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

PLENARY SESSION

15-20 July 2009
Kaohsiung, Taiwan

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Highlights of the ISC9 Plenary Meeting

The ISC9 Plenary, held in Kaohsiung, Taiwan from 15-20 July 2009, was attended by members from Canada, Chinese Taipei, Japan, Korea, the United States and the Secretariat for the Pacific Community. Regarding tuna stocks, the Plenary reviewed recommendations from the albacore and Pacific bluefin tuna working groups regarding stock status based on data updates and sensitivity analyses. Regarding billfish stocks, the Plenary maintained the conservation advice from ISC7 for striped marlin and endorsed a new stock assessment for swordfish which found the stocks to be healthy and well above the level required to sustain recent catches. A special seminar on reference points for fisheries management was held, and a proposal for multi-national, multi-species biological research was completed and endorsed. Several requests from the Western and Central Pacific Fisheries Commission were considered, and a Memorandum of Understanding with the Inter-American Tropical Tuna Commission was progressed. It was agreed to pursue organizing a World Blue Marlin Symposium to convene experts on this species and gather information for the upcoming stock assessment. For the coming year, work priorities will focus on achieving better functionality for the ISC website and database through engaging a Database Administrator and webpage designer. The ISC workplan for 2009- 2010 includes revisiting the 2009 swordfish assessment and preparing for albacore tuna, Pacific bluefin tuna, and blue marlin stock assessments. The next Plenary will be held in July 2010 in Canada.

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 (US). 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 a number of guidelines for its operations. The two main goals of the ISC are (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 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 2008, although some data for the most recent years are provisional. The total landed amount reported thus far for 2007 was 91,600 metric tons (t) of albacore – *Thunnus alalunga*, 20,234* t (* indicates preliminary data) of Pacific bluefin tuna – *T. orientalis*, 9,300* t of swordfish – *Xiphias gladius* and 600* t of striped marlin – *Tetrapterus audax*. The total catch of these four species in 2007, 121,800* t, represents an increase of about 13% relative to 2006 catches (107,300 t). Catches in 2007 relative to 2006 by species showed a large increase for albacore (28,000 t), and a slight decrease (1,000*-4,000* t) for Pacific bluefin tuna, swordfish and striped marlin (Tables 1-4).

1.2 Opening of the Meeting

The Ninth Plenary meeting of the ISC (ISC9) was convened at Kaohsiung, Taiwan at 0900 on 15 July 2009 by the ISC Chairman, G. Sakagawa. A role call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea, the USA, and the Secretariat for the Pacific Community (SPC) (*Annex 1*). A representative of the Western and Central Pacific Fisheries Commission (WCPFC) attended as an Observer. ISC members China and Mexico, and organizations with significant interest including the Inter-American Tropical Tuna Commission (IATTC), the Food and Agriculture Organization (FAO), and the North Pacific Marine Science Organization (PICES) did not attend the Plenary.

The Honorable Wu Hsiung Chen, Minister of the Council of Agriculture, Taiwan delivered the opening address. Noting that this meeting marks the first time an ISC Plenary meeting is being held in Taiwan, he re-confirmed his commitment to supporting research and management of sustainable fish stocks. He welcomed the meeting as further means of strengthening Taiwan's ongoing efforts to improve fisheries data quality and to promote international scientific exchange and collaboration. Mr. Chen closed by wishing the meeting success and delegates a pleasant and memorable stay.

2 ADOPTION OF AGENDA

The agenda for the meeting was considered (*Annex 2*) and the ISC Chairman added two new items. The first was a discussion of habitat issues to be raised under Agenda Item 7 (Stock Status and Conservation Advice) and the second was the matter of ISC working paper which will be covered under Agenda Item 11 (Administrative Matters). The agenda was then 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

The ISC Chairman noted that national reports were submitted by Canada, Chinese Taipei, Japan, Korea, Mexico and the United States, but China had not submitted a national report for ISC9.

3.1 Canada

J. Holmes presented a summary of 2008 catch, nominal effort, and nominal catch-per-unit-effort (CPUE) data for the Canadian North Pacific albacore troll fishery (*ISC/09/PLENARY/07*). The data presented in this report are based on 95% logbook coverage and are raised to 100%. The Canadian fleet of 134 vessels in 2008 is the smallest fleet on record since 1995 and operated primarily within the coastal waters of the United States and Canada and in adjacent high seas areas. All catch and effort occurred east of 150°W, i.e., Canadian vessels did not operate anywhere within the WCPFC Convention Area in 2008. Preliminary estimates of North Pacific albacore catch and effort are 5,478 tonnes (t) and 5,881 vessel days (v-d), respectively, in 2008. These figures represent a 10% and 17% reduction in catch and effort relative to 2007. Nominal CPUE was 0.931 t/v-d in 2008, the highest on record. Approximately 87% of the 2008 catch occurred within the USA EEZ, 9% of the catch occurred in high seas waters and only 4% in the Canadian EEZ, reflecting the reduced availability in temperate areas due to cold ocean conditions in 2008. By-catch of other tuna or billfish species, sharks, sea turtles and sea birds was negligible.

Fishers voluntarily provided 736 fork length measurements, which showed that albacore in the Canadian catch ranged from 54 cm (3.31 kg) to 89 cm (14.75 kg)

in size. Three modes are present in the length frequency data at 57 cm (3.89 kg), 64 cm (5.50 kg) and 74-75 cm (8.67 kg), and correspond to 2-, 3- and 4-yr old fish, respectively. Size composition data sampled from Canadian catches landed in U.S. ports by the U.S. port sampling program were not available for this report.

Canada is undertaking research to (1) develop CPUE standardization procedures that will account for the increasing experience of captains remaining in the fishery and the adoption of satellite technology for targeting fishing locations, and (2) to forecast albacore availability in temperate waters based on sea surface temperature and ocean productivity. An electronic log-book pilot program involving 10-15 vessels is continuing during the 2009 fishing season.

Discussion

In response to several questions, J. Holmes explained that fishery distribution information is presented based on catch, rather than CPUE, because of potential biases in the nominal CPUE statistics which have not yet been corrected through standardization. These biases include increasingly effective targeting due to satellite technology developments since approximately 2002 and the ongoing attrition of less experienced fishermen from the fishery. The unit of vessel days used in the presentation refers to fishing days and excludes transit time. An onboard size sampling program is being implemented to address questions regarding potential migration patterns in the fishing grounds. The sampling program calls for the first ten fish landed daily to be measured. This, in effect, randomizes the sample and should not lead to biases when compared to other forms of sampling, such as port sampling, since there is not expected to be any high-grading at sea.

J. Holmes also described the acquisition of logbook data in more detail. The Canadian government requires logbooks to be filled in and submitted. However, the logbooks are purchased by fishermen from the Canadian Highly Migratory Species Foundation, an industry body, which uses the proceeds to maintain the logbook database.

3.2 Chinese Taipei

The national report for Chinese Taipei was presented by S.L. Lin (*ISC/09/PLENARY/09*). There are two kinds of Taiwanese tuna fleets operating in the North Pacific Ocean: large-scale tuna longline (LTLL) vessels which are ≥100 GT, and small-scale tuna longline (STLL) vessels which are <100 GT. This report compiles the catch statistics of the above mentioned fleets for the North Pacific. The number of active LTLL vessels operating in the North Pacific Ocean in 2006 was 104, but reduced in 2007 and 2008 to 90 and 84, respectively. In 2008, LTLL in the North Pacific were estimated to have caught 2,490 tons of albacore and 338 tons of swordfish. There was no substantial change in these levels in 2008 as compared to 2007. The report provides catch estimates for North Pacific albacore,

Pacific bluefin tuna, bigeye tuna, yellowfin tuna, swordfish and marlins by Taiwanese longline fisheries from 1997 to 2008. It also shows the fishing effort distribution of Taiwanese LTLL vessels operating in the North Pacific region during 2006-2008. Due to high fuel price, some vessels ceased to operate in 2008. This in turn created difficulties for dispatching observers and as a result, observer trips decreased from 8 in 2007 to 2 in 2008.

Discussion

The ISC Chairman noted that all ISC members should be reporting on all fleets which catch tuna and tuna-like fishes in the North Pacific Ocean and reminded members to consider expanding the coverage of their annual report in future submissions.

3.3 Japan

H. Nakano presented the national report for Japan (*ISC/09/PLENARY/12*). The total landing of tunas (excluding skipjack) caught by Japanese fisheries in the north Pacific Ocean in 2007 was 127,000 t and the total landing of swordfish and billfishes (striped marlin, blue marlin and black marlin) was 11,200 t. Landings of skipjack tuna totalled 225,000 t. Japanese tunas, billfishes and skipjack catches in 2007 did not differ substantially from 2006 levels.

Japanese tuna fisheries consist of the three major fisheries: longline, purse seine, pole-and-line; as well as other miscellaneous fisheries like troll, drift-net, and set-net fisheries. These fisheries comprise around 90% of the total tuna catch of Japanese fisheries in recent years. Japanese research activities on tuna and tuna-like species in the Pacific Ocean in 2008 and first half of 2009 were described including tagging studies, sampling of tuna larvae/early juveniles using plankton nets, and joint research with Chinese Taipei on age and growth curves for Pacific bluefin tuna.

Discussion

In response to a question regarding which species are included in Japan's data as "other marlins", it was clarified that such species would include sailfish and short-bill spearfish. With regard to whether billfishes are caught by Japanese gill net fisheries, K. Yokawa explained that large scale drift net fisheries in Japan target marlin, but the catches of black marlin and sailfish in these fisheries is rather low. There is a type of gear used off southern Kyushu which could be considered a kind of gill net and sometimes catch sailfish. While the Japan government's tagging research program does not include billfishes, K. Yokawa mentioned that annually about 40-50 marlins, mostly blue and striped, are tagged by Japanese sport fishermen.

3.4 Korea

J. T. Yoo presented the national report for Korea (*ISC/09/PLENARY/08*) which included information on longline and purse seine fisheries in the North Pacific and catches of Pacific bluefin tuna by domestic fisheries in Korean waters. The two main sources of data are fishery production surveys by the Ministry for Food, Agriculture, Forestry & Fisheries (MIFAFF) and logbook data held by the National Fisheries Research & Development Institute (NFRDI).

Total annual catch of tunas and tuna-like species by Korean distant-water longline fishery in the North Pacific ranged between 60 and 34,080 t, and averaged 15,103 t, during 1972-2008. Major species caught by the longliners in the North Pacific were bigeye tuna (47.1%) and yellowfin tuna (27.8%). The annual catch of bigeye tuna by longliners generally tended to increase during 1972-2008, while the annual catch of yellowfin tuna steadily decreased after the mid 1990s. In 2008, the catches of bigeye and yellowfin tunas by longliners were 12,285 and 2,302 t, respectively.

The majority of the catch of distant-water purse seiners during 1980-2008 was skipjack and yellowfin tuna. Total annual catch of Korea distant-water purse seine fishery tended to decrease after a peak of 100,687 t in 2003. The annual catch of skipjack tuna by the purse seiners peaked at 88,654 t in 2003, and then decreased. In recent years, the annual catch of yellowfin tuna by purse seiners fluctuated around 10,000 tons.

Pacific bluefin tuna in Korean waters has mainly been caught by Korean domestic offshore purse seiners as bycatch. The main fishing ground for Pacific bluefin tuna was around Jeju Island. The number of offshore purse seiner vessels has gradually decreased since 1994. The catch of Pacific bluefin tuna peaked at 2,141 t in 2003, and then rapidly decreased. Annual mean fork length of Pacific bluefin tuna during 2000-2008 tended to increase, and in 2008 two modes of larger fish (120 and 150 cm) appeared in the length frequency distribution.

Discussion

A number of issues were raised with regard to data quality and reporting including:

- Questions regarding the potential for species mis-identification, in particular for bigeye tuna. It was acknowledged that mis-identification could lead to underestimation of the number of bigeye tuna as well as to uncertainty in the data for other species, and that additional sampling and/or estimation techniques may be necessary to improve data quality.
- Apparently sharp declines in catches since 2006 may be due to incomplete receipt of data at the time these data were tabulated.

- Historical and current catches of tuna and tuna-like species by gear types other than longline and purse seine, e.g. the former distant water gillnet fishery, should be investigated and reported, if possible.
- If available, distribution data for the distant water fisheries should be presented.
- If billfish data are available by species, then species-specific data should be provided. However, if the species identifications are dubious, the data should be annotated to explain this.
- If the logbook data coverage is less than 100%, the data should be raised to represent the total catches, i.e. including those catches which are not reported in logbooks.

The delegate from Korea agreed to investigate these issues with regard to available Korean data in order to improve data quality for future ISC submissions.

3.5 Mexico

Although the delegate from Mexico was, on short notice, unable to attend ISC9, a national report was submitted (*ISC/09/PLENARY/10*). (The following summary was prepared based on this submission.) The Mexican fishery for tuna and tuna-like species is mainly a purse seine fishery focused on yellowfin tuna, and to a lesser extent skipjack tuna. Preliminary data for 2008 indicate that total landings increased to 123,000 t from 108,000 t in 2007. The species composition was approximately 70% yellowfin tuna, 18% skipjack and 12% other species. Pacific bluefin tuna is included in the other species category; preliminary catch data for 2008 indicate 4400 t of Pacific bluefin were caught by Mexican purse seiners, a slight increase from 2007 levels. In addition to the purse seine fishery, Mexico has a swordfish fishery, which is composed of longliners and some gill netters. Swordfish comprise 12-25% of the catch of this fleet and sharks, in particular blue shark, comprise as much as 63% of the catches in recent years. Striped marlin is the predominant billfish caught in Mexican waters, and all billfishes except swordfish are reserved for the sport fishery. The number of striped marlin caught at three main locations on the Mexican Pacific coast from 1990-2006 ranged from 9,500 to 29,000 but increased to 58,000 in 2007 and a preliminary estimate of 59,000 in 2008.

Discussion

It was noted that since some of Mexico's data are reported in numbers of fish, these data will need to be converted to weight before they can be used by the ISC and its working groups for annual reporting and data analysis. The ISC Chairmen suggested that Mexico work toward identifying appropriate conversion factors in order to report their data in weight in future submissions.

3.6 United States

J. Childers presented the report on U.S. fisheries and research (*ISC/09/PLENARY/11*). U.S. fisheries for highly migratory species in the North Pacific Ocean range from coastal, artisanal fisheries to distant water, large scale fisheries. One of the largest U.S. fisheries in the North Pacific is the western Pacific purse seine fishery operating within the WCPFC area under the South Pacific Regional Tuna Treaty. This fishery operates mainly in the tropical areas of the South Pacific and catches skipjack, yellowfin and bigeye tunas. The other large scale U.S. fishery in the North Pacific is the longline fishery based out of Hawaii and California. This fishery targets swordfish and tunas. Other fisheries include a distant water troll fishery operating from the West Coast to the mid-Pacific; a West Coast based pole-and-line fishery and smaller scale tropical troll fisheries in Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands; tropical handline fisheries in Hawaii; a coastal gillnet fishery off California; and a small-scale harpoon fishery off California. Catches in 2008 increased in the purse seine fishery operating in the central and western Pacific and in the longline fishery based out of Hawaii and California. Various monitoring and economic research projects are being conducted to enhance available information on U.S. Pacific fisheries, and to assess economic impacts and trends in these fisheries. These studies include tuna and billfish tagging and studies of age and growth, size composition and foraging; shark tagging, age and growth, abundance and juvenile surveys, and post-release mortality studies; and gear modification research to reduce bycatch of turtles and sharks.

Discussion

Several specific technical points were clarified by J. Childers in response to questions arising during the discussion, including:

- Catches of swordfish by pole-and-line gear in 2008 were mainly by small scale coastal fisheries based in southern California.
- The apparent decline in reported catches of yellowfin, skipjack and Pacific bluefin tunas after the mid-1990s may be due to shift in targeting by the pole-and-line albacore fleet which used to target yellowfin in tropical waters but now focus on albacore in temperate waters.
- The large increase in pole-and-line vessels in 2007-2008 is an artifact and will be corrected with review of classification of distant water troll and pole-and-line vessels. It was noted that 2007 and 2008 data are annotated as being preliminary.
- The increase in purse seine vessels in 2007-2008 is due to changing economic conditions. They are not all newly built vessels.
- The observed contraction in the fishery ground of the US albacore troll fishery (*ISC/09/PLENARY/11*, Figure 2) is probably due to a combination of increasing fuel prices and increased schooling of albacore in coastal

waters. The caption for this figure should read “Distribution of catch in number of fish in the US albacore troll fishery, 2008).

- More information on the fishing grounds, size composition and seasonality of catches of Pacific bluefin tuna will be provided to the PBFWG. These matters will be further addressed in the PBFWG by correspondence.

4 REPORT OF THE ISC CHAIRMAN

The ISC Chairman reported that the ISC completed nine intercessional workshops this year. Each workshop was organized for members and invited experts to participate in advancing collaborative research and to complete tasks associated with stock assessment research on tuna and tuna-like species in the North Pacific Ocean. Key accomplishments during the year include:

1. Completion of a full stock assessment for swordfish;
2. Research on sources of mis-specification, particularly in M for older ages, in the Pacific bluefin tuna stock assessment of 2008;
3. Preparations for the next full stock assessment of albacore;
4. Development of plans for addressing pending technical issues for striped marlin and swordfish stock assessments;
5. Development of a proposal to improve biological information and reduce uncertainties in the stock assessments; and
6. Development of a proposal for advancing a blue marlin stock assessment.

In addition to these accomplishments, the ISC experienced several challenges, including the loss of the services of C. Boggs, R. Conser and N. Miyabe, who stepped down as leaders of ISC working groups. These colleagues served ISC with distinction and contributed to the success of the ISC since the beginning of the working groups and will be missed. Succeeding R. Conser as Chairman of the Albacore Working Group (ALBWG) will be J. Holmes. Succeeding N. Miyabe as Chairman of the Statistics Working Group (STATWG) will be S.K. Chang.

The ISC also experienced difficulties in securing commitments and support for effective operations of the ISC. Support not provided from key ISC members included:

1. Funding for hiring of a professional Database Administrator (DA) and support staff to handle mounting database-associated matters;
2. Funding and authority to execute reconstruction and maintenance of a user-friendly ISC website to serve as an up-to-date information source;
3. Commitment by some Working Group Chairmen to complete workshop reports by due dates and according to standards;
4. Funding of two projects (albacore sampling and database management support) submitted for funding to the WCPFC Northern Committee (NC) in 2008 to address immediate needs; and

5. Commitment by some members to support their scientists in stock assessment meetings and activities.

The ISC Chairman believes that such failures of members to carry out their commitments have prevented the ISC from achieving all planned objectives in an efficient manner within the existing organizational framework, i.e., in-kind contributions by members and without an established Secretariat. If this trend continues, he is concerned that the work of the ISC and the effectiveness of the organization will suffer. The Chairman recommended that ISC members take this threat seriously and either take action to raise the level of support and commitment required for the ISC to accomplish its mission or consider an alternative framework.

5 INTERACTION WITH REGIONAL ORGANIZATIONS

5.1 IATTC-ISC Memorandum of Understanding (MOU)

In introducing this item, the ISC Chairman explained that the draft MOU between ISC and IATTC was discussed at ISC8 and that further development of this MOU was an action item for this year. The current draft of the MOU is contained in *ISC/09/PLENARY/06*. The draft MOU provides a framework for mutual cooperation including reciprocal consultations; exchange of reports; cooperative stock assessments; routine exchange of fishery data in accordance with the rules and procedures for data confidentiality; and standardization of data codes and standards. The effective date, modification and termination clauses, and a review provision are also included. The ISC Chairman stated that the main driver of the MOU was the need to identify a mechanism to allow IATTC to participate in all of the ISC meetings without having to apply for observer status on a case-by-case basis. He noted the involvement of IATTC in ISC stock assessment will strengthen the process given their important role in managing stocks in the North Pacific.

Several members requested clarification of the role of IATTC and the nomenclature to be used when describing their participation. The ISC Chairman explained that the IATTC would be an observer to the ISC Plenary and a full participant in the ISC Working Groups. Given this intent, it was suggested to modify the penultimate paragraph of Part I to read "*The Director of the IATTC and his designated staff will be invited to participate as observers to the plenary meetings of the ISC and to participate as full members in the work of its Working Groups*". Clarification was also requested as to whether ISC members, in addition to the ISC Chairman, would be invited to observe the annual meeting of the IATTC. It was noted that currently all of the ISC parties are being invited to IATTC meetings either as members or cooperating non-members.

The ISC Chairman stressed that nothing in the draft MOU would supercede the ISC's own rules and provisions for data sharing and exchange. Nevertheless, it

was agreed to more precisely specify the data to be exchanged between ISC and IATTC. The provision for data exchange was agreed to be rephrased as: "*Routinely exchange fishery data from the north eastern Pacific Ocean in accordance with the rules and procedures for data confidentiality adopted by each organization …*".

The ISC Chairman agreed to incorporate these two amendments to the MOU text and distribute the revised draft to ISC members and IATTC. If no further substantive changes are requested, and IATTC agrees to the changes, the ISC Chairman will sign the MOU on behalf of ISC. If additional changes are requested either by ISC members or IATTC, the MOU text will be tabled for further discussion at ISC10.

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

The ISC Chairman asked S.K. Soh, WCPFC Observer, to comment on general issues of interaction between ISC and WCPFC.

S.K. Soh reviewed the current terms of the ISC-WCPFC MOU. Under the existing agreement, the WCPFC will pay, as mutually agreed, costs for special scientific advice requested by the Commission, but only the Northern Committee may make such requests to the ISC. The results produced in response to such a request will be presented at meetings of the Northern Committee and Scientific Committee, and may be presented to the WCPFC Commission, if requested. Other interactions between ISC and WCPFC described in the existing MOU include reciprocal consultation; exchange of relevant meeting reports and other information; and exchange of fishery data in accordance with applicable rules and procedures for data confidentiality. S.K. Soh also highlighted that the report of the Independent Review of the Commission's Science Structure and Functions was posted on the WCPFC website in early June, and noted that WCPFC had requested ISC's responses in relation to five items contained in the WCPFC proposals related to this review (*ISC/09/PLENARY/INFO/05*).

Specific issues relating to review of the ISC-WCPFC MOU, ISC's response to the Independent Review of WCPFC Science Structure and Function, and the five items requested by the WCPFC Secretariat (*ISC/09/PLENARY/INFO/05*) will be dealt with under Agenda Item 11-Administrative Matters.

5.3 Interactions between ISC and PICES

The ISC Chairman noted receipt of an invitation for ISC to participate in the annual meeting of PICES to be held in Korea in October. In response to a request for nominations, G. DiNardo offered to represent ISC at this meeting. This nomination was accepted by the Plenary. G. DiNardo will attend and report any noteworthy issues back to the Plenary subsequent to the meeting.

6 REPORTS OF WORKING GROUPS AND REVIEW OF ASSIGNMENTS

6.1 Albacore

J. Holmes reported on the activities of the ALBWG over the past year. The group met twice during the past year: a regular meeting held 14-22 April 2009 in Shimizu, Japan (*Annex 6*), and an update meeting held 8-9 July 2009 in Kaohsiung, Chinese Taipei (*Annex 9*). The primary focus of the April 2009 meeting was on the stock assessment modeling, particularly the transition from the VPA to the Stock Synthesis (SS) model, consideration of alternative modeling approaches, and updating minimum spawning stock biomass (SSB) estimates with respect to the interim management objectives adopted by the Northern Committee (NC). The meeting held in conjunction with ISC9 focused on updating fishery statistics, providing a qualitative update on stock status since the last assessment, and planning for the next North Pacific albacore stock assessment. Some ALBWG objectives continue from meeting to meeting, e.g. preparations for the next stock assessment and annual updates of national fishery statistics. 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:

1. An update of national fishery statistics through 2008;
2. Satisfactory progress in developing a length-based stock synthesis (SS) integrated model, which will use catch-at-length as input data for the next assessment;
3. The decision to use the length-based SS3 model as the primary platform for the next stock assessment;
4. Development of data protocols and specifications for SS3 and VPA in the next stock assessment;
5. Completion of a biological research plan to improve albacore stock assessments by collecting new life history data;
6. Development of work plans for 2009-2011 in preparation for the next stock assessment;
7. Election of a new Working Group Chairman (J. Holmes);
8. Provision of a qualitative update on stock status since the last (2006) assessment;
9. Work plan to develop indices of SSB for stock status updates between stock assessments; and
10. Estimation of an F-based reference point ($F_{SSB\text{-}ATHL}$) for the North Pacific albacore interim management objective adopted by the NC.

Based on discussions at the meeting in July 2009, the ALBWG concluded that the schedule proposed at ISC8 for the next stock assessment (a data preparation

meeting in October 2009 and a stock assessment workshop in March 2010) would have to be delayed by one year. The new schedule for the next North Pacific albacore stock assessment consists of a regular meeting to complete fishery definitions and identify indices of SSB 16-23 March 2010 in Shimizu, Japan; a short meeting to update fisheries statistics and stock status information scheduled for July 2010 (in conjunction with ISC10); another regular meeting for data preparation scheduled for 16-26 October 2010 in La Jolla, US (exact dates depending on the IATTC Science Workshop schedule); and a stock assessment workshop 22-29 March 2011 at a location to be determined. All of these meetings are required in order to complete assignments and review results for the next assessment by March 2011.

Good progress has been made in transitioning from the age-structured VPA to length-based SS model for the next stock assessment because of the commitment of ALBWG members. However, the ALBWG would like to point out several issues to the ISC Plenary that may affect future work:

1. Staffing and other resource issues are posing challenges to member participation. Continuity of participation by the same scientists will be critical in the upcoming cycle of meetings leading to the next stock assessment;
2. The one-year delay in scheduling of ALBWG meetings for the next stock assessment may affect other ISC WG work plans as many of the same scientists are involved;
3. NC and IATTC management requests may significantly increase the ALBWG workload and impede progress on the next assessment;
4. There is a need to include outside experts in a peer review function either as an ongoing process throughout the series of meetings required for a stock assessment or through some other mechanism; and
5. Collaboration with WCPFC SC on North Pacific albacore and South Pacific albacore assessments has been proposed. The ALBWG notes practical challenges at this time given the tight timeline for the next assessment and resource challenges faced by member scientists. Exploration of data gap issues could be mutually beneficial.

Discussion

In response to a question concerning the nature of requests for ISC services from the IATTC, J. Holmes clarified that there has not yet been such a request but that should a request be received it could have implications for the workload of the ALBWG.

National points of contact for the ALBWG were confirmed to be J. Holmes for Canada, S.Y. Yeh and C.Y. Chen for Chinese Taipei, K. Uosaki for Japan, J.T. Yoo for Korea, L. Fleischer for Mexico, H.H. Lee for the US, J. Hampton for SPC, and A. Aires-da-Silva for IATTC.

6.2 Pacific bluefin tuna

Y. Takeuchi, Chairman of the Pacific Bluefin Tuna Working Group (PBFWG), presented the summary of the activities of the group since ISC8 (*Annexes 4 and 10*). The PBFWG met on 10-13 December 2008 in Ishigaki, Japan and on 10-11 July 2009 in Kaohsiung, Taiwan. At the December 2008 workshop, 28 working papers were presented with participation of 31 scientists from Chinese Taipei, Japan, Mexico, USA and the IATTC, as well as two invited scientists. At this meeting, the PBFWG reviewed biological studies on Pacific bluefin tuna. The WG also reviewed the model specification of the 2008 stock assessment and concluded that adult M is likely higher than the value used in the 2008 stock assessment. At the December 2008 workshop, the WG identified one alternative M schedule that appeared most appropriate. At the July 2009 workshop, a new sensitivity analysis was conducted with the alternative M scenario, and its implications for stock status findings and conservation advice at ISC9 were reviewed.

In addition to the work to refine the 2008 stock assessments required by the ISC8 Action Item Plan (*ISC/09/PLENARY/01*), recent scientific contributions of the PBFWG were highlighted. The first of these is that an age and growth study from otolith readings by T. Shimose et al. was accepted for publication in *Fisheries Research* in June 2009. The second is the identification of an improved estimate of adult Pacific bluefin tuna natural mortality (M) as described above and additionally in section 7.2.

Y. Takeuchi also reviewed the PBFWG workplan for 2010 and 2011 including the schedule of the next full stock assessment. The WG plans to hold one workshop in November 2009 in La Jolla, USA. The objective of this workshop is to focus on conducting a full range of sensitivity analyses using the new M schedule and the Stock Synthesis 3 model. As for the schedule of the next full stock assessment, the WG concluded that it could be undertaken in 2011 at the earliest. A two intercessional meeting process is planned with an initial data preparatory meeting to be held in March 2011 in Shimizu, Japan followed by the stock assessment meeting to be held 24-31 May 2011. Potential conflicts of the proposed schedule with planned meetings of other ISC working groups were however noted. In closing, the PBFWG Chairman expressed concern about the possible decline in future involvement and contributions to the PBFWG from members and observers.

Discussion

National points of contact for the PBFWG were confirmed to be L. Song for China, C.C. Hsu for Chinese Taipei, M. Ichinokawa for Japan, J.T. Yoo for Korea, M. Dreyfus for Mexico, K. Piner and H.H. Lee for the US, J. Hampton for SPC, and A. Aires-da-Silva for IATTC.

6.3 Billfish

G. DiNardo, Chairman of the Billfish WG (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 *7*). Workshop goals included the review and update of fishery statistics, completing a North Pacific swordfish stock assessment and billfish biological research plan, developing a plan to assess Pacific blue marlin and developing responses to a suite of external requests by RFMOs and RFOs. 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. 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, as well as completion of a North Pacific swordfish stock assessment, further improvements are still needed.

Administrative matters were presented including increasing work for the BILLWG Chairman outside of the ISC membership, the increasing workload of the BILLWG members, and the lack of WG commitment by ISC membership. A proposed assessment schedule was presented which included the completion of a North Pacific striped marlin stock assessment in July 2011 and a Pacific-wide blue marlin stock assessment in July 2012. 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 intercessional workshops were presented including 2-9 December 2009, in Honolulu, Hawaii, US and 21-28 April 2010 at a location yet to be determined. The exact dates of the April meeting may change to allow participation in the 26-29 April 2010 International Symposium on Climate Change Effects on Fish and Fisheries in Sendai, Japan.

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. In addition, the lack of understanding on the part of RFMOs and RFOs regarding the role of ISC also hampers progress. Possible solutions to the problems were presented and guidance from the Plenary sought. Finally, it was pointed out that many of the WG's goals for 2008-2009 were achieved and that their successful completion is linked directly to the commitment and dedication of scientists from the member countries and organizations.

Discussion

The ISC Chairman raised the issue of data acquisition for this working group stating that a strategy for obtaining data from China and various RFMOs was being implemented. G. DiNardo clarified that Spain has agreed to provide data but that data transfer is yet to occur.

The feasibility of using an integrated model (i.e. incorporating size structure information) for swordfish given the limited data was questioned: G. DiNardo explained that initial comparisons between the integrated model and other models, such as the Bayesian surplus production model, show consistent results and that it is highly likely that the conservation advice for swordfish will not change.

Another question was raised regarding the responsibility for the ISC BILLWG for a striped marlin stock defined to be within the IATTC Convention Area. G. DiNardo noted that initially the IATTC indicated it would be conducting its own stock assessment for striped marlin but had yet to do so. It appears that coordination and collaboration with IATTC on such issues will be both necessary and useful.

National points of contact for the BILLWG were confirmed to be X.J. Dai for China, C.L. Sun and S.P. Wang for Chinese Taipei, K. Yokawa for Japan, J.T. Yoo for Korea, L. Fleischer and F. Farias for Mexico, K. Piner and J. Brodziak for the US, J. Hampton for SPC, and M. Hinton for IATTC.

6.4 Bycatch

G. DiNardo presented a report on the intercessional meeting of the ISC Bycatch Working Group (BCWG) on behalf of outgoing BCWG Chairman C. Boggs. An ISC BCWG meeting was held 14-15 January in Honolulu, Hawaii that included participants from Japan, Chinese-Taipei and the US. The group discussed ongoing research on bycatch monitoring and mitigation by member nations. A number of papers were presented demonstrating progress since the last meeting regarding estimation and mitigation of bycatch in HMS fisheries on the high seas. The group developed recommendations on bycatch data collection, and discussed specifications for tori lines to help reduce seabird bycatch in longline fisheries. A work plan was updated and the group plans to move forward on a number of collaborative projects on sea turtle, seabird and shark bycatch monitoring, mitigation, and population status assessments. A new Chairman is needed for the working group.

Discussion

It was agreed that the ISC Chairman should call for nominations for a new Chairman of the BCWG. The ISC Chairman agreed to do so noting that even though the purpose and objectives of this working group have recently been subject to some deliberation, the high and sustained interest in bycatch issues within the international community warrants the continued existence of this working group.

6.5 Biological Research Task Force

S.K. Chang, Co-Chairman (with J. Holmes) of the Biological Research Task Force (BRTF) presented a report on its meeting held in May in Busan, Korea. The full report of this meeting is provided in *Annex 8*.

The need for biological research has been raised many times by ISC WGs because much of the biological data required by the WGs either are 40+ years old or insufficient. This has resulted in uncertainties in stock assessments. The BRTF, which was established by ISC8, was designed to develop an integrated multi-year, multi-species, multi-national biological research program to address this issue. Ongoing biological research programs are encouraged, but a more comprehensive program is necessary and thus the proposed biological research program should be supported.

The BRTF meeting focused on two priorities for albacore, swordfish, striped marlin and blue marlin: (1) sex-specific age and growth data; and (2) maturity data. Pacific bluefin tuna assessments have benefited from some recent important biological research, but acquiring sex-specific length and maturity data from very small and very large individuals still remains a priority. A program was developed for size-stratified sampling for each species and with consideration of sampling from as many fleets as possible and covering as wide a range of fish sizes as possible.

Target and projected sample sizes were defined by species and size range for each fishery. A budget according to each species was developed and through cost sharing the total costs were reduced to $434,000 over a three-year period. A coordinator was appointed to handle each species, but an overall coordinator for the entire program is required to, among other things, look for lessons from sampling programs of other RFMOs. The research proposal of the BRTF meetings *(Annex 12)* is discussed is discussed in Section 11.7.

Discussion

The ISC Chairman supplemented the presentation by adding that the WCPFC NC has recognized the need for biological studies to reduce the level of uncertainty in ISC's stock assessments. Despite this recognition, it is not yet clear what sources of funding can be made available for such studies.

6.6 Seminar on Reference Points for HMS Fisheries Management

J. Brodziak presented the results of a seminar convened just prior to ISC9 at the request of the ISC Chairman to discuss reference points for HMS fisheries management. A full report of the seminar is provided in *Annex 13*. The seminar included seven presentations on the theory and application of biological reference points and socioeconomic indicators for fisheries management with special

consideration of highly migratory species. The presentations focused on objective measures of sustainability; resource management in tuna RFMOs, and associated yield-based reference points; modern spawning potential reference points; and reference points for ecosystem-based fishery management.

Discussion

In discussion, J. Brodziak noted that although the seminar did not lead to any specific recommendations for the formulation of reference points for use in ISC stock assessments, the eventual necessity of making progress toward such formulation is strongly supported by the scientific literature. The ISC Chairman expressed his appreciation to J. Brodziak and K. Piner for convening the seminar, and thanked all presenters for their participation.

7 STOCK STATUS AND CONSERVATION ADVICE

7.1 Albacore

J. Holmes summarized the recent work of the ALBWG on North Pacific albacore stock status (*Annex 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 NC3 (September 2007). No formal update of stock status has been conducted since the 2006 assessment. However, at its 8-9 July 2009 meeting, the ALBWG undertook a qualitative update using available fisheries data from 2006 to 2008 and concluded that:

1. A new stock assessment will be necessary to fully understand the implications of the new data available since the last stock assessment. The following conclusions are based on data after 2005 that were presented at this meeting;

2. The 2006 stock assessment (ISC7 Plenary Report, Annex 5) estimated that albacore spawning biomass reached an historical high in 2005. The working group's qualitative interpretation of new data neither supported nor refuted this estimate;

3. The working group’s qualitative interpretation of new data neither supported nor refuted a decline in spawning biomass after 2005 that was projected in the 2006 stock assessment;

4. The working group’s qualitative interpretation of new data neither supported nor refuted the relatively strong recruitment from the 2001 and 2003 year-classes estimated in the 2006 stock assessment; and

5. Nominal albacore effort in most fisheries appears to have declined since 2005 and catches since 2004 (with the exception of 2007) have been substantially lower than in the previous decade. This could mean that F_{2008} is now less than the F (0.75 yr^{-1}) used in the 2006 stock assessment projections. Alternatively, F may be as high as the value used in the stock assessment projections since the level of recruitment after 2005 is not known.

Discussion

In discussion there was general agreement that uncertainty about the current stock status of North Pacific albacore is increasing as time elapses since the last stock assessment. Adding to the uncertainty is the fact that in the ALBWG's most recent qualitative assessment of updated data (July 2009), the available catch per unit effort (CPUE) data had not yet been standardized and therefore were not completely reliable as indices of stock abundance.

Some members stated that this situation calls for the application of a precautionary approach; however, other members suggested that the actual stock situation may have in fact improved since the last assessment. In particular, there are some signs that fishing effort may be decreasing or stable which would indicate that fishing mortality may be decreasing. On the other hand, as there is no informative data on the status of recruitment to this stock since 2005, it is possible that recruitment has decreased causing a reduction in SSB despite declines in effort. Acknowledging this, it was agreed that the final sentence in Point #5 of the conclusions of the ALBWG should be rephrased as follows:

5. Nominal albacore effort in most fisheries appears to have declined since 2005 and catches since 2004 (with the exception of 2007) have been substantially lower than in the previous decade. This could mean that F_{2008} is now less than the F (0.75 yr^{-1}) used in the 2006 stock assessment projections. However, the level of recruitment after 2005 is not known.

Members agreed that a new stock assessment should be conducted as soon as is practicable, however, due to workload constraints this is not scheduled to occur until 2011. In the absence of updated stock assessment results, there was also consensus that it is not possible to update the conservation advice for this species or to provide a specific evaluation of stock status against the interim management objective defined by the Northern Committee in September 2008. Therefore, it was agreed to retain the existing conservation advice and highlight several key points from the recent ALBWG qualitative assessment for ongoing consideration. One of these key points was to seek further clarification from the Northern Committee regarding whether the interim management objective was intended to be used as a limit or a target.

Conservation Advice

After discussion of the ALBWG conclusions (*Annex 9*) and consideration of comments raised by Plenary members, the ISC offers no new conservation advice for North Pacific albacore above and beyond that which was provided to ISC7 in July 2007, pending the results of a new stock assessment, planned for 2011. To reiterate, the advice provided at ISC7 was:

> ***"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 [commonly used in fisheries management] (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 NC adopted an interim management objective at NC4 (September 2008) to maintain the spawning stock biomass (SSB) above the average level of its 10 historically lowest points (ATHL) with a probability of 50% until reference points are established. The associated F-based threshold ($F_{SSB-ATHL}$) was not estimated during the last stock assessment, but the ISC-ALBWG was requested to conduct its assessments, and to express the results of its assessments, such that they include the information necessary to achieve this interim management objective.

Based on analyses conducted by the ALBWG since ISC8, the following points are highlighted:

1. **The ISC9 Plenary notes that there is increasing uncertainty concerning the status of North Pacific albacore in the absence of a new stock assessment.**
2. **The estimated value of $F_{SSB-ATHL}$ is 0.75 yr^{-1} for a 25-year projection period using fishery data through 2008. This value is similar to the most recent estimate of F ($F_{2002-2004}$ = 0.75 yr^{-1}) from the last stock assessment.**
3. **The ALBWG did not determine the proximity of F_{2008} to this reference point.**

4. **The ALBWG has generally interpreted $F_{SSB\text{-}ATHL}$ as a limit reference point, however, further guidance is required from the Northern Committee to clarify whether $F_{SSB\text{-}ATHL}$ is considered a target or limit reference point. If $F_{SSB\text{-}ATHL}$ is intended to be a limit reference point, then further consideration about the probability of falling below the threshold may be needed.**

7.2 Pacific Bluefin Tuna

Y. Takeuchi, Chairman of the PBFWG, presented results of a new sensitivity analysis using a revised schedule of natural mortality (M) values (Table 5), focusing on the pros and cons of the results. This new schedule was developed at the 10-17 December 2008 PBFWG workshop (*Annex 4*) and applied to the 2008 stock assessment of Pacific bluefin tuna analyzed during a working group meeting held 10-11 July 2009 (*Annex 10*).

The comparison of the results from the 2008 stock assessment base case and the new sensitivity run showed limited differences in the estimated recruitment time series, but considerably higher levels of SSB using the new M values as compared to the 2008 stock assessment base case. However, even when using the new M values no apparent stock recruitment relationship was found. In retrospective analyses focused on recruitment, SSB, and overall and age-specific fishing mortality rates, underestimation of the most recent year's recruitment, together with overestimation of Fs in most years, was observed in both the 2008 base case and the new analysis. In addition, recent years' SSB estimates using the new M values were more variable than the 2008 base case, but did not show bias.

Changes in biomass-based management quantities were also reviewed and were found to be approaching a more plausible range (see the last paragraph of this section). In addition, the magnitude of the statistical uncertainties estimated from bootstrapping was similar to tuna stock assessments results by other tuna RFMOs including IATTC and WCPFC. In general SSB estimates using the new M values are larger than those in 2008 base case, and differences between estimates using the previous and new M values were larger in recent years.

Using the new M values, preliminary results of the future stock projection suggest that in the short term (2009-2010), SSB will decline, but in the longer term SSB will attain its historical median level. Comparisons of current F relative to the potential biological reference points (F_{max}, $F_{0.1}$, $F_{20\%}$, $F_{30\%}$, $F_{40\%}$, F_{MED}) showed that it is higher than potential target BRPs, but lower than or close to potential limit BRPs. The change in the yield per recruit curve in the new M sensitivity run relative to the 2008 base case showed that the Y/R curve becomes much flatter and the current F exceeds F_{max} by 31%. The expected increase in Y/R if F is reduced to F_{max} is about 4% relative to current Y/R.

Based on these observations of the effects of the new M schedule on the 2008 stock assessment, the PBFWG made the following conclusions with regard to stock status and conservation advice (see Appendix 4 in *Annex 10* for details):

> "The controversial quantities of "low plausibility" have been eliminated with the alternative PBF M schedule: low SBR levels (<5%) for the base case model [were] replaced with around 10-24%, which seem[s] more plausible in the tuna world. Also, an improvement of the model fit to the PBF data has been noted. On the other hand, most of [the] conclusions about stock status and conservation advice presented [at the] ISC plenary last year seem to be robust to [the] natural mortality schedule, except for the results related to unfished biomass and minor differences [i]n short term future projections and [the] shape of the YPR curve."

Based on these more plausible results, the PBFWG Chairman highlighted the possible changes in the ISC8 conclusions regarding stock status and conservation advice provided by the PBFWG (see section 3.2 in *Annex 10* for details). However, some of the results arising from the additional sensitivity analyses made interpretation of stock status quite difficult. When an additional set of adult M values slightly different from those determined at the December 2008 workshop was applied, estimated SSBs were substantially different. The magnitude of the change in SSB was more significant in recent years. This relatively high sensitivity of SSB to changes in adult M also substantially affects the biomass- and F-based management quantities (e.g. current catch, current SSB, total biomass and current F to equilibrium yield at F_{max}, equilibrium SSB at F_{max}, equilibrium total biomass at F_{max} and F_{max}). Therefore slight changes in adult M were shown to lead to large changes in management quantities. The PBFWG Chairman explained that one potential cause of this problem could be that there is an apparent conflict between CPUE series as illustrated by the likelihood profile with regard to R_0

Discussion

The plenary reviewed the previous conclusions about the PBF stock status given in the ISC8 Plenary report (Section 7.2). With the more plausible results of preliminary sensitivity runs using a new M schedule contained in *Annex 10*, and described above, members considered the following text to be more appropriate:

1. Recruitment has fluctuated without trend over the assessment period (1952-2006), 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, estimated with the value for natural mortality (M) used in the 2008 stock assessment was 20,000 t based on the SS2 model and 23,000 t based on the SS3 model. Applying the revised estimate of M from the 2009 workshops and the SS3 model, the SSB was estimated at 73,000 t. These SSB estimates for 2005 are above the median level over the assessment period (1952-2006). If the future fishing mortality rate (F) continues at the current F level, the short-term projections (2009-2010) indicate SSB will decline. In the longer term, SSB is expected to attain levels comparable to median SSB levels over the assessment period.

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 $F_{current}$ exceeds the target BRPs is variable (Figure 1). If current F is reduced to F_{MAX} spawning potential (%SPR) is expected to increase in absolute terms by 10%, and yield per recruit is expected to increase by 4% relative to current levels (Figure 2).

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}), i.e. Fs above which the likelihood of recruitment failure is high (Figure 1).

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 period (1952-2006). Recent catch is near the average for the assessment period (~22,000 t).

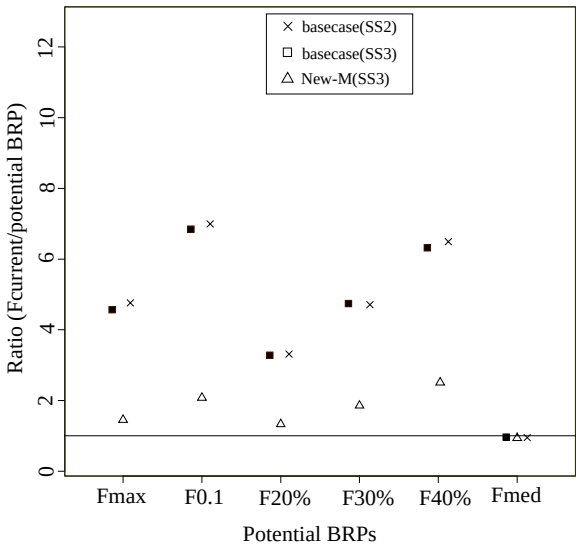


Figure 1. Box-plot of potential reference points (F_{max}, $F_{0.1}$, $F_{20\%}$, $F_{30\%}$, $F_{40\%}$, F_{med}) deriving from a base-case by SS2, SS3 and New-M for Pacific bluefin tuna. The horizontal line at y=1 indicates where the ratio of the current F to the F based BRPs.

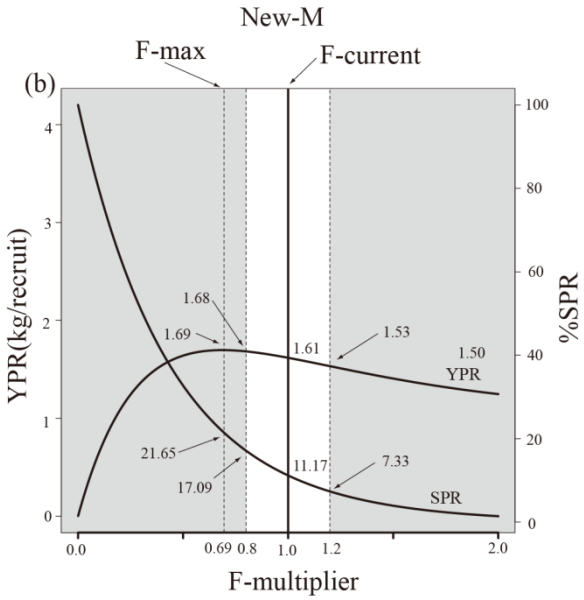


Figure 2. Yield per recruit curve and associated % spawners per recruit for Pacific bluefin tuna resulting from application of the new natural mortality (M) schedule as produced by the PBFWG at the 10-11 July 2009 working group meeting.

Conservation Advice

After discussion of the PBFWG's assessment reports (*Annexes 4* and *10*) and consideration of comments raised by Plenary members, the ISC offers the following conservation advice:

1. **If F remains at the current level and environmental conditions remain favourable, the recruitment should be sufficient to maintain current yield well into the future.**
2. **A reduction in F in combination with favourable environmental conditions, should lead to greater SPR.**
3. **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.**

With regard to advice on the current level of F, differing viewpoints were expressed. Some members concurred with the findings of the PBFWG which stated:

4. **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.**

In contrast, other members suggested that the following statement better reflects the current understanding of the stock status relative to the range of reference points considered (Figure 1):

4. **Given the conclusions of the July 2009 PBFWG, the current level of F relative to potential biological reference points, and increasing trend of juvenile F, it is important that the current [sic] level of F is decreased below the 2002-2004 levels on juvenile age classes.**

7.3 Striped Marlin

G. DiNardo, Chairman of the BILLWG, presented an update on the stock status of striped marlin. He noted that no new assessment has been conducted. The last assessment was conducted in 2007 and presented at ISC7. A new assessment is scheduled to be completed in 2011. The new assessment will consider a multi-stock hypothesis, probably a two stock scenario. A qualitative review of stock status was not conducted; therefore the BILLWG proposes that the ISC Plenary maintain the existing conservation advice for this species.

Discussion

Members discussed potential ways of progressing toward effort reduction for striped marlin in accordance with the existing conservation advice. G. DiNardo indicated that the Northern Committee's striped marlin working group will be addressing this issue and that members of the ISC BILLWG have agreed to assist with this task.

Members also noted the importance of collaborative work in ensuring the success of the next stock assessment. One important element of this will be close coordination with IATTC which would be facilitated through an MOU between ISC and IATTC (*Section 5.1*). Another important element is the provision of improved estimates of biological parameters which would be facilitated through implementation of the ISC BRTF's proposal (*Section 11.7*). Chinese Taipei has already initiated collaborative sampling and research to estimate biological parameters for striped marlin.

Conservation Advice

In the absence of further information and analysis regarding the stock status of North Pacific striped marlin, the ISC Plenary agreed to maintain the conservation advice from ISC7, i.e.:

> ***"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 Swordfish

G. DiNardo, Chairman of the BILLWG, presented background information on the swordfish stock assessment process and J. Brodziak presented the results of the 2009 swordfish stock assessment.

The assessment of swordfish stocks in the North Pacific Ocean was conducted using a Bayesian Surplus Production (BSP) model assuming two hypotheses for stock structure: a single stock in the North Pacific Ocean, above the equator (Stock Scenario-1; Figure 3) and two stocks separated by an irregular boundary extending from Mexico to the southwest and including sections of the eastern South Pacific extending to 20°S latitude (Stock Scenario-2; Figure 4). Available evidence (i.e., genetic analyses) supports the two-stock hypothesis and consequently stock status and conservation advice should be based on the two-

stock scenario. Within the two stock scenario, Sub-Area 1 is defined as the Western-Central Pacific Ocean (WCPO) stock and Sub-Area 2 is defined as the Eastern Pacific Ocean (EPO) stock. Stock status and conservation advice follows for each of the sub-areas.

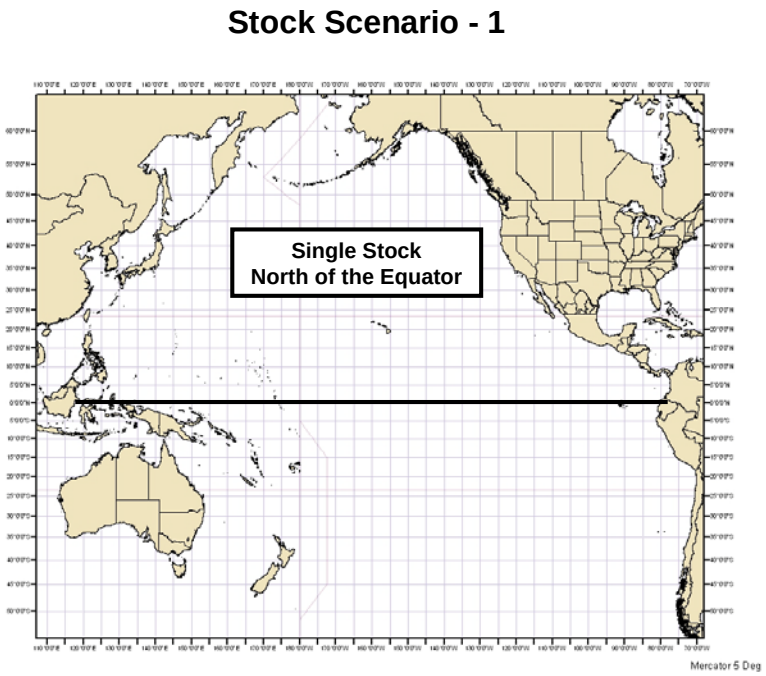


Figure 3. Stock Scenario-1, a single North Pacific swordfish stock north of the equator.

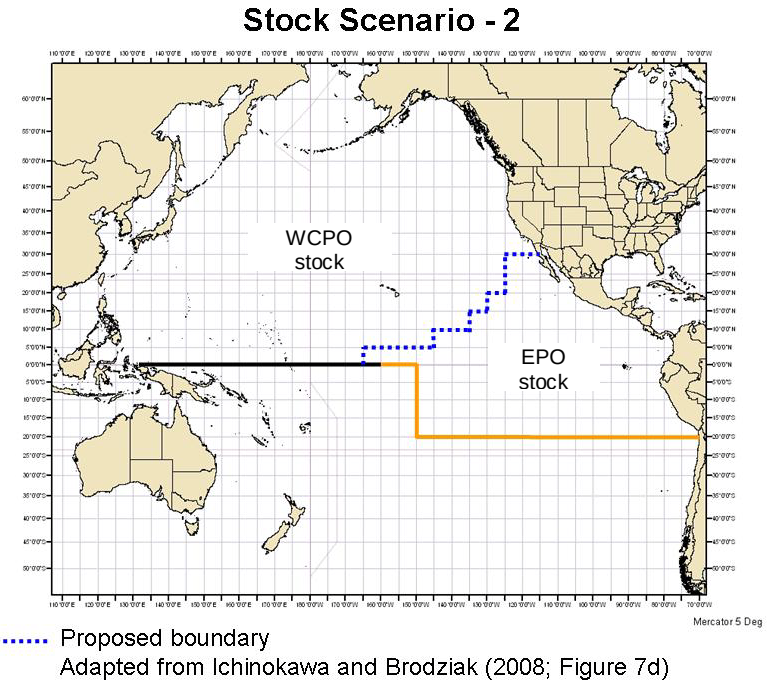


Figure 4. Stock Scenario-2, two North Pacific swordfish stocks with boundaries according to ISC/08/BILLWG-SS/04.

Stock Status: Sub-Area 1—Western-Central Pacific Ocean (WCPO) Stock.

Results from BSP model analysis indicate that the exploitable biomass of swordfish for the WCPO stock has fluctuated above the B_{MSY} level (B_{MSY} = 57,300 t ± 11,800 t and MSY = t ± 2,000 t) in most years used in the analysis (1951-2006) (Figure 5). It fell below B_{MSY} for some years in the 1990s but has been above B_{MSY} in the most recent 5 years (2002-2006).

The exploitation rate for the WCPO stock has fluctuated during the period 1951-2006, but has remained below the level required for MSY (H_{MSY} = 26.2% ± 6.2%) (Figure 6). The probability that the exploitation rate in 2006 exceeded the exploitation rate at MSY is low at 1%. Projecting exploitable biomass through 2010 by assuming (1) a constant 3-year (2004-2006) average exploitation rate for the fishery and (2) fishing operations largely remaining unchanged, results in exploitable biomass levels above B_{MSY} and sufficient to sustain recent levels of catch (Figure 5). The phase plot or Kobe diagram is shown in Figure 7.

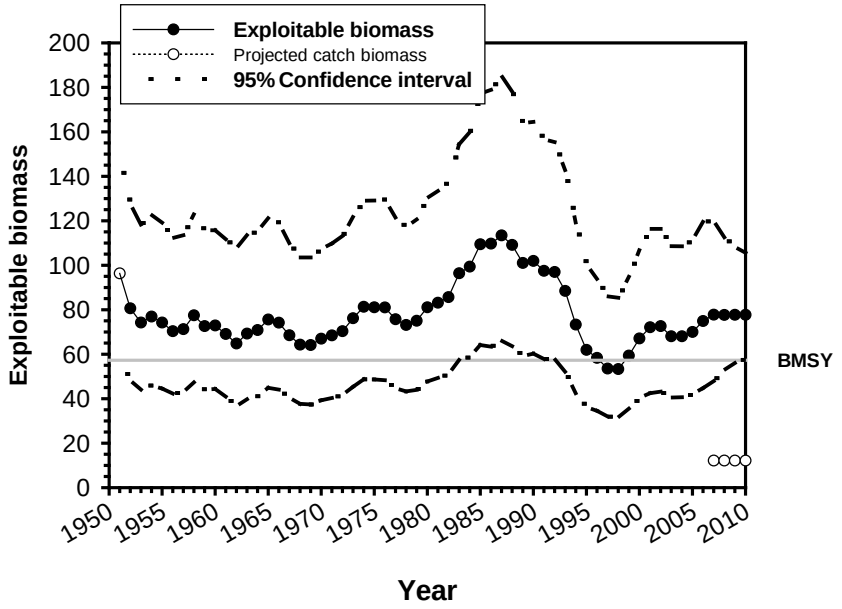


Figure 5. Exploitable biomass of swordfish in Sub-Area 1 (WCPO) relative to exploitable biomass at maximum sustainable yield (B_{MSY}) from 1951 – 2006, and projected from 2007 – 2011 assuming the average harvest rate from 2004 – 2006.

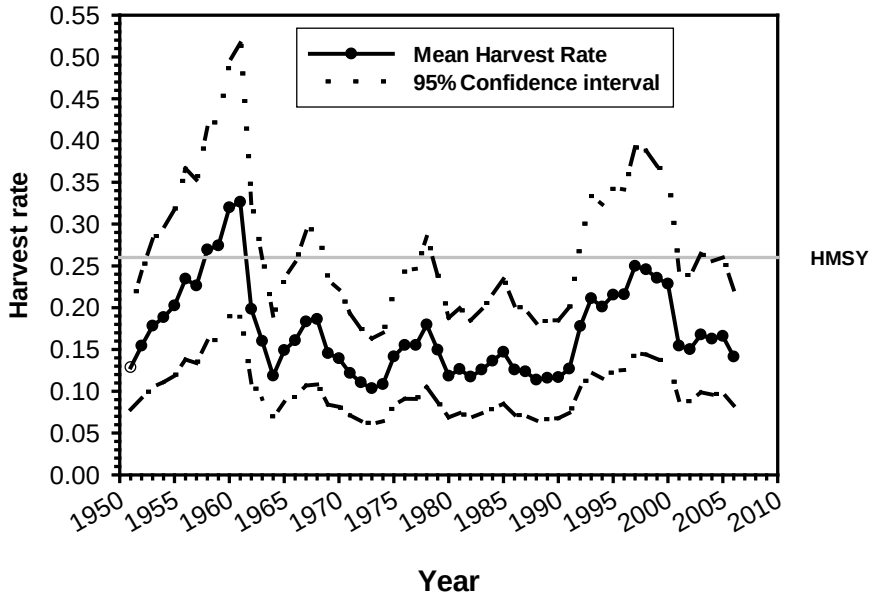


Figure 6. Estimated harvest rate of swordfish in Sub-Area 1 (WCPO) relative to harvest rate at maximum sustainable yield (H_{MSY}) from 1951 – 2006.

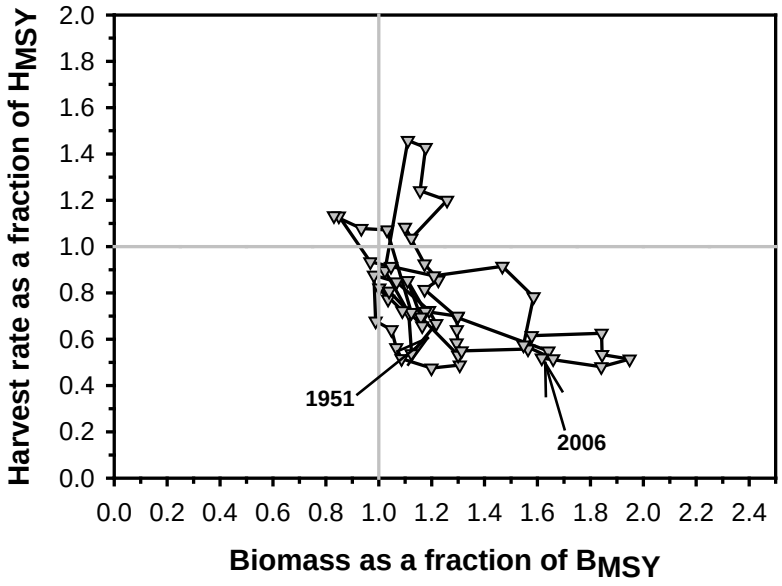


Figure 7. Sub-Area 1 (WCPO) biomass of swordfish as a fraction of B_{MSY} and harvest rate as a fraction of H_{MSY} (1951 – 2006).

Stock Status: Sub-Area 2-- Eastern Pacific Ocean (EPO) Stock

Similarly, results from BSP model analysis indicate that the exploitable biomass of swordfish for the EPO stock has fluctuated above the B_{MSY} level (B_{MSY} = 24,800 t ± 6,900 t and MSY = 3,100 t ± 1,400 t) for most years (Figure 8). The exception was for some years in the 1950s when it was below the B_{MSY}. For the most recent 5 years (2002-2006), the exploitable biomass was well above the B_{MSY}.

The exploitation rate during the period from 1951 to 2006 has remained well below the level required for MSY (H_{MSY} = 12.7% ± 4.9%) (Figure 9). The probability that this rate in 2006 exceeded the exploitation rate at MSY is low at 1%. Projecting exploitable biomass forward until 2010 by assuming (1) a constant 3-year (2004-2006) average exploitation rate and (2) fishing operations to those observed in 2006, results in exploitable biomass levels above B_{MSY} which is sufficient to sustain recent levels of catch (Figure 8).

The phase plot or Kobe diagram (Figure 10) summarizes the information for the EPO stock of swordfish and shows that the stock is in good condition.

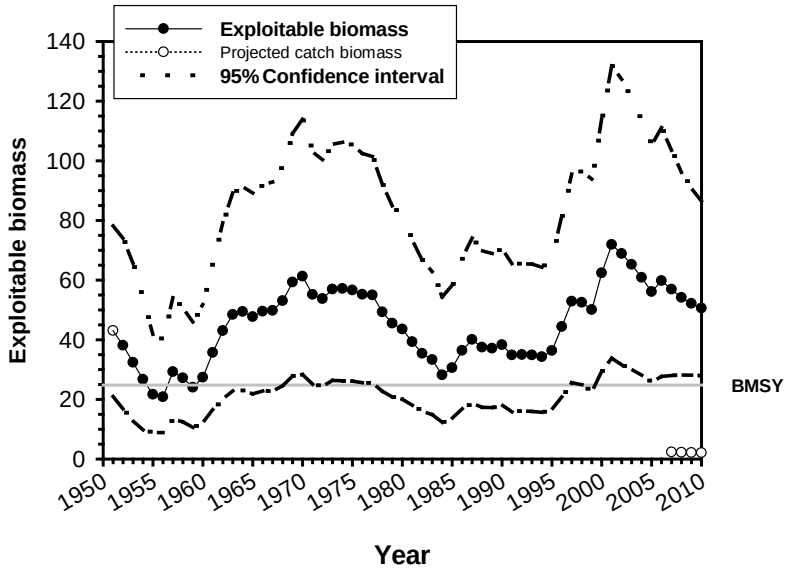


Figure 8. Exploitable biomass of swordfish in Sub-Area 2 (EP0) relative to exploitable biomass at maximum sustainable yield (B_{MSY}) from 1951 – 2006, and projected from 2007 – 2011 assuming the average harvest rate from 2004 – 2006.

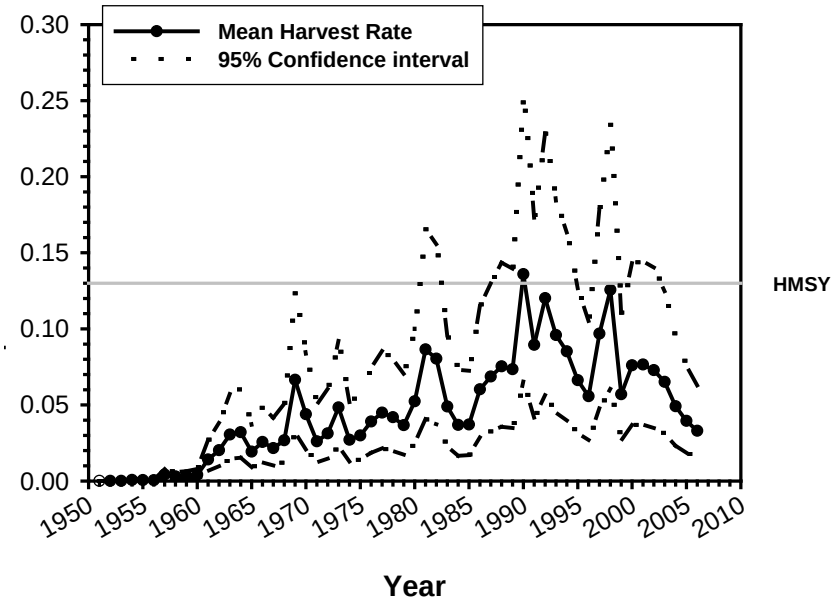


Figure 9. Estimated harvest rate of swordfish in Sub-Area 2 (EPO) relative to harvest rate at maximum sustainable yield (H_{MSY}) from 1951 – 2006.

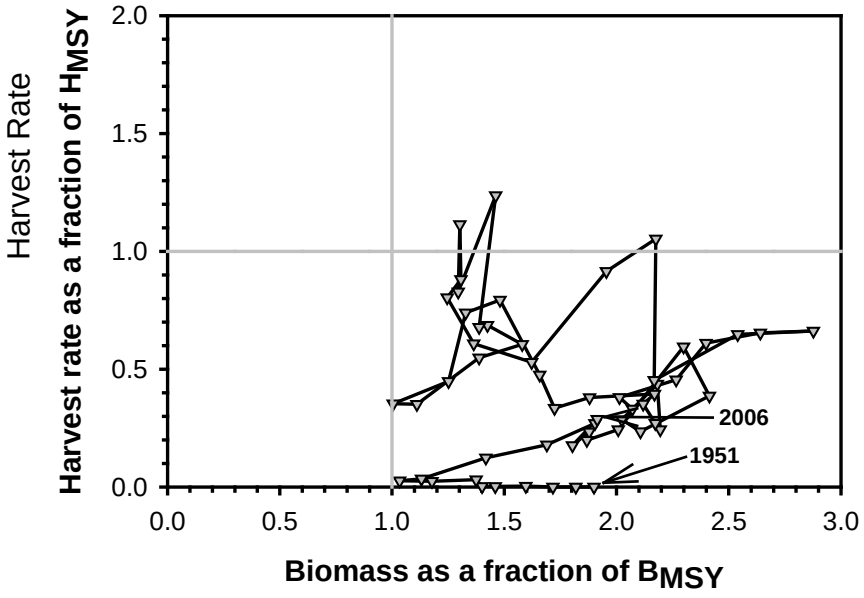


Figure 10. Sub-Area 2 (EPO) biomass of swordfish as a fraction of B_{MSY} and harvest rate as a fraction of H_{MSY} (1951 – 2006).

Discussion

Members raised questions with regard to the two-stock structure used in the assessment. In particular it was queried how the stock assessment results for the EPO would be reported to and coordinated with IATTC. There was consensus that close consultation with IATTC is required, especially with regard to any differences in the results obtained by ISC and those obtained if IATTC conducts its own assessment. G. DiNardo noted that a representative of IATTC had participated in the ISC swordfish assessment and had agreed with the specification of the stock boundaries. There was also discussion of whether the stock boundaries used in the assessment had truncated fisheries, particularly those focused on areas south of the assessment area, along arbitrary boundaries based on existing RFMO management bounderies. G. DiNardo explained that fishery data were examined and there did not appear to be high fishing effort near the southern boundary of the eastern Pacific stock. The existence of a large fishery off Chile was noted, but this was considered to be outside the scope of the ISC's consideration.

The BILLWG will proceed with attempts to acquire data from Spain, but it was acknowledged that these data will not produce CPUE indices and are not expected to change the results of the assessment. These data will be included in the upcoming assessment, as well as a review of the southern boundary established in the EPO (20^{o}S), which will be reported at ISC10.

Conservation Advice

After discussion of the BILLWG's assessment report (*Annex 7*) and consideration of comments raised by Plenary members, the ISC offers the following conservation advice:

The WCPO and EPO stocks of swordfish are healthy and well above the level required to sustain recent catches.

7.5 Blue Marlin

G. DiNardo, Chairman of the BILLWG, informed the Plenary that the most recent stock assessment for blue marlin was conducted approximately ten years ago and found that this species may be fully exploited. No recent assessment has been conducted. Due to the Pacific-wide distribution of blue marlin, producing a credible stock assessment will require cooperation and contributions from scientists from many countries. In order to facilitate this process, the BILLWG requested the endorsement of the Plenary in initiating planning for a World Blue Marlin Symposium in March 2011 which will bring together scientists conducting research on blue marlin, as well as provide a mechanism for obtaining input data for the ISC stock assessment currently scheduled for 2012. The first step would be to form a Steering Committee and to identify and approach potential sponsors for funding.

Discussion

Members expressed concern that it may be difficult to secure the necessary funding for the symposium. However, it was agreed to allow the BILLWG to proceed with symposium planning on the condition that if support/funding is lacking, the idea may have to be abandoned. The Chairman of the BILLWG will report on progress at ISC10.

Conservation Advice

There is no current conservation advice for blue marlin.

7.6 Sharks: Blue, Shortfin Mako, others.

The ISC Chairman introduced this topic in order to explore whether the ISC should begin to develop a work plan to address issues associated with the conservation of sharks rather than only those associated with bycatch. He noted that the current terms of reference of the BCWG are focused on the development of mitigation measures with a focus on seabirds and sea turtles and monitoring of shark, bycatch. It is therefore difficult for the BCWG to consider issues of directed fisheries for sharks. Another reason that the ISC has not explicitly addressed shark issues thus far is related to competing priorities and limited resources. Nevertheless, conservation and management of sharks is important to the sustainability of directed shark fisheries in the North Pacific Ocean as well as a topic of interest among NGOs. The ISC Chairman suggested that ISC members consider ways to gather information on shark stock status for potential future assessments.

Discussion

Members discussed the issue of whether there are sufficient data to support shark stock assessments and if not, whether more active acquisition of shark data should be pursued under the STATWG. Members also considered whether the ISC's goal was to focus on bycatch mitigation and if so whether the assessment of fishery impacts to shark populations would be better left to other organizations such as IATTC and WCPFC. It was noted that shark catch data are already reported by members to these two RFMOs and that it would be counterproductive to duplicate this reporting to ISC.

S.K. Chang, Chairman of the STATWG, explained that in order to fulfill the current responsibilities of the STATWG, aggregated tuna and billfish catch for the North Pacific was necessary for monitoring ISC-area highly migratory species production. Compilation of data relating to sharks as bycatch also falls within the current remit of the BCWG, and S.K. Chang explained that an ISC data-reporting format for the number of encounters with sharks, seabirds, and sea turtles in commercial fisheries for tuna and tuna-like species has been developed.

There was consensus that the question of what shark data should be compiled by ISC should be the subject of further discussion after the BCWG discusses the shark bycatch data requirements. The ISC Chairman agreed to identify a new Chairman for the BCWG and to ask that Chairman to convene a BCWG meeting to discuss these issues, among others. The results of the discussion will be reported to ISC10.

Conservation Advice

There is no current conservation advice for shark species.

7.7 Habitat

The ISC Chairman introduced this new topic to the ISC Plenary agenda on the basis that data on oceanographic conditions and trends are important for informed assessment of tuna and tuna-like species. The ISC Plenary was therfore asked to consider whether it would be advisable for the ISC to form a stronger relationship with PICES, which is already a non-voting member of ISC. In this way the ISC would be able to benefit from PICES' ongoing tracking of long- and short-term oceanographic conditions of the North Pacific Ocean.

Members suggested that PICES could be invited to make a presentation to the ISC regarding their forthcoming PICES report on the state of North Pacific ecosystems. It was noted that although ISC is not a member of PICES, other than through the ISC member countries, PICES invites ISC to attend its annual meetings each year. As it has been agreed that G. DiNardo will attend PICES on behalf of ISC this year, he was given the additional task of identifying which current activities of PICES might hold some benefit for the work of the ISC. G. DiNardo will report back to the Plenary on this issue as part of his feedback from the 2009 PICES annual meeting.

In addition, it was suggested that the various ISC Working Groups (WGs) share their own experiences with using oceanographic data to account for habitat factors, e.g. in CPUE standardization. It was suggested that next year's ISC10 seminar could focus on habitat issues, including presentations from the ISC WGs, as well as from outside experts perhaps based in the host country for ISC10, on habitat issues and methods. An alternative topic for the seminar was also discussed that focused on advances in stock assessment modeling. It may be possible to combine these topics into a single program and this will be considered by the ISC Chairman in consultation with the local organizers of ISC10.

8 REVIEW OF STOCK STATUS OF SECONDARY STOCKS

8.1 Eastern Pacific – Yellowfin and Bigeye Tunas

H. H. Lee 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 bigeye tuna (*ISC/08/PLENARY/INFO/02*).

IATTC assessed bigeye tuna using Stock Synthesis version 3, assuming a single EPO stock which does not mix with the WPO stock, as in the 2008 assessment. The base assessment model and assumptions about model parameters were generally the same as those used for the 2008 assessment. Sensitivity analyses were conducted for three

alternative assumptions: (1) a stock-recruit relationship, (2) Richards growth function, and (3) extending the western limit of the biological distribution from 150ºW to 170ºW. The base case was the most optimistic of the four scenarios. The Richards growth function produced better fits and may become the base case in future assessments.

The status of the bigeye tuna stock was assessed considering calculations based on spawning biomass and MSY. As of January 2009, the biomass of 3+ quarter-age fish was at historical low levels and spawning biomass was below S_{MSY}. The 2009 spawning biomass ratio (SBR) is 0.17 which is 11% less than the level corresponding to MSY (SBR_{MSY}). The F multiplier (the fishing mortality at MSY as a ratio of the current fishing mortality) from the 2009 assessment (0.81) is slightly lower than the F multiplier in the 2008 assessment (0.82). This indicates that overfishing is occurring. Recent catches are 19% higher than catches corresponding to MSY and greatly influenced by the more recent (1993) development of the floating object fisheries. Prior to 1993 F was below F_{MSY}. Recent biomass is only slightly lower than that at B_{MSY} (0.99) in the 2009 assessment base case, but the results are more pessimistic if a stock recruitment relationship is assumed (B_{MSY} = 0.62). This indicates that the stock is overfished.

IATTC assessed the yellowfin tuna stock using Stock Synthesis version 3 (which differs from previous assessments that used A-SCALA) based on a single stock of yellowfin tuna in the EPO, as in the 2008 assessment. Other major improvements in the 2009 assessment include explicitly modeling of sex-structure and use of functional forms in the estimation of selectivity patterns. The estimated SBR trajectories for the 2009 assessment are similar to those from the 2008 assessment, but biomass estimates are lower indicating scaling sensitivity to the assessment model. In addition, the IATTC staff discovered a retrospective bias of overestimating recent recruitments owing to size composition data from floating-object sets. However, the conclusion of stock status appears to be robust to this issue based on sensitivity work removing the floating object fishery from the model.

The status of the yellowfin tuna stock was evaluated considering calculations based on spawning stock biomass and MSY. At the beginning of 2009 the SBR was 0.35 compared to 0.34 for 2008. SBR_{MSY} for the 2009 assessment decreased from 0.34 (in the 2008 assessment) to 0.27 due to a change in selectivity estimated by the new assessment model. For most of the quarters 1985-2003 spawning biomass was above S_{MSY}. For most of the periods 1975-1984 and 2005-2007, the spawning biomass was estimated to be less than S_{MSY}. At the start of 2009, the SBR is estimated to be above the level corresponding to SBR_{MSY}. The F multiplier from the 2009 assessment (1.09) is less than the F multiplier (1.13) from the 2008 assessment. Recent fishing mortality is below that corresponding to MSY. Results are more pessimistic if a stock-recruitment relationship is assumed and fishing mortality is above that corresponding to MSY. IATTC staff noted that yield could likely remain near the maximum even if fishing effort is reduced below F_{MSY}.

Discussion

ISC members expressed their appreciation for the presentation and asked to be kept informed of future updates on stock status. ISC members requested more information

about the use of sex-specific input data to the assessments. H.H. Lee noted that some of the biological input parameters were sex-specific and referred members to the information documents for more details. .

8.2 Western Pacific Ocean – Yellowfin and Bigeye Tunas

S. Nicol of SPC presented the results of the 2008 bigeye tuna and the 2007 yellowfin tuna stock assessments that were presented at the WCPFC SC meeting in August 2008. (The bigeye assessment is provided in *ISC/08/PLENARY/INFO/04*). The bigeye tuna assessment results from the base-case model in 2007 closely approximate the results from the 2006 assessment, with inclusion of additional fisheries and changes in fishery configurations. These changes represent refinements to the model rather than substantive changes to model structure, and result in only minor changes to biomass trajectories. The key conclusions of the models presented are similar to the comparative model runs from the 2006 base-case assessment: depletion levels estimated in the base-case (0.26) were slightly lower than the 2006 (LOWSAMP) assessment (0.29), $F_{CURRENT}/F_{MSY}$ was more pessimistic (1.44 compared with 1.32 for 2006) and $B_{CURRENT}/B_{MSY}$ was higher (1.37 compared with 1.27) while $SB_{CURRENT}/SB_{MSY}$ was comparable (1.19 compared with 1.20). These metrics indicate that recent fishing mortality has continued to increase unless fishing patterns and the maximum sustainable yield (MSY) have changed, although biomass levels have continued to be sustained by higher recruitment. However, the MSY-based reference points are not directly comparable as there has been a shift in the age-specific fishing mortality in recent years due to the recent decline in the longline catch. The estimate of $F_{CURRENT}/F_{MSY}$ indicates that overfishing of bigeye tuna is occurring in the WCPO with a very high probability. While the stock is not yet in an overfished state with respect to total biomass ($B_{CURRENT}/B_{MSY}$ >1), the situation is less optimistic with respect to adult biomass. A number of plausible model options indicate that adult biomass has been below the SB_{MSY} level for a considerable period ($SB_{CURRENT}/SB_{MSY}$ *<1*). For the base-case model, there is also a 42.8% probability that SB_{MSY}/SB_{2006} is less than 1.0. Further, both the adult and total biomass are predicted to become overfished at 2003-2006 average fishing mortality levels and long-term average recruitment levels. This is consistent with a recent decline in biomass under increasing fishing mortality levels, resulting in an increase in the probability of the stock becoming overfished over time. Recent catches of bigeye tuna are high relative to the estimated MSY, both because of high recent fishing mortality and because the stock has benefited from above-average recruitment over the past 15 years.

With regard to yellowfin tuna, the 2007 stock assessment conclusions differ slightly from the 2006 assessment, particularly in relation to the ratio of the current estimate of fishing mortality compared with the fishing mortality at maximum sustainable yield (F/F_{MSY}), with the threshold in the 2007 assessment being slightly more optimistic than that in the 2006 assessment. While the point estimate of F/F_{MSY} remains slightly less than 1.0 (0.95), the probability distribution associated with the fishing mortality-based reference point indicates that there is almost an equal probability that the value of F/F_{MSY} is less than or greater than the reference point. Therefore, the possibility of overfishing is still relatively high (47%). The reference points that predict the status of the stock under equilibrium conditions are B/B_{MSY} (1.10) and SB/SB_{MSY} (1.12), which indicate that the long-term

average biomass would remain slightly above the level capable of producing MSY at 2002−2005 average fishing mortality. Overall, current biomass exceeds the estimated biomass at MSY (B/B_{MSY} >1.0) indicating that the yellowfin stock in the WCPO is not in an overfished state, although there is a small probability (6.2%) that it is in an overfished state. The change in the estimated MSY in 2007 from that in 2006 may reflect changes in the data structure, fishery designations and levels of uncertainty in the assessment, especially in estimating absolute values, and the change in the scenarios modeled between years. The attribution of depletion to various fisheries or groups of fisheries indicates that the Indonesian and Philippines domestic fisheries have the greatest impact, particularly in their home Region (3) and are contributing significantly to the impact in adjacent assessment Regions 1, 4 and 5 through fish movement. The purse-seine fishery also has a high impact in Regions 3 and 4 and accounts for a significant component (~40%) of the recent (2002−2005) impacts in all other Regions, except Region 6. It is notable that the composite longline fishery is responsible for biomass depletion of about 10% in the WCPO during recent years and generally catches larger, older size classes, while purse-seine fisheries are responsible for a larger percentage of the impacts and generally the catch is smaller and younger fish. The point estimate of the $F_{current}/F_{MSY}$ ratio (0.95) in the 2007 assessment was lower than the point estimate (1.11) in the 2006 assessment, where the "current" period is 2002–2005 for yellowfin stock assessment. This change is largely due to the new configuration of the fisheries, their updated size data, and the modeling improvements. However, the possibility of overfishing is still relatively high (47%). The WCPO yellowfin tuna fishery can be considered to be fully exploited. Both the 2006 and 2007 assessments indicate that there is a high probability that overfishing is occurring (73% for the base case 2006 assessment and 47% for the base case 2007 assessment).

Discussion

ISC members thanked SPC for the presentation and stated that they look forward to receiving future updates on stock status. S. Nicol confirmed that while some of the data sets used in the assessment cover the entire Pacific, the assessment specifically focused on the WCPFC Convention Area including an area of overlap with IATTC. Nevertheless, SPC has in the past undertaken Pacific-wide assessments and such an assessment is currently underway for bigeye tuna.

9 REVIEW OF STATISTICS AND DATA BASE ISSUES

9.1 Report of the STATWG

S.K. Chang, Chairman of the STATWG, presented a report on its meeting held 12-14 July in Kaohsiung, Taiwan. A full report of the meeting is provided in *Annex 11*.

An inventory of data that have been collected by members and may be available for stock assessment was discussed and updated by members at the meeting. It was stressed that this inventory does not fully represent ISC data holdings and will be updated further. A

new data field labelled 'Discard' was added to the inventory format to indicate whether members have collected information on discards.

The previously adopted data submission procedure was revised to ensure the ISC Database Administrator (DA) is kept informed of members' submission of data. That is, members will notify the DA via email when they submit Category II and III data to WG Data Managers. A format for a data submission report card was proposed to track member performance on data submission. In 2009, most members submitted catch data on schedule. Inconsistencies in data submissions and values were noted between the ISC catch tables and relevant WGs' catch tables. Several measures were suggested to resolve these issues.

The Chairman of each WG discussed data requirements for stock assessments. Most of the outstanding issues related to securing data from non-ISC members and other Pacific RFMOs. Until sufficient resources can be devoted to the DA position these issues will be addressed by continuous efforts of the WG Chairmen.

Four aspects of database expansion including data rescue, metadata, bycatch and total HMS catch for the entire North Pacific Ocean were discussed. It was noted that progress has been made with PBF historical data and there might be additional historical information that could be rescued from logbooks for fisheries in Hawaii. Despite the fact that metadata for member-submitted data is recognized as being critical, the availability of these metadata is limited[1]. A one-day session was planned as part of the 2010 STATWG meeting to collect metadata which members are requested to prepare in advance. A template for members to report annual encounters with bycatch species was developed for further evaluation by the BCWG. Finally, members were requested to provide total catches for all stocks they fished by 27 November 2009 to the STATWG Chairman so that these data can be compiled into a total catch table.

In response to a request at ISC8, a position description for the DA was finalized. Because much of the ISC data standardization and access functions are intended to be undertaken by the DA, the group reiterated that it was critical that the DA position be allocated sufficient resources to allow the DA to fulfill all of the responsibilities outlined in the position description. The continued existence of the STATWG was confirmed as necessary at least until the DA role is fully functional. At that point, the need for the continued existence of the STATWG should be reviewed.

A proposal by the WCPFC Secretariat to incorporate ISC data into WCPFC holdings was presented and discussed. The STATWG considered that there is no need for ISC data to be incorporated into WCPFC data holdings. This opinion was based on 1) WCPFC already holds most of the data held by ISC and 2) any remaining data may not be able to be provided due to ISC members' confidentiality rules and/or due to the data being from outside the WCPFC Convention Area (i.e. the EPO).

[1] Examples of metadata include a) whether data were converted from number to weight, and if so for which years and using which conversion factors; and b) factors and/or methods for raising sampled catches to total catch figures.

Discussion

In discussion it was clarified that the data inventory and data submission report card were only partially complete at this time and therefore are not meant for wide circulation. The STATWG will endeavor to complete both after receiving further data from members by 27 November 2009.

Some members explained that they had encountered difficulties in obtaining WCPFC data for use in WG stock assessments. S.K. Soh, WCPFC Observer, clarified that access to the WCPFC data held by SPC required adherence to specific data request procedures and that unspecified, bulk mail-type requests cannot be accommodated. In response to a further question, S.K. Soh explained that while SPC holds all of the WCPFC data, the SPC also holds data collected prior to the establishment of the WCPFC and/or beyond the jurisdiction of WCPFC. The ISC Chairman noted that it would be useful to receive a catalog of WCPFC data holdings.

9.2 Data Submission Report Card

As discussed above in *Section 9.1*, a format for the data submission report card was developed. Data submissions by members will be reported to the Plenary using the new Data Submission Report Card beginning with ISC10.

9.3 North Pacific-wide catch and bycatch

The ISC Chairman explained that since one of the functions of ISC is to track North Pacific HMS fisheries production, the STATWG agreed to an expansion of the ISC database to be able to provide aggregate (i.e. North Pacific-wide) catch data. These data will be tabulated for all members individually and for all non-members. In addition, the STATWG proposed a new format for the reporting of bycatch, now referred to as "encounter" data (see *Annex 11*), for further consideration by the BCWG. These two new data sets, along with historical data rescue and metadata, are four aspects of ISC database expansion agreed by the STATWG.

Discussion

It was agreed that members should not be requested to submit bycatch/"encounter" information until after the format of the new table has been reviewed and approved by the BCWG.

S.K. Chang, Chairman of the STATWG, noted that definitions for zero catch (with effort); zero catch (no effort); catch rounded to zero if below a certain threshold; and no data/submission should be standardized and agreed upon. He also indicated that the reporting formats for ISC data require updating. The ISC Chairman suggested that these tasks should be assigned to the Chairman of the STATWG (who in future may delegate this task to the DA) who will work in conjunction with the WGs to develop the appropriate formats.

9.4 Rescue of Historical Data

As discussed above in *Section 9.1*, there are ongoing efforts toward rescue of historical data. These data should be captured in the ISC databases for use in WG assessments. Providing for the incorporation of newly-available historical data into the ISC databases will be the responsibility of the ISC DA.

9.5 Data Inventory

As discussed above in *Section 9.1*, development of an ISC data inventory, including metadata is underway. While this work is currently being led by the Chairman of the STATWG, some of the responsibilities may, in the future, be transferred to the ISC DA.

10 REVIEW OF MEETING SCHEDULE

10.1 Time and Place of ISC10

Provisional dates for ISC10 are 20-26 July 2010. Canada offered to host the meeting either in Vancouver or Victoria, British Columbia and committed to providing further details as they become available.

Related WG workshops in conjunction with ISC10 are preliminarily scheduled to begin on 12 July with concurrent 2-day WG workshops for albacore and billfishes. These will likely be followed by a 2-day meeting of the PBFWG on 14-15 July, and a 3-day meeting of the STATWG, including a one-day metadata workshop to be held during the period 16-19 July. A heads of delegation meeting is planned for the evening of 20 July and a seminar on 20 July. Constraints to further adjustment of these dates, including an ICCAT bluefin tuna stock assessment running through 9 July 2010, and the commencement of the WCPFC SC6 on 9 August 2010, were noted.

10.2 Working Group Intercessional Meetings

The ISC9 Plenary discussed schedules for WG intercessional meetings (ISC/09/PLENARY/03). Although standard practice would be to assess each species annually, the ISC Chairman noted that such frequent assessment is not possible given the lack of resources and new information available to the ISC soon after a stock assessment. At the same time, the ISC Chairman urged members to make their best efforts to undertake assessment of the priority stocks regularly and without undue delay. Members noted that given the potential for excessive demands on staff participating in both Pacific bluefin and albacore stock assessments, it was important to carefully coordinate these assessments.

Considerable efforts were made to accommodate members' workload and scheduling constraints, and to provide reasonable timeframes for data and model preparation given the issues which need to be tackled in each species assessment. An updated schedule of stock assessments was established and a tentative schedule of ISC workshops was

compiled for 2009-2012 (*Table 6*). Each WG Chairman will circulate the schedule to absent members and non-members likely to participate in the WG intercessional meetings to determine if there are any major conflicts. Coordination with IATTC and Mexico was noted to be particularly important for some of the assessments.

11 ADMINISTRATIVE MATTERS

11.1 Organization Chart and Contact Persons

The ISC Organization Chart (*ISC/08/PLENARY/02*) was considered and updated through discussion with members (*Figure 11*).

11.2 Glossary of Terms

The ISC Chairman announced that he had completed a draft glossary (*ISC/09/PLENARY/05*) in response to an action item from ISC7 and the ISC8 (*ISC/09/PLENARY/01*). The glossary is a living document which will be updated in an ongoing manner as comments arise.

11.3 Webpage

H. Nakano noted ongoing efforts by the the National Research Institute for Far Seas Fisheries of Japan including an updated design for the website that has been abandoned (*ISC/09/PLENARY/INFO/06*). He acknowledged that some members have commented that the updated design is still not satisfactory. For this reason, he proposed to contract a professional website designer and produce a prototype of a fully re-designed ISC website by 1 September 2009.

Members welcomed the proposal by H. Nakano but voiced concerns about the continuing shortcomings of the ISC website, noting that these concerns have been expressed at previous Plenary meetings. There was some discussion of whether website development responsibilities should be passed to another ISC member but it was agreed that further consideration of this issue should be postponed for the time being to allow H. Nakano to make progress with his new proposal. The importance of a fully-functional, visually attractive and professional website to serve as a positive public interface for the ISC was emphasized. It was suggested that “under construction” or similar notices be posted on the existing website as soon as possible to alert users that a new and improved version is under development.

In order to clarify ISC’s expectations for the website, the ISC Chairman agreed to compile previous correspondence on this issue, including detailed specifications and a framework layout, and re-transmit these for H. Nakano’s reference. In addition to re-design of the website, the ISC Chairman identified the need for H. Nakano to propose website maintenance protocols including procedures for updating information displayed on the website. These maintenance protocols should be provided to ISC members for comment.

Given the need to ensure ISC members will be satisfied with the outcome of the ISC website re-design, H. Nakano proposed to proceed with development in a step-wise manner. A prototype design will be provided to ISC members by 1 September 2009.

Comments will be requested and considered before the next block of design work is undertaken.

11.4 Database Administrator (DA)

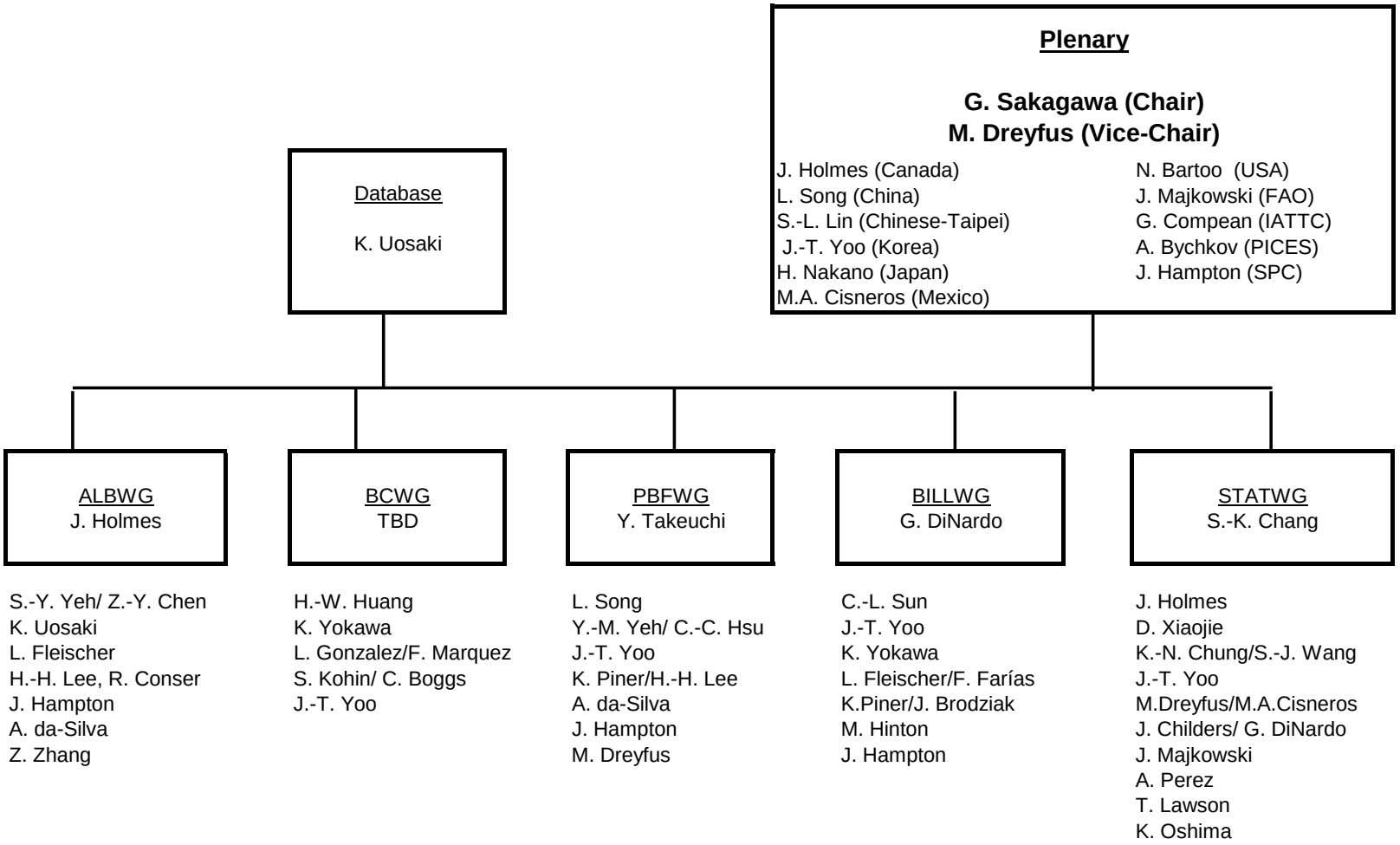
The ISC Chairman highlighted one of the items in this year's ISC Action Plan (*ISC/09/PLENARY/01*) was to complete a position description for the DA and that this had been accomplished (*ISC/09/PLENARY/04*).

H. Nakano provided an update on the DA position currently based at the National Research Institute of Far Seas Fisheries, Japan. K. Uosaki has been appointed as the DA but due to heavy workload his availability to devote time to the ISC database is limited. Japan is therefore seeking a suitable candidate for this role and hopes to have the new DA in place within the next few months. H. Nakano noted that finding a person with the right combination of database management, fisheries and language skills may be challenging.

While supporting Japan's proposal to promptly appoint a new DA, ISC members voiced continuing concerns about shortfalls in performance of the DA role again this year. Some ISC members expressed appreciation for the DA position funding contributed by Japan but urged Japan to ensure that this funding is sufficient to attract and support a qualified person.

It was agreed that Japan should proceed as proposed to recruit a suitable DA in the next few months to carry out the responsibilities in the position description and to begin assisting with the work of the STATWG. It was also agreed that the performance of the DA should be reviewed at ISC10 and if this performance is again considered deficient, options such as transferring DA responsibilities to another ISC member, or securing private funding for the position, should be pursued.

Figure 11. ISC Organizational Chart (as of July 2009)



11.5 Review of MRAG Report

The ISC Chairman noted the release of the Independent Review of the WCPFC's Science Structure and Functions prepared by MRAG (ISC/09/PLENARY/info/03). Since this review refers to ISC activities and interactions with WCPFC, it is appropriate for ISC to review the report and provide comments. In order to facilitate this, comments were solicited from ISC members and compiled into a draft document which was circulated to ISC members during the Plenary. Comments on this draft document were requested by 18 September 2009. Once comments are received and incorporated the intent is to submit the document to the WCPFC.

11.6 Response to proposals from WCPFC

The ISC Chairman noted the receipt of a package of three proposals from WCPFC relating to revision of the WCPFC-ISC MOU, peer review of stock assessments, and WCPFC-ISC data harmonization.

<u>WCPFC-ISC MOU</u>

Concerning the issue of the MOU, the ISC Chairman explained that the existing MOU requires a review after 12 months of execution and that this review is currently underway. As part of this review, the WCPFC Secretariat, on behalf of the Commission, is requesting several changes to the MOU.

The most significant issue associated with these changes involves creating an additional line of reporting between the ISC and the WCPFC Scientific Committee (SC). Under the current MOU the ISC reports to the WCPFC only through the NC. The ISC Chairman noted that the ISC is structured to be an independent provider of information to the NC for use in NC decision-making. The proposed change in the MOU would alter the relationship between the ISC and the WCPFC as the ISC would then report not only to the NC but also to the SC, which has a much broader membership than the NC; this could result in conflicting requests and demands. The proposed addition would also create an administrative issue since the current scheduling of ISC meetings does not allow sufficient time to prepare documents before the SC document submission deadline. Other issues related to the proposed MOU revision, i.e. potential increases in workload and costs for ISC members and a clear mechanism for cost recovery, were also noted.

Since there is no formal mechanism for the ISC to submit comments on the package of proposals to the SC or NC, the ISC Chairman questioned how the ISC can make its opinions on the proposals known so that they can be discussed in these forums. S.K. Soh, WCPFC Observer, clarified that the proposals are being put forward to ISC9 and SC5. Comments received from the ISC and the SC will be considered and reflected in submissions to NC5 and to WCPFC6.

ISC9 agreed to provide formal comments on the proposal to revise the WCPFC-ISC MOU after considering the views of the NC during discussions of this topic at NC5.

Peer Review of Stock Assessments

In response to a question, S.K. Soh explained that the proposal from the WCPFC covers peer review of stock assessments for both the ISC and SC, providing several options and estimates for each. A revised proposal will be considered at SC5.

While expressing support for the concept of peer review, ISC members recommended that the WCPFC proposal be revised to clearly specify the objectives for the peer reviews, particularly given the existing review functions provided by the ISC organizational structure. However, for the peer review itself, a focus on the stock assessment results, rather than the process, was recommended. It was acknowledged that for the peer review to be effective the key supporting working papers must be made available. Members considered that the WCPFC proposal appears to underestimate costs, particularly with regard to costs associated with a coordinator to select peer reviewers and define terms of reference. The proposal was also found to be unclear in terms of when the peer review would take place, i.e. whether it would need to be completed prior to the use of the stock assessment results for management purposes. The need to address potential conflicts of interest of peer reviewers was also raised, and it was suggested that familiarization with existing peer review providers such as CIE, and the peer review processes SEDAR, STAR, and those used at ICCAT would be useful as a starting point.

WCPFC-ISC Data Harmonization

In response to the WCPFC's request that ISC assist the Secretariat to develop a strategy for the incorporation of ISC data to WCPFC data holdings, ISC9 noted the findings of the STATWG summarized above under *Section 9.1*. It was considered that at the time of the request the WCPFC Secretariat may not have had a full understanding of the ISC operational practices with regard to data, but that this understanding had been improved through discussion between ISC and the WCPFC observer at ISC9.

ISC9 concluded that it would be inappropriate to proceed with development of the type of strategy requested by the WCPFC's proposal for several reasons. First, as stated by the STATWG, since most of the ISC members are also WCPFC members, it is expected that they already submit the relevant data to both organizations. Second, the release of data must comply with the ISC Operations Manual which states that Category I, II and III data shall only be made available to contributors and members of ISC Working Groups for use in the work of the Working Groups. Release of these data to other parties could be considered if presented in the form of a specific data request, but approval and conditions for release would have to be obtained from the contributors of the specific data to be released.

Rather than proceeding with a strategy for incorporation, ISC9 considers it would be more appropriate for ISC and WCPFC to exchange data catalogues and identify data gaps

as a first step. An inventory of data that have been collected by members and which may be available for stock assessment will be finalized over the coming months.

A catalog of data held by ISC will be produced in the coming months with assistance from the DA. This can be shared with WCPFC as part of a process of periodic consultation to review overall consistency between data sets.

11.7 Biological Research Proposal

The work of the Biological Research Task Force resulting in a biological research proposal is described in *Section 6.5* and the proposal is provided as *Annex 12*. The Plenary was asked to adopt the biological research proposal for submission to the WCPFC's NC in September. All members expressed their full support for the proposal.

With regard to funding, the ISC Chairman clarified that the intention was to submit the proposal directly to the NC, not to the SC. The ISC Chairman agreed to investigate whether the proposal would best be submitted as part of ISC's standing submission to the NC or whether a separate working paper would provide a better vehicle. In response to a question regarding identifying priority components of the proposal in case only partial funding is available, the ISC Chairman indicated that compartmentalized proposals had failed in the past. Given the start-up costs, in setting up the laboratories to conduct the analyses, for example, a large-scale, multi-national research program is considered the only cost effective way to proceed. It was agreed that an overall coordinator for the research program could be appointed once funding was secured.

11.8 ISC Working Paper Policy

The ISC Chairman opened discussion on the topic of the ISC's working paper policy. The current working paper policy states that ISC Working Group documents are not available to the public, but that titles and email addresses of authors are provided so that interested parties may contact authors directly to request copies. This policy was formulated in response to some scientific journals rejecting manuscripts which have been posted on the internet on the grounds of previous publication.

However, in order to improve transparency and dissemination of ISC scientific results, an option to revise the current working paper policy has been discussed by some of the WGs. Under the revised policy option, the Chairman of each Working Group will decide which working papers are fundamental to the stock assessment and these papers will be made publicly available. For all other papers, it will be left to the author to decide whether to make the paper publicly available or to list the title and author's email address only.

Members discussed this option and considered that rather than having the Working Group Chairmen decide which papers should be made publicly available, it should be the prerogative of all authors to decide whether to make the paper publicly available or to list their titles and authors' email address only. An alternative option involving automatic

public release of documents after a certain period of time (e.g. 3-5 years) was also discussed but was considered to be administratively burdensome and rejected.

It was agreed that as of the close of ISC9 the ISC working paper policy is revised as follows:

Working papers presented at WG workshops, excluding information papers and other non-working paper documents, shall be released publicly through the ISC website or other means only with the authors' permission. If an author chooses not to release the working paper publicly, the title and author's email address only will be released so that interested parties may contact authors directly to request copies.

12 ADOPTION OF REPORT

A draft Report of the Ninth 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 ISC9 Plenary.

13 CLOSE OF MEETING

The ISC Chairman extended his sincere appreciation to officials from the Fisheries Agency of Taiwan and the Overseas Fisheries Development Council for organizing and hosting of the meeting, in particular Mr James Sha, Director General, Council of Agriculture, for hosting the Plenary banquet. The contributions of staff from these agencies including Alton Liao, Wei Yang Liu, Stella Wang, and Tracy Hsia, as well as William Liu for technical support, were essential to the smooth running of the meeting and were graciously acknowledged. The Chairman also thanked the participants for their contributions.

The ISC Chairman noted that he will be stepping down after the close of ISC10 and members should be considering nominations for a new Chairman. While he will continue to devote his full efforts to supporting the work of ISC, he pointed out that the main work of the organization is done by the members and thus the ISC requires the proactive contributions of each and every participant.

As the local organizer for ISC10, J. Holmes expressed his admiration for the smooth, efficient, and enjoyable execution of ISC9 by Chinese Taipei, and noted that it will serve as his inspiration for organizing ISC10.

Table 1. Albacore (*Thunnus alalunga*) catches (in metric tons) in the North Pacific Ocean by fishery, 1952-2008. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

Year	Japan							Korea		Chinese-Taipei		
	Purse Seine	Gill Net	Set Net	Pole and Line	Troll	Longline	Other	Gill Net	Longline	Gill Net	Longline [1]	
											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	20,420	234		420		3,990	483
2006	364	221	55	15,400	460	21,027	42		138		3,848	469
2007	5,682	226	30	37,768	519	22,386	42		56		2,465	451
2008	(1,033)	(226)	(30)	(19,577)	(519)	(22,386)	(42)		(365)		(2,490)	(579)

1 Catches for 2000-2004 contain estimates of offshore longline catches from vessels landing at domestic ports.

Table 1 (continued)

Year	United States								Mexico		Canada	Other		Grand Total
	Purse Seine	Gill Net	Pole and Line	Troll [2]	Handline	Sport [3]	Longline	Other	Purse Seine	Pole and Line [4]	Troll [5]	Troll [6]	Longline [7]	
1952				23,843		1,373	46				71			96,150
1953				15,740		171	23				5			78,760
1954				12,246		147	13							63,448
1955				13,264		577	9							56,462
1956				18,751		482	6				17			78,420
1957				21,165		304	4				8			94,225
1958				14,855		48	7				74			57,681
1959				20,990		0	5				212			53,287
1960				20,100		557	4				141			65,363
1961			2,837	12,055		1,355	5	1	2	39	4			54,610
1962			1,085	19,752		1,681	7	1	0	0	1			49,226
1963			2,432	25,140		1,161	7		31	0	5			70,900
1964			3,411	18,388		824	4		0		3			64,357
1965			417	16,542		731	3		0		15			74,997
1966			1,600	15,333		588	8	1	0		44			68,116
1967			4,113	17,814		707	12				161			85,063
1968			4,906	20,434		951	11				1,028			71,448
1969			2,996	18,827		358	14		0		1,365			76,992
1970			4,416	21,032		822	9		0		390			69,992
1971			2,071	20,526		1,175	11		0		1,746			93,211
1972			3,750	23,600		637	8		100	0	3,921			108,688
1973			2,236	15,653		84	14		0		1,400			108,812
1974			4,777	20,178		94	9		1	0	1,331			117,201
1975			3,243	18,932		640	33	10	1	0	111			98,783
1976			2,700	15,905		713	23	4	36	5	278			128,514
1977			1,497	9,969		537	37		3	0	53			64,446
1978			950	16,613		810	54	15	1	0	23			101,578
1979			303	6,781		74	--		1	0	521			72,724
1980			382	7,556		168	--		31	0	212			76,911
1981			748	12,637		195	25		8	0	200			72,564
1982			425	6,609		257	105	21	0	0	104			75,009
1983			607	9,359		87	6		0	0	225			56,934
1984	3,728		1,030	9,304		1,427	2		107	6	50			74,596
1985	26	2	1,498	6,415	7	1,176	0		14	35	56			61,085
1986	47	3	432	4,708	5	196			3	0	30			48,064
1987	1	5	158	2,766	6	74	150		7	0	104			51,038
1988	17	15	598	4,212	9	64	307	10	15	0	155			47,333
1989	1	4	54	1,860	36	160	248	23	2	0	140			46,041
1990	71	29	115	2,603	15	24	177	4	2	0	302			55,683
1991	0	17	0	1,845	72	6	312	71	2	0	139			39,311
1992	0	0	0	4,572	54	2	334	72	10	0	363			56,825
1993		0	0	6,254	71	25	438		11	0	494			56,118
1994		38	0	10,978	90	106	544	213	6	0	1,998	158		75,339
1995		52	80	8,045	177	102	882	1	5	0	1,763	94		69,942
1996	11	83	24	16,938	188	88	1,185		21	0	3,316	469	1,735	88,203
1997	2	60	73	14,252	133	1,018	1,653	1	53	0	2,168	336	2,824	108,753
1998	33	80	79	14,410	88	1,208	1,120	2	8	0	4,177	341	5,871	100,226
1999	48	149	60	10,060	331	3,621	1,542	1	0	57	2,734	228	6,307	127,541
2000	4	55	69	9,645	120	1,798	940	3	70	33	4,531	386	3,654	87,052
2001	51	94	139	11,210	194	1,635	1,295		5	18	5,248	230	1,471	92,190
2002	4	30	381	10,387	235	2,357	525		28	0	5,379	466	700	107,226
2003	44	16	59	14,102	85	2,214	524		28	0	6,861	378	(2,400)	94,807
2004	1	12	126	13,346	157	1,506	361		104	0	7,856	--	(2,400)	90,623
2005		20	66	8,413	175	1,719	296		0	0	4,845	--	(2,400)	61,284
2006		3	23	12,524	86	385	270		109	0	5,832	--	(2,400)	65,607
2007		4	21	11,887	98	1,244	250		40	0	6,075	--	(2,400)	93,651
2008		(1)	(6)	(10,254)	(1)	(381)	(359)	(1)	(10)		(5,478)		(2,400)	(68,146)

2 Albacore troll catches contain an unknown proportion of pole and line catch.
3 Sport and Other catches combined for 2007 due to confidentiality policies
4 Mexico Pole and line catches for 1999 and 2000 include 34 and 4 metric tons, respectively from longline.
5 1960 Canada troll catches include 136 metric tons caught by purse seine.
6 Other troll catches are from vessels registered in Belize, Cook Islands, Tonga, and Ecuador.
7 Updates for Other Longline not available.

Table 2. Pacific bluefin tuna (*Thunnus orientalis*) catches (in metric tons) in the North Pacific Ocean by fishery, 1952-2008. Blank indicates no effort. - indicates data not available. 0 indicates less than 1

Year	Japan [1]									Korea [3]	
	Purse Seine		Set Net	Pole and Line	Troll [2]	Longline			Others	Purse Seine	Trawl
	Tuna PS	Small PS				Distant Water NP	Distant Water SP	Coastal			
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		
1966	10,082		1,261	613	1,614	1,370	174		129		
1967	6,462		2,603	1,210	3,273	878	44		302		
1968	9,268		3,058	983	1,568	500	7		217		
1969	3,236		2,187	721	2,219	313	20	565	195		
1970	2,907		1,779	723	1,198	181	11	426	224		
1971	3,721		1,554	938	1,492	280	51	417	317		
1972	4,212		1,107	944	842	107	27	405	197		
1973	2,266		2,351	526	2,108	110	63	728	636		
1974	4,106		6,019	1,192	1,656	108	43	1,069	754		
1975	4,491		2,433	1,401	1,031	215	41	846	808		
1976	2,148		2,996	1,082	830	87	83	233	1,237		
1977	5,110		2,257	2,256	2,166	155	23	183	1,052		
1978	10,427		2,546	1,154	4,517	444	7	204	2,276		
1979	13,881		4,558	1,250	2,655	220	35	509	2,429		
1980	11,327		2,521	1,392	1,531	140	40	671	1,953		
1981	25,422		2,129	754	1,777	313	29	277	2,653		
1982	19,234		1,667	1,777	864	206	20	512	1,709	31	
1983	14,774		972	356	2,028	87	8	130	1,117	13	
1984	4,433		2,234	587	1,874	58	22	85	868	4	
1985	4,154		2,562	1,817	1,850	38	9	67	1,175	1	
1986	7,412		2,914	1,086	1,467	30	14	72	719	344	
1987	8,653		2,198	1,565	880	30	33	181	445	89	
1988	3,583	22	843	907	1,124	51	30	106	498	32	
1989	6,077	113	748	754	903	37	32	172	283	71	
1990	2,834	155	716	536	1,250	42	27	267	455	132	
1991	4,336	5,472	1,485	286	2,069	48	20	170	650	265	
1992	4,255	2,907	1,208	166	915	85	16	428	1,081	288	
1993	5,156	1,444	848	129	546	145	10	667	365	40	
1994	7,345	786	1,158	162	4,111	238	20	968	398	50	
1995	5,334	13,575	1,859	270	4,778	107	10	571	586	821	
1996	5,540	2,104	1,149	94	3,640	123	9	778	570	102	
1997	6,137	7,015	803	34	2,740	142	12	1,158	811	1,054	
1998	2,715	2,676	874	85	2,865	169	10	1,086	700	188	
1999	11,619	4,554	1,097	35	3,387	127	17	1,030	709	256	
2000	8,193	8,293	1,125	102	5,121	121	7	832	689	1,976	0
2001	3,139	4,481	1,366	180	3,329	63	6	728	782	968	10
2002	4,171	5,102	1,100	99	2,427	47	5	794	631	767	1
2003	1,033	5,399	839	44	1,839	85	12	1,152	446	2,141	0
2004	4,844	2,577	896	132	2,182	231	9	1,616	514	636	0
2005	4,061	7,390	2,182	549	3,406	107	14	1,818	548	1,085	
2006	3,962	3,272	1,421	108	1,544	63	11	1,058	777	833	
2007	(3,058)	(2,841)	(1,503)	(236)	(2,385)	(84)	(8)	(2,225)	(1,209)	(1,054)	
2008	(2,954)	(6,299)	(3,265)	(64)	(3,229)	[7]	[7]	(883)	(1,193)	(1,536)	

1 Part of Japanese catch is estimated by the WG from best available source for the stock assessment use.

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

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

Table 2 (continued)

Year	Chinese-Taipei				United States [4]			Mexico		non-ISC members		Grand Total
	Purse Seine	Gill Net	Longline [4]	Others	Purse Seine	Sport	Others	Purse Seine	Others	New Zealand [5]	Others [6]	
1952					2,076	2						21,123
1953					4,433	48						22,071
1954					9,537	11						30,529
1955					6,173	93						33,960
1956					5,727	388						42,338
1957					9,215	73						38,548
1958					13,934	10						30,568
1959					3,506	13	56	171	32			22,498
1960					4,547	1	0	0				28,038
1961					7,989	23	16	130				33,197
1962					10,769	25	0	294				35,157
1963					11,832	7	28	412				37,444
1964					9,047	7	39	131				30,595
1965			54		6,523	1	77	289				29,189
1966					15,450	20	12	435				33,127
1967			53		5,517	32	0	371				22,712
1968			33		5,773	12	8	195				23,590
1969			23		6,657	15	9	260				18,389
1970					3,873	19	0	92				13,402
1971			1		7,804	8	0	555				19,109
1972			14		11,656	15	45	1,646				23,188
1973			33		9,639	54	21	1,084				21,593
1974			47	15	5,243	58	30	344				22,660
1975			61	5	7,353	34	84	2,145				22,924
1976			17	2	8,652	21	25	1,968				21,358
1977			131	2	3,259	19	13	2,186				20,788
1978			66	2	4,663	5	6	545				28,841
1979			58		5,889	11	6	213				33,694
1980			114	5	2,327	7	24	582				24,615
1981			179		867	9	14	218				36,622
1982		2	207		2,639	11	2	506				31,369
1983	9	2	175		629	33	11	214				22,541
1984	5		477	8	673	49	29	166				13,557
1985	80	11	210		3,320	89	28	676				18,073
1986	16	13	70		4,851	12	57	189				21,252
1987	21	14	365		861	34	20	119				17,494
1988	197	37	108	25	923	6	50	447	1			10,977
1989	259	51	205	3	1,046	112	21	57				12,934
1990	149	299	189	16	1,380	65	92	50				10,644
1991		107	342	12	410	92	6	9		2		17,771
1992	73	3	464	5	1,928	110	61	0	0	0		15,986
1993	1		471	3	580	298	103			6		12,804
1994			559		906	89	59	63	2	2		18,910
1995			335	2	657	258	49	10		2		31,219
1996			956		4,639	40	70	3,700		4		25,514
1997			1,814		2,240	156	133	367		14		26,629
1998			1,910		1,771	413	281	1	0	20		17,762
1999			3,089		184	441	184	2,369	35	21		31,153
2000			2,780	2	693	342	61	3,019	99	21		35,474
2001			1,839	4	292	356	48	863		50		20,505
2002			1,523	4	50	654	12	1,708	2	55	10	21,165
2003			1,863	21	22	394	18	3,211	43	41	19	20,625
2004			1,714	3	0	49	11	8,880	14	67	10	26,389
2005			1,368		201	79	7	4,542		20	7	29,388
2006			1,149			96	2	9,816		21	3	26,142
2007			(1,401)		(42)	(14)	(2)	(4,147)		21 [8]	3 [8]	(20,234)
2008			(979)			(93)	(1)	(4,407)		21 [8]	3 [8]	(24,927)

4 US in 1952-1958 contains catch from other countries - primarily Mexico. Other includes catches from gillnet, troll, pole-and-line, and longline

5 Catches by NZ are derived from the Ministry of Fisheries, Science Group (Compilers) 2006: Report from the Fishery Assessment Plenary, May 2006: stock assessments and yield estimates. 875 p. (Unpublished report held in NIWA library, Other countries include AUS, Cooks, Palau and so on. Catches derived from Japanese Imort Statistics as minimum estimates.

6 Other countries include AUS, Cooks, Palau and so on. Catches derived from Japanese Imort Statistics as minimum estimates.

7 The catch for Japanese coastal longline in 2008 includes that of the distant water and offshore longliners.

8 Catches in New Zealand and Other countries since 2007 are carry-over of that in 2005

Table 3. Swordfish (*Xiphias gladius*) catches (in metric tons) in the North Pacific Ocean by fishery, 1952-2008. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

Year	Japan						Chinese Taipei							
	Gill Net	Set Net [1]	Harpoon [2]	Longline		Other [4]	Gill Net			Harpoon	Longline			Other
				Distant Water [3]	Coastal		Small Mesh	Large Mesh	Set Net		Distant Water	Offshore [5]	Coastal	
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	1	31	1,069	18,525	42	68					-	-		0
1959	2	31	891	17,236	66	44					-	427		91
1960	0	67	1,191	20,058	51	30					-	520		127
1961	0	15	1,335	19,715	51	29					-	318		73
1962	4	15	1,371	10,607	78	44					-	494		62
1963	0	17	747	10,322	98	59					-	343		18
1964	0	16	1,006	7,669	91	66					-	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	56					0	843		7
1970	0	9	1,748	7,324	427	39					-	904		5
1971	1	37	473	7,037	350	48					-	992		3
1972	55	1	282	6,796	531	22					-	862		11
1973	720	23	121	7,123	414	29					-	860		119
1974	1,304	16	190	5,983	654	29					1	880		136
1975	2,672	18	205	7,031	620	60					29	899		153
1976	3,488	14	313	8,054	750	182					23	613		194
1977	2,344	7	201	8,383	880	73					36	542		141
1978	2,475	22	130	8,001	1,031	111					-	546		12
1979	983	15	161	8,602	1,038	49					7	661		33
1980	1,746	15	398	6,005	849	30					10	603		76
1981	1,848	9	129	7,039	727	61					2	656		25
1982	1,257	7	195	6,064	874	59					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	423	6,422	1,387	34					50	1,135		225
1996	428	4	597	6,916	1,067	45	-	2	10	19	9	701	-	0
1997	365	5	346	7,002	1,214	62	-	1	8	27	15	1,358	24	1
1998	471	2	476	6,233	1,190	68	1	8	15	17	20	1,178	-	0
1999	724	5	416	5,557	1,049	47	1	4	5	51	70	1,385	-	0
2000	808	5	497	6,180	1,121	49	1	5	5	74	325	1,531	1	0
2001	732	15	230	6,932	908	30	1	17	8	64	1,039	1,691	1	0
2002	1,164	11	201	6,230	965	29	1	7	16	1	1,633	1,557	1	1
2003	1,198	4	149	5,376	1,063	28	-	3	8	-	1,084	2,196	-	0
2004	1,062	4	229	5,395	1,509	30	1	5	7	-	884	1,828	-	3
2005	956	3	187	5,359	1,294	337	2	1	5	-	437	1,813	-	18
2006	796	5	244	6,261	1,505	343								
2007				(6,499)										
2008														

1 Trap net
2 Contains trolling and harpoon but majority of catch obtained by harpoon.
3 Distant water and Offshore longline gears combined
4 "Other" refers to catches by other baitfishing methods, trap nets, and various unspecified gears.
5 Offshore longline category includes some catches from harpoon and other fisheries but does not include catches unloaded in foreign ports.

Table 3 (continued)

Year	Korea	Mexico	United States				Grand Total
	Longline	Other [6]	Gill Net	Harpoon	Longline[7]	Other [8]	
1952	-	-	-	-			13,643
1953	-	-	-	-			14,361
1954	-	-	-	-			15,564
1955	-	-	-	-			16,066
1956	-	-	-	-			17,442
1957	-	-	-	-			17,208
1958	-	-	-	-			21,694
1959	-	-	-	-			20,746
1960	-	-	-	-			24,005
1961	-	-	-	-			23,498
1962	-	-	-				14,637
1963	-	-	-				13,568
1964	-	-	-				11,180
1965	-	-	-				13,314
1966	-	-	-				14,249
1967	-	-	-				14,656
1968	-	-	-				14,392
1969	-	-	-				14,155
1970	-	-	-	612	5	10	13,053
1971	0	-	-	99	1	3	11,015
1972	0	2	-	171	0	4	10,709
1973	0	4	-	399	0	4	11,789
1974	0	6	-	406	0	22	11,601
1975	0	-	-	557	0	13	14,232
1976	0	-	-	42	0	13	15,662
1977	219	-	-	318	17	19	15,157
1978	68	-	-	1,699	9	13	16,095
1979	-	7	-	329	7	57	13,928
1980	64	380	160	566	5	62	12,949
1981	-	1,575	473	271	3	2	14,801
1982	48	1,365	945	156	5	10	13,872
1983	11	120	1,693	58	5	7	14,757
1984	48	47	2,647	104	15	75	15,552
1985	24	18	2,990	305	2	104	17,990
1986	9	422	2,069	291	2	109	16,756
1987	44	550	1,529	235	24	31	17,470
1988	27	613	1,376	198	24	64	16,016
1989	40	690	1,243	62	281	56	15,371
1990	61	2,650	1,131	64	2,437	43	17,724
1991	5	861	944	20	4,535	44	16,302
1992	8	1,160	1,356	75	5,762	47	21,842
1993	15	812	1,412	168	5,936	161	22,376
1994	66	581	792	157	3,807	24	18,288
1995	10	437	771	97	2,981	29	16,564
1996	15	439	761	81	2,848	15	15,953
1997	100	2,365	708	84	3,393	11	19,086
1998	153	3,603	931	48	3,681	19	20,112
1999	132	1,136	606	81	4,329	27	17,624
2000	202	2,216	649	90	4,834	9	20,602
2001	438	780	375	52	1,969	5	17,288
2002	439	465	302	90	1,524	3	16,642
2003	381	671	216	107	1,959	0	16,446
2004	410	270	169	62	1,111	37	15,020
2005	434	235	220	76	1,475	0	14,857
2006	477	347	444	71	1,175	2	13,676
2007	(452)	(383)	(484)	(58)	(1,444)	(0)	(11,327)
2008		(84)					(2,092)

6 All gears combined
7 Hawaii and California longline fisheries combined
8 Other includes pole and line, purse seine, troll and troll/handline, half ring, and unspecified gears.

Table 4. Striped marlin (*Tetrapterus audax*) catches (in metric tons) in the North Pacific Ocean by fishery, 1952-2008. 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 [1]	Gill Net		Set Net	Harpoon	Longline			Other [3]
	Small Mesh	Large Mesh	Distant Water	Coastal	Other		Small Mesh [2]	Large Mesh			Distant Water	Offshore	Coastal	
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	6,357	632	118	630					1	568		139
1974	0	3,112	6,700	327	49	775					24	650		118
1975	0	6,534	5,281	286	38	685					64	732		96
1976	0	3,561	5,136	244	34	571					32	347		140
1977	0	4,424	3,019	256	15	547					17	524		219
1978	0	5,593	3,957	243	27	418					0	618		78
1979	0	2,532	5,561	366	21	526					26	432		122
1980	0	3,467	6,378	607	5	537					61	223		132
1981	0	3,866	4,106	259	12	538					17	491		95
1982	0	2,351	5,383	270	13	655					7	397		138
1983	22	1,845	3,722	320	10	792					0	555		214
1984	76	2,257	3,506	386	9	719					0	965		330
1985	40	2,323	3,897	711	24	732					0	513		181
1986	48	3,536	6,402	901	33	571					0	179		148
1987	32	1,856	7,538	1,187	6	513					31	383		151
1988	54	2,157	6,271	752	7	668					7	457		169
1989	102	1,562	4,740	1,081	13	537					8	184		157
1990	19	1,926	2,368	1,125	3	545					2	137		256
1991	27	1,302	2,845	1,197	3	506					36	254		286
1992	35	1,169	2,955	1,247	10	302					1	219		197
1993	-	828	3,476	1,723	1	443					5	221		142
1994	-	1,443	2,911	1,284	1	383					1	137		196
1995	-	970	3,494	1,840	3	278					27	83		82
1996	-	703	1,951	1,836	4	152	-	8	3	30	26	162	-	6
1997	-	813	2,120	1,400	3	163	-	9	3	33	59	290	2	-
1998	-	1,092	1,784	1,975	2	304	1	15	6	19	90	205	9	-
1999	-	1,126	1,608	1,551	4	183	1	7	5	26	66	128	3	-
2000	-	1,062	1,152	1,109	8	297	1	17	6	29	153	161	1	1
2001	-	1,077	985	1,326	11	237	-	16	5	30	121	129	-	-
2002	-	1,264	764	796	5	291	1	14	8	6	251	226	-	-
2003	-	1,064	1,013	842	3	203	1	26	5	11	241	91	-	-
2004	-	1,339	699	1,000	2	92	2	8	5	7	261	95	-	2
2005	-	1,214	562	668	1	98	9	1	9	5	176	76	-	8
2006	-	1,190	642	538	1	95								
2007			(313)											
2008														

1 Contains bait fishing, net fishing, trapnet, trolling, harpoon, etc.

2 Coastal Gillnet and other net'

3 Includes 'Coastal Other' and 'Offshore Other'

Table 4 (continued)

Year	Korea	Mexico		United States				Costa Rica	Grand Total
	Longline	Longline	Sport [4]	Troll	Handline	Sport [4]	Longline	Sport [4]	
1952	-					23			7,162
1953	-					5			5,097
1954	-					16			6,178
1955	-					5			6,108
1956	-					34			7,774
1957	-					42			7,766
1958	-					59			10,247
1959	-					65			10,270
1960	-					30			8,642
1961	-					24			9,021
1962	-					5			10,279
1963	-					68			10,914
1964	-					58			19,281
1965	-					23			16,918
1966	-					36			12,658
1967	-					49			15,986
1968	-					51			19,746
1969	-					30			14,544
1970	-					18			17,571
1971	0					17			16,489
1972	0					21			11,729
1973	0					9			13,692
1974	0					55			13,784
1975	0					27			15,718
1976	0					31			12,072
1977	43					41			11,082
1978	28					37			12,977
1979	-					36			11,601
1980	37					33			13,460
1981	-					60			11,425
1982	39					41			11,276
1983	19					39			9,521
1984	23					36			10,291
1985	16			18		42			10,482
1986	61	-		19		19			13,903
1987	1	-		30	1	28	272		14,016
1988	11	-		54		30	504		13,129
1989	26	-		24	0	52	612		11,087
1990	315	-	181	27	0	23	538		9,455
1991	141	-	75	41	0	12	663	106	9,485
1992	318	-	142	38	1	25	459	281	9,391
1993	388	-	159	68	1	11	471	438	10,368
1994	1,045	-	179	35	0	17	326	521	10,473
1995	307	-	190	52	0	14	543	153	10,031
1996	429	-	237	54	1	20	418	122	8,158
1997	1,017	-	193	38	1	21	352	138	8,652
1998	635	-	345	26	0	23	378	144	9,051
1999	433	-	266	28	1	12	364	166	7,977
2000	537	-	312	15	1	10	200	97	7,169
2001	254	-	237	44	2		351	151	6,977
2002	188	-	305	30	0		226	76	6,453
2003	206	-	322	29	0		552	79	6,690
2004	75	-	-	34	1		376	19	6,021
2005	141	-	-	20	0		493	-	5,486
2006	56			21	0		609		5,158
2007	(28)			(13)	()		(265)		(2,626)
2008									(2,008)

4 Estimated from catch in number of fish.

Table 5. Natural mortality rate (M) schedule for Pacific bluefin tuna used in the 2008 stock assessment and new schedule of M adopted at the December 2008 PBFWG workshop.

Age	**0**	**1**	**2**	**3**	**4=<**
Original M	1.6	0.46	0.27	0.2	0.12
New M	1.6	0.386	0.25	0.25	0.25

Table 6. Tentative schedule of ISC meetings for 2009-2012.

Date	Meeting	Contact
Note: BILLWG= Billfish Working Group; PBFWG= Pacific Bluefin Tuna WG; BCWG = Bycatch WG; ALBWG = Albacore WG, STATWG = Statistics WG		
TBD	BCWG	G. Sakagawa Gary.Sakagawa@noaa.gov
2009		
Nov 9-16	PBFWG Workshop – La Jolla, CA, USA (Sensitivity analysis)	Y. Takeuchi Yukiot@fra.affrc.go.jp
Dec 2-9	BILLWG Workshop – Hawaii, HI, USA (SWO stock assessment/MLS stock structure)	G. DiNardo Gerard.DiNardo@noaa.gov
2010		
Mar 16-23	ALBWG Workshop – Shimizu, Japan (Data update and model review)	J. Holmes John.Holmes@dfo-mpo.gc.ca
Apr 21-28	BILLWG Workshop – TBD (SWO data and model review)	G. DiNardo
Jul 12-13	ALBWG Workshop – TBD (Review)	J. Holmes
Jul 12-13	BILLWG Workshop – TBD (Review)	G. DiNardo
Jul 14-15	PBFWG Workshop – TBD (Update)	Y. Takeuchi
Jul 16-19	STATWG Workshop – TBD (Workshop)	S.-K. Chang SKChang@faculty.nsyu.edu.tw
Jul 20-26	ISC10 – Canada (Plenary)	G. Sakagawa
Oct 19-26	ALBWG – La Jolla, CA, USA (Data preparation)	J. Holmes
Dec	BILLWG – TBD (Data analysis)	G. DiNardo
Dec	PBFWG – TBD (Data Prep)	Y. Takeuchi

2011		
Mar	ALBWG – TBD (Full Assessment)	J. Holmes
Mar	World Blue Marlin Symposium – TBD	G. DiNardo
Mar	BILLWG – TBD (Striped marlin Assessment)	G. DiNardo
Jul	ISC11 – TBD (Plenary)	TBD
2012		
May	PBFWG – TBD (Full Assessment)	Y. Takeuchi
Jul	ISC12 – TBD (Plenary)	TBD