287	3	12,797	--	29,933	897		21		5	
1994	2,026	263	11	26,389	--	29,565	823		54		83	
1995	1,177	282	28	20,981	856	29,050	78		14		4,280	
1996	581	116	43	20,272	815	32,440	127		158		7,596	
1997	1,068	359	40	32,238	1,585	38,899	135		404		9,119	337
1998	1,554	206	41	22,926	1,190	35,755	104		226		8,617	193
1999	6,872	289	90	50,369	891	33,339	62		99		8,186	207
2000	2,408	67	136	21,550	645	29,995	86		15		7,898	944
2001	974	117	78	29,430	416	28,801	35		64		7,852	832
2002	3,303	332	109	48,454	787	23,585	85		112		7,055	910
2003	627	126	69	36,114	922	20,907	85		146		6,454	712
2004	7,200	61	30	32,255	772	17,341	54		78		4,061	927
2005	850	154	97	16,133	665	20,549	234		395		3,990	482
2006	364	221	55	15,400	460	21,606	42		147		3,848	469
2007	(5,194)	(221)	(55)	(38,289)	(460)	(21,606)	(42)		(91)		(2,465)	(451)

Table 1. (Continued)

Year	United States								Mexico			Canada	Other		Grand Total
	Purse Seine	Gill Net	Pole and Line	Troll	Handline	Sport	Longline	Other	Purse Seine	Pole and Line	Longline	Troll	Troll 1	Longline	
1952				23,843		1,373	46					71			94,198
1953				15,740		171	23					5			76,807
1954				12,246		147	13								61,494
1955				13,264		577	9								54,507
1956				18,751		482	6					17			76,464
1957				21,165		304	4					8			92,268
1958				14,855		48	7					74			55,723
1959				20,990		0	5					212			51,328
1960				20,100		557	4					5			63,267
1961			2,837	12,055		1,355	5	1	2	39	0	4			52,649
1962			1,085	19,752		1,681	7	1	0	0	0	1			47,264
1963			2,432	25,140		1,161	7		31	0	0	5			68,937
1964			3,411	18,388		824	4		0			3			62,393
1965			417	16,542		731	3		0			15			73,032
1966			1,600	15,333		588	8	1	0			44			66,150
1967			4,113	17,814		707	12					161			83,096
1968			4,906	20,434		951	11					1,028			69,480
1969			2,996	18,827		358	14		0			1,365			75,023
1970			4,416	21,032		822	9		0			390			68,022
1971			2,071	20,526		1,175	11		0			1,746			91,240
1972			3,750	23,600		637	8		100	0	0	3,921			106,716
1973			2,236	15,653		84	14		0			1,400			106,839
1974			4,777	20,178		94	9		1	0	0	1,331			115,227
1975			3,243	18,932		640	33	10	1	0	0	111			96,808
1976			2,700	15,905		713	23	4	36	5	0	278			126,538
1977			1,497	9,969		537	37		3	0	0	53			62,469
1978			950	16,613		810	54	15	1	0	0	23			99,600
1979			303	6,781		74	--		1	0	0	521			70,745
1980			382	7,556		168	--		31	0	0	212			74,931
1981			748	12,637		195	25		8	0	0	200			70,583
1982			425	6,609		257	105	21	0	0	0	104			73,027
1983			607	9,359		87	6		0	0	0	225			54,951
1984	3,728		1,030	9,304		1,427	2		107	6	0	50			72,612
1985	26	2	1,498	6,415	7	1,176	0		14	35	0	56			59,100
1986	47	3	432	4,708	5	196			3	0	0	30			46,078
1987	1	5	158	2,766	6	74	150		7	0	0	104			49,051
1988	17	15	598	4,212	9	64	307	10	15	0	0	155			45,345
1989	1	4	54	1,860	36	160	248	23	2	0	0	140			44,052
1990	71	29	115	2,603	15	24	177	4	2	0	0	302			53,693
1991	0	17	0	1,845	72	6	312	71	2	0	0	139			37,320
1992	0	0	0	4,572	54	2	334	72	10	0	0	363			54,833
1993		0	0	6,254	71	25	438		11	0	0	494			54,125
1994		38	0	10,978	90	106	544	213	6	0	0	1,998	158		73,345
1995		52	80	8,045	177	102	882	1	5	0	0	1,763	137		67,990
1996	11	83	24	16,938	188	88	1,185		21	0	0	3,316	505	1,735	86,242
1997	2	60	73	14,252	133	1,018	1,653	1	53	0	0	2,168	404	2,824	106,824
1998	33	80	79	14,410	88	1,208	1,120	2	8	0	0	4,177	286	5,871	98,173
1999	48	149	60	10,060	331	3,621	1,542	1	0	23	34	2,734	261	6,307	125,576
2000	4	55	69	9,645	120	1,798	940	3	70	29	4	4,531	490	3,654	85,154
2001	51	94	139	11,210	194	1,635	1,295		5	18	0	5,248	127	1,471	90,087
2002	4	30	381	10,387	235	2,357	525		28	0	0	5,379	127	700	104,886
2003	44	16	59	14,102	85	2,214	524		28	0	0	6,861	127	2,400	92,553
2004	1	12	126	13,346	157	1,506	361		104	0	0	7,856	127	2,400	88,746
2005		202	66	8,413	175	1,719	296		0	0	0	4,845	127	2,400	61,696
2006		3	23	12,524	95	385	270		109	0	0	5,832	127	2,400	64,325
2007	(77)	(4)	(21)	(11,436)	(100)	(1,147)	(250)		(40)	()	()	(6,075)	(127)	(2,400)	(90,551)

1 Other troll catches from vessels registered in Belize, Cook Islands, Tonga, and Ecuador.

Table 2. Swordfish (*Xiphias gladius*) catches (in metric tons) in the North Pacific Ocean by fisheries, 1952-2007. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ).

Year	Japan						Chinese Taipei		
				Longline			Longline		
	Gill Net	Set Net	Harpoon [1]	Distant Water [2]	Coastal	Other [3]	Distant Water	Offshore [4]	Other [5]
1952	0	68	2,569	8,890	152	12	-	-	0
1953	0	21	1,407	10,796	77	107	-	-	0
1954	0	18	813	12,563	96	121	-	-	0
1955	0	37	821	13,064	29	160	-	-	0
1956	0	31	775	14,596	10	73	-	-	0
1957	0	18	858	14,268	37	70	-	-	0
1958	0	31	1,069	18,525	42	67	-	-	0
1959	0	31	891	17,236	66	44	-	427	91
1960	1	67	1,191	20,058	51	30	-	520	127
1961	2	15	1,335	19,715	51	30	-	318	73
1962	0	15	1,371	10,607	78	44	-	494	62
1963	0	17	747	10,322	98	59	-	343	18
1964	4	17	1,006	7,669	91	70	-	358	10
1965	0	14	1,908	8,742	119	208	-	331	27
1966	0	11	1,728	9,866	113	45	-	489	31
1967	0	12	891	10,883	184	38	-	646	35
1968	0	14	1,539	9,810	236	50	-	763	12
1969	0	11	1,557	9,416	296	47	0	843	7
1970	0	9	1,748	7,324	427	37	-	904	5
1971	1	37	473	7,037	350	17	-	992	3
1972	55	1	282	6,796	531	21	-	862	11
1973	720	23	121	7,123	414	29	-	860	119
1974	1,304	16	190	5,983	654	28	1	880	136
1975	2,672	18	205	7,031	620	60	29	899	153
1976	3,488	14	313	8,054	750	171	23	613	194
1977	2,344	7	201	8,383	880	72	36	542	141
1978	2,475	22	130	8,001	1,031	111	-	546	12
1979	983	15	161	8,602	1,038	46	7	661	33
1980	1,746	15	398	6,005	849	31	10	603	76
1981	1,848	10	129	7,039	727	59	2	656	25
1982	1,257	7	195	6,064	874	58	1	855	49
1983	1,033	9	166	7,692	999	32	0	783	166
1984	1,053	13	117	7,177	1,177	98	-	733	264
1985	1,133	10	191	9,335	999	69	-	566	259
1986	1,264	9	123	8,721	1,037	47	-	456	211
1987	1,051	11	87	9,495	860	45	3	1,328	190
1988	1,234	8	173	8,574	678	19	-	777	263
1989	1,596	10	362	6,690	752	21	50	1,491	38
1990	1,074	4	128	5,833	690	13	143	1,309	154
1991	498	5	153	4,809	807	20	40	1,390	180
1992	887	6	381	7,234	1,181	16	21	1,473	243
1993	292	4	309	8,298	1,394	44	54	1,174	310
1994	421	4	308	7,366	1,357	37	-	1,155	219
1995	561	7	440	6,422	1,387	17	50	1,135	225
1996	428	4	633	6,916	1,067	9	9	701	31
1997	365	5	396	7,002	1,214	11	15	1,358	61
1998	471	2	535	6,233	1,190	9	20	1,178	41
1999	724	5	461	5,557	1,049	2	70	1,385	61
2000	808	5	539	6,180	1,121	8	325	1,531	86
2001	732	15	255	6,932	908	5	1,039	1,691	91
2002	1,164	11	222	6,230	965	8	1,633	1,557	27
2003	1,198	4	167	5,352	1,039	10	1,084	2,196	11
2004	1,339	23	33	(6,165)	1,454	33	884	1,828	16
2005				(6,972)			437	1,813	26
2006				(6,363)	(1,465)		438	2,587	
2007							(345)	(2,907)	

1 Contains trolling and harpoon but majority of catch obtained by harpoon.

2 Distant water and Offshore longline gears combined. Catches by gear for 1952-1970 were estimated roughly using FAO statistics and other data. Catches for 1971-2002 are more reliably estimated.

3 For 1952-1970 "Other" refers to catches by other baitfishing methods, trap nets, and various unspecified gears.

4 Offshore longline category does not include catches unloaded in foreign ports.

5 Includes Offshore Gillnet, Offshore Others, Coastal Harpoon, Coastal Setnet, Coastal Gillnet and Other Net, Coastal Longline, Coastal Others

Table 2. (Continued)

Year	Korea	Mexico	United States [7]					Grand Total
	Longline	Other [6]	Gill Net	Harpoon	Hawaii Longline	California Longline [8]	Other [9]	
1952	-	-	-	-				11,691
1953	-	-	-	-				12,408
1954	-	-	-	-				13,611
1955	-	-	-	-				14,111
1956	-	-	-	-				15,485
1957	-	-	-	-				15,251
1958	-	-	-	-				19,734
1959	-	-	-	-				18,786
1960	-	-	-	-				22,045
1961	-	-	-	-				21,539
1962	-	-	-					12,671
1963	-	-	-					11,604
1964	-	-	-					9,225
1965	-	-	-					11,349
1966	-	-	-					12,283
1967	-	-	-					12,689
1968	-	-	-					12,424
1969	-	-	-					12,177
1970	-	-	-	612	5	-	10	11,081
1971	-	-	-	99	1	-	3	9,013
1972	-	2	-	171	0	-	4	8,736
1973	-	4	-	399	0	-	4	9,816
1974	-	6	-	406	0	-	22	9,626
1975	-	-	-	557	0	-	13	12,257
1976	-	-	-	42	0	-	13	13,675
1977	-	-	-	318	17	-	19	12,960
1978	-	-	-	1,699	9	-	13	14,049
1979	-	7	-	329	7	-	57	11,946
1980	-	380	160	566	5	-	62	10,906
1981	-	1,575	473	271	3	0	2	12,819
1982	-	1,365	945	156	5	0	10	11,841
1983	-	120	1,693	58	5	0	7	12,763
1984	-	47	2,647	104	3	12	75	13,520
1985	-	18	2,990	305	2	0	104	15,981
1986	-	422	2,069	291	2	0	109	14,761
1987	-	550	1,529	235	24	0	31	15,439
1988	-	613	1,376	198	24	0	64	14,001
1989	-	690	1,243	62	218	0	56	13,279
1990	-	2,650	1,131	64	2,436	0	43	15,672
1991	-	861	944	20	4,508	27	44	14,306
1992	-	1,160	1,356	75	5,700	62	47	19,842
1993	-	812	1,412	168	5,909	27	161	20,368
1994	-	581	792	157	3,176	631	24	16,228
1995	-	437	771	97	2,713	268	29	14,559
1996	12	439	761	81	2,502	346	15	13,954
1997	246	2,365	708	84	2,881	512	11	17,234
1998	123	3,603	931	48	3,263	418	19	18,084
1999	104	1,136	606	81	3,100	1,229	27	15,597
2000	161	2,216	649	90	2,949	1,885	33	18,586
2001	349	780	375	52	220	1,749	19	15,212
2002	350	465	302	90	204	1,320	3	14,551
2003	311	671	216	107	147	1,812	11	14,336
2004	(350)	270	182	69	213	898	44	(13,801)
2005	(407)	235	220	77	1,475		5	(11,667)
2006	(477)	347	443	71	1,211		5	(13,407)
2007	(452)	(250)	(474)	(59)	(1,750)		(22)	(6,259)

6 All gears combined

7 Estimated weight of retained catch. Does not include discards

8 For 2005-2007 California and Hawaii longline catches are combined

9 Other includes pole and line, purse seine, troll and troll/handline, half ring, and unspecified gears.

Table 3. Striped marlin (*Tetrapuerus audax*) catches (in metric tons) in the North Pacific Ocean by fisheries, 1952-2007. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ).

Year	Japan						Chinese Taipei		
	Gill Net		Longline			Other [2]	Longline		Other [5]
	Small Mesh	Large Mesh	Distant Water [1]	Coastal	Other		Distant Water	Offshore [4]	
1952	0	0	2,901		722	1,564			
1953	0	0	2,138		47	954			
1954	0	0	3,068		52	1,088			
1955	0	0	3,082		28	1,038			
1956	0	0	3,729		59	1,996			
1957	0	0	3,189		119	2,459			
1958	0	3	4,106		277	2,914		543	387
1959	0	2	4,152		156	3,191		391	354
1960	0	4	3,862		101	1,937		398	350
1961	0	2	4,420		169	1,797		306	342
1962	0	8	5,739		110	1,912		332	211
1963	0	17	6,135		62	1,910		560	199
1964	0	2	14,304		42	2,344		392	175
1965	0	1	11,602		19	2,796		355	157
1966	0	2	8,419		112	1,573		370	180
1967	0	3	11,698		127	1,551	2	385	204
1968	0	3	15,913		230	1,040	1	332	208
1969	0	3	8,544	600	3	2,630	2	571	192
1970	0	3	12,996	690	181	1,029	0	495	189
1971	0	10	10,965	667	259	2,016	0	449	135
1972	0	243	7,006	837	145	990	9	380	126
1973	0	3,265	6,299	632	118	630	1	568	139
1974	0	3,112	6,625	327	49	775	24	650	118
1975	0	6,534	5,193	286	38	685	64	732	96
1976	0	3,561	4,996	244	34	571	32	347	140
1977	0	4,424	2,722	256	15	547	17	524	219
1978	0	5,593	2,464	243	27	418	0	618	78
1979	0	2,532	4,898	366	21	526	26	432	122
1980	0	3,467	5,871	607	5	537	61	223	132
1981	0	3,866	3,957	259	12	538	17	491	95
1982	0	2,351	5,211	270	13	655	7	397	138
1983	22	1,845	3,575	320	10	792	0	555	214
1984	76	2,257	3,335	386	9	719	0	965	330
1985	40	2,323	3,698	711	24	732	0	513	181
1986	48	3,536	5,178	901	33	571	0	179	148
1987	32	1,856	5,439	1,187	6	513	31	383	151
1988	54	2,157	5,768	752	7	668	7	457	169
1989	102	1,562	4,582	1,081	13	537	8	184	157
1990	19	1,926	2,298	1,125	3	545	2	137	256
1991	27	1,302	2,677	1,197	3	506	36	254	286
1992	35	1,169	2,757	1,247	10	302	1	219	197
1993	0	828	3,286	1,723	1	443	5	221	142
1994	0	1,443	2,911	1,284	1	383	1	137	196
1995	0	970	3,494	1,840	3	278	27	83	82
1996	0	703	1,951	1,836	4	152	26	162	47
1997	0	813	2,120	1,400	3	163	59	290	47
1998	0	1,092	1,784	1,975	2	304	90	205	50
1999	0	1,126	1,608	1,551	4	183	66	128	42
2000	0	1,062	1,152	1,109	8	297	153	161	55
2001	0	1,077	985	1,326	11	237	121	129	51
2002	0	1,264	764	795	5	291	251	226	29
2003	0	1,064	1,008	826	3	203	241	91	43
2004	(0)	(1,339)	(761)	(964)	(2)	(90)	261	95	24
2005			(803)				176	76	32
2006			(620)	(520)			204	87	(140)
2007							(102)	(133)	(170)

1 Distant water and offshore catches combined
2 Contains bait fishing, net fishing, trapnet, trolling, harpoon, etc.
3 Estimated from catch in number of fish.
4 Offshore longline category does not include catches unloaded in foreign ports.
5 Includes Drift Gillnet, Offshore Gillnet, Offshore Others, Coastal Harpoon, Coastal Setnet, Coastal Gillnet and Other Net, Coastal Longline, Coastal Others

Table 3. (Continued)

Year	Korea	Mexico	United States				Costa Rica	Grand Total
	Longline	Sport [3]	Troll	Handline	Sport [3]	Longline	Sport [3]	
1952					23			5,210
1953					5			3,144
1954					16			4,224
1955					5			4,153
1956					34			5,818
1957					42			5,809
1958					59			8,289
1959					65			8,311
1960					30			6,682
1961					24			7,060
1962					5			8,317
1963					68			8,951
1964					58			17,317
1965					23			14,953
1966					36			10,692
1967					49			14,019
1968					51			17,778
1969					30			12,575
1970					18			15,601
1971					17			14,518
1972					21			9,757
1973					9			11,661
1974					55			11,735
1975					27			13,655
1976					31			9,956
1977					41			8,765
1978					37			9,478
1979					36			8,959
1980					33			10,936
1981					60			9,295
1982					41			9,083
1983					39			7,372
1984					36			8,113
1985			18		42			8,282
1986			19		19			10,632
1987			30	1	28	272		9,929
1988			54		30	504		10,627
1989			24	0	52	612		8,914
1990		181	27	0	23	538		7,080
1991		75	41	0	12	663	106	7,185
1992		142	38	1	25	459	281	6,883
1993		159	68	1	11	471	438	7,797
1994		179	35	0	17	326	521	7,434
1995		190	52	0	14	543	153	7,729
1996	348	237	54	1	20	418	122	6,081
1997	828	193	38	1	21	352	138	6,466
1998	519	345	26	0	23	378	144	6,937
1999	352	266	28	1	12	364	166	5,897
2000	436	312	15		10	200	97	5,067
2001	206	237	44		0	351	151	4,926
2002	153	305	30	0	0	226	76	4,415
2003	172	322	29	0	0	538	79	4,619
2004	(75)		33	2	0	376	(19)	(4,041)
2005	(115)		20	0	0	511		(1,733)
2006	(56)		21	0	0	611		(2,259)
2007	(28)		(13)		()	(274)		(720)

Table 4. Pacific bluefin tuna (*Thunnus orientalis*) catches (in metric tons) in the North Pacific Ocean by fisheries, 1952-2007. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ).

Year	Japan									Korea [6]		Chinese-Taipei			
	Purse Seine		Set Net	Pole and Line	Troll [1]	Longline [2]			Others [5]	Purse Seine [7]	Trawl	Purse Seine	Gill Net	Longline	Others
	Tuna PS	Small PS				Distant Water NP [3]	Distant Water SP [3]	Coastal [4]							
1952	7,680		2,145	2,198	667	2,694	9		1,700						
1953	5,570		2,335	3,052	1,472	3,040	8		160						
1954	5,366		5,579	3,044	1,656	3,088	28		266						
1955	14,016		3,256	2,841	1,507	2,951	17		1,151						
1956	20,979		4,170	4,060	1,763	2,672	238		385						
1957	18,147		2,822	1,795	2,392	1,685	48		414						
1958	8,586		1,187	2,337	1,497	818	25		215						
1959	9,996		1,575	586	736	3,136	565		167						
1960	10,541		2,032	600	1,885	5,910	193		369						
1961	9,124		2,710	662	3,193	6,364	427		599						
1962	10,657		2,545	747	1,683	5,769	413		293						
1963	9,786		2,797	1,256	2,542	6,077	449		294						
1964	8,973		1,475	1,037	2,784	3,140	114		1,884						
1965	11,496		2,121	831	1,963	2,569	194		1,106					54	
1966	10,082		1,261	613	1,614	1,370	174		129						
1967	6,462		2,603	1,210	3,273	878	44		302					53	
1968	9,268		3,058	983	1,568	500	7		217					33	
1969	3,236		2,187	721	2,219	313	20	565	195					23	
1970	2,907		1,779	723	1,198	181	11	426	224						
1971	3,721		1,555	938	1,492	280	51	417	317					1	
1972	4,212		1,107	944	842	107	27	405	197					14	
1973	2,266		2,351	526	2,108	110	63	728	636					33	
1974	4,106		6,019	1,192	1,656	108	43	3,183	754					47	15
1975	4,491		2,433	1,401	1,031	215	41	846	808					61	5
1976	2,148		2,996	1,082	830	87	83	233	1,237					17	2
1977	5,110		2,257	2,256	2,166	155	23	183	1,052					131	2
1978	10,427		2,546	1,154	4,517	444	7	204	2,276					66	2
1979	13,881		4,558	1,250	2,655	220	35	509	2,429					58	
1980	11,327		2,521	1,392	1,531	140	40	671	1,953					114	5
1981	25,422		2,129	754	1,777	313	29	277	2,653					179	
1982	19,234		1,667	1,777	864	206	20	512	1,709	31			2	207	
1983	14,774		972	356	2,028	87	8	130	1,117	13		9	2	175	
1984	4,433		2,234	587	1,874	57	22	85	868	4		5		477	8
1985	4,154		2,562	1,817	1,850	38	9	67	1,175	1		80	11	210	
1986	7,412		2,914	1,086	1,467	30	14	72	719	344		16	13	70	
1987	8,653		2,198	1,565	880	30	33	181	445	89		21	14	365	
1988	3,583	22	843	907	1,124	51	30	106	498	32		197	37	108	25
1989	6,077	113	748	754	903	37	32	172	283	71		259	51	205	3
1990	2,834	155	716	536	1,250	42	27	267	455	132		149	299	189	16
1991	4,336	5,472	1,485	286	2,069	48	20	170	650	265			107	342	12
1992	4,255	2,907	1,208	166	915	85	16	428	1,081	288		73	3	464	5
1993	5,156	1,444	848	129	546	145	10	667	365	40		1		471	3
1994	7,345	786	1,158	162	4,111	238	20	968	398	50				559	
1995	5,334	13,575	1,859	270	4,778	107	10	571	586	821				335	2
1996	5,540	2,104	1,149	94	3,640	123	9	778	570	102				956	
1997	6,137	7,015	803	34	2,740	142	12	1,158	811	1,054				1,814	
1998	2,715	2,676	874	85	2,865	169	10	1,086	700	188				1,910	
1999	11,619	4,554	1,097	35	3,387	127	17	1,030	709	256				3,089	
2000	8,193	8,293	1,125	102	5,121	121	7	832	689	1,976	0			2,780	2
2001	3,139	4,481	1,366	180	3,329	63	6	728	782	968	10			1,839	4
2002	4,171	5,102	1,100	99	2,427	47	5	794	631	767	1			1,523	4
2003	945	5,399	839	44	1,839	85	12	1,152	446	2,141	0			1,863	21
2004	4,792	2,577	896	132	2,182	231	9	1,616	514	636	0			1,714	3
2005	3,871	7,389	2,182	549	3,406	117	14	1,818	548	594				1,368	
2006	3,889	3,272	1,421	108	1,544	77	16	1,058	777	949				1,149	1
2007	(2,943)	(2,749)	(1,395)	(236)	(2,385)	(372 [8])		(684 [9])	(1,209)	(946)				(1,401)	(10)

1 The troll catch for farming estimating 10 - 20 mt since 2000, is excluded.

2 Catch of the distant-water and offshore longline consist of those yielded by vessels larger than 0 GRT.

3 NP and SP indicate North and South Pacific, respectively.

4 Catch of the coastal longline consist of those yielded by vessels smaller than 20 GRT.

5 Others fisheries include drift net, handline, trawl, other longline and unclassified fisheries

6 Catch statistics of Korea derived from Japanese Import statistics for 1982-1999.

7 Annual catches of the Korean purse seine from 2000 to 2006 were modified due to chage of data source.

8 Because of unavailability of logbook data, annual catch of the distant-water and offshore longline fishery could not estimate for NP and SP Annual catch of the dist. & off. longline might be contaminated by the catch of small vessel (< 20 GRT) categorized into the offshore longliners.

9 Annual catch of a part of coastal longline might be incorpolated into that of the dist. & off. longline.

Table 4. (Continued)

Year	United States							Mexico		New Zealand	Others	Grand Total
	Purse Seine	Gill Net	Pole and Line	Troll	Sport	Longline	Others	Purse Seine	Others			
1952	2,076				2							19,171
1953	4,433				48							20,117
1954	9,537				11							28,574
1955	6,173				93							32,005
1956	5,727				388							40,382
1957	9,215				73							36,591
1958	13,934				10							28,610
1959	3,506	0	56	0	13	0	0	171	32			20,538
1960	4,547	0	0	0	1	0	0	0				26,078
1961	7,989	0	16	0	23	0	0	130				31,236
1962	10,769	0	0	0	25	0	0	294				33,195
1963	11,832	0	28	0	7	0	0	412				35,481
1964	9,047	0	39	0	7	0	0	131				28,631
1965	6,523	0	11	0	1	0	66	289				27,223
1966	15,450	0	12	0	20	0	0	435				31,161
1967	5,517	0	0	0	32	0	0	371				20,745
1968	5,773	0	8	0	12	0	0	195				21,622
1969	6,657	0	9	0	15	0	0	260				16,420
1970	3,873	0	0	0	19	0	0	92				11,432
1971	7,804	0	0	0	8	0	0	555				17,138
1972	11,656	0	3	0	15	0	42	1,646				21,216
1973	9,639	0	1	0	54	0	20	1,084				19,620
1974	5,243	0	0	0	58	0	30	344				22,800
1975	7,353	0	83	0	34	0	1	2,145				20,949
1976	8,652	0	22	0	21	0	3	1,968				19,382
1977	3,259	0	10	0	19	0	3	2,186				18,811
1978	4,663	0	4	0	5	0	2	545				26,863
1979	5,889	0	5	0	11	0	1	213				31,715
1980	2,327	0	0	0	7	0	24	582				22,634
1981	867	4	0	10	9	0	0	218				34,641
1982	2,639	1	1	0	11	0	0	506				29,387
1983	629	3	6	0	33	0	2	214				20,558
1984	673	6	5	0	49	1	18	166				11,572
1985	3,320	8	3	0	89	0	18	676				16,088
1986	4,851	16	1	0	12	0	40	189				19,266
1987	861	2	0	0	34	0	18	119				15,507
1988	923	4	5	0	6	0	42	447	1			8,989
1989	1,046	3	9	0	112	0	9	57				10,945
1990	1,380	11	61	0	65	0	20	50				8,654
1991	410	4	0	0	92	2	0	9		2		15,781
1992	1,928	9	2	0	110	38	13	0	0	0		13,994
1993	580	32	5	0	298	42	24			6		10,811
1994	906	28	1	0	89	30	0	63	2	2		16,916
1995	657	20	1	0	258	29	0	10		2		29,224
1996	4,639	43	0	2	40	25	0	3,700		4		23,518
1997	2,240	58	1	1	156	26	47	367		14		24,631
1998	1,771	40	4	128	413	54	54	1	0	20		15,764
1999	184	22	2	20	441	54	87	2,369	35	21		29,154
2000	693	30	12	1	342	19	0	3,025	99	21		33,481
2001	292	35	1	6	356	6	0	863		50		18,504
2002	50	7	2	1	654	2	0	1,708	2	55	10	19,162
2003	22	14	3	0	394	1	0	3,211	43	41	19	18,534
2004	0	10	0	0	49	1	0	8,880	14	67	10	24,333
2005	201	5	0	0	79	1	0	4,542		20	7	26,712
2006	0	1	0	0	96	1	0	9,706		21	3	24,090
2007	(42)	(2)			(14)	()		(4,005)				(18,393)

Table 5. Schedule of ISC and other tuna and tuna-like species regional fisheries management organization meetings, 2008-2010

		Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10
ISC	ALB WG	Update (15-16)							Model Dev (2/24-3/3)	Model Dev (2/24-3/3)				Update? (8-9)			Data Prep. Model Dev. (6-13)					Full Assess (2-9)	
	PBF WG	Update (17-18)					Model Dev. Ref. pts. (10-17)							Update? (10-11)					Mod. Dev.				
	BILL WG					Stock cond. SWO (11-14)		SWO Rev. (13-21)			SWO Full Stock Assess.							Rev.?						Rev.?
	BC WG							Rev. (14-15)															
	STAT WG	Rev. (18-21)												Rev. (12-14)									
	Plenary	(23-28)												(15-18&20)									
Others	ICCAT			SCRS (29-Oct.3)		Comm. (17-24)																	
	IATTC				Worskhop (14-17)							Workshop											
	WPFC		SC (11-22)	NC (9-11)	TCC (2-7)		Comm. (8-12)								SC (10-21)	NC (15-17)	TCC (1-6)		Comm. (7-11)				
	IOTC						SC (1-5)																
	OTHERS				WFC (20-24)							Tuna Conf?											

Explanation:
Model Dev. = Model development and analyses
Data Prep. = Data preparation and review
Ref. pts. = Biological reference points
Stock Cond. = Stock condition advice
Full Assess. = Complete stock assessment with new model, data or information
Update = Updated stock assessment with additional data and minor corrections to existing data
Rev. = Review of activities, plans and progress

Stock assessment target dates (last full assessment)

2009
SWO Full
PBF update (2008)

2010
ALB Full (2006)
MLS Full (2007)
SWO Update (2009)

2011
PBF Full (2008)
ALB Update (2010)

2012
SWO Full (2009)