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**REPORT OF THE EIGHTH MEETING OF THE
INTERNATIONAL SCIENTIFIC COMMITTEE FOR
TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN
(PLENARY SESSION)**

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ISC¹

¹ International Scientific Committee for Tuna and Tuna-like Species in the North Pacific



**REPORT OF THE EIGHTH MEETING OF THE
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22-27 July 2008
Takamatsu, Japan

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Takamatsu, Japan
Plenary Session, 22-27 July 2008

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Highlights of the ISC8 Plenary Meeting

The ISC8 Plenary, held in Takamatsu, Japan from 22-27 July 2008, was attended by delegations from Canada, Chinese Taipei, Japan, Korea, Mexico and the United States. The Plenary endorsed several key products prepared by the species working groups over the past year. A Pacific bluefin tuna stock assessment, involving a complex application of the Stock Synthesis 2 (SS2) model and several major advancements in parameter specification and model development, was completed. Further development of biological reference points and production of “Kobe” diagrams were accomplished for North Pacific albacore. An assessment of the geographic center of stock abundance for striped marlin was produced for use in deciding whether to designate striped marlin as a northern stock under the WCPFC. During ISC8 a special seminar on biological research needs was held to facilitate discussion of how data gaps hindering assessments can be filled. In looking ahead, the Plenary agreed to prioritize and accelerate work on the ISC database and website in order to improve the interface between the ISC and its partners and constituents, and to continue preparations for an upcoming stock assessments of swordfish and albacore scheduled for 2009 and 2010, respectively. The next Plenary will be held in July 2009 in Chinese Taipei.

1 INTRODUCTION AND OPENING OF THE MEETING

1.1 Introduction

The ISC was established in 1995 through an intergovernmental agreement between Japan and the United States of America (USA). Since its establishment and first meeting in 1996, the ISC has undergone a number of changes to its charter and name (from the Interim Scientific Committee to the International Scientific Committee) and has adopted guidelines for its operations. The two main goals of the ISC are to 1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes which inhabit the North Pacific Ocean during a part or all of their life cycle; and 2) to establish the scientific groundwork, if at some point in the future, it is decided to create a multilateral regime for the conservation and rational

utilization of these species in this region. The Committee is made up of voting Members from coastal states and fishing entities of the region and coastal states and fishing entities with vessels fishing for highly migratory species in the region, and non-voting members from relevant intergovernmental fishery and marine science organizations, recognized by all voting Members.

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

1.2 Opening of the Meeting

The Eighth Plenary meeting of the ISC was convened at Takamatsu, Japan at 0945 on 22 July 2008 by the ISC Chairman, G. Sakagawa. A role call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea, Mexico and the USA (*Annex 1*). A Western and Central Pacific Fisheries Commission (WCPFC) representative attended as an Observer. Representatives of China, the Inter-American Tropical Tuna Commission (IATTC), the Secretariat for the Pacific Community (SPC), the Food and Agriculture Organization (FAO), and the North Pacific Marine Science Organization (PICES) sent their regrets for being unable to attend.

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

2 ADOPTION OF AGENDA

After some brief logistical announcements, the agenda for the meeting was tabled (*Annex 2*). The ISC Chairman highlighted the addition of a seminar on biological research needs on Day 3 to this year's meeting which will allow a discussion of how data gaps hindering assessments can be filled. Noting that the agenda had been circulated prior to the

meeting and receiving no requests for amendments, the agenda was adopted. S. Clarke was assigned lead rapporteur duties. Summaries of presentations were provided for the report by the presenters. A list of meeting documents is contained in *Annex 3*.

3 DELEGATION REPORTS ON FISHERY MONITORING, DATA COLLECTION AND RESEARCH

3.1 Canada

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

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

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

Discussion

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

3.2 Chinese-Taipei

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

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

The OSLL vessels generally target bigeye and yellowfin tunas with considerable swordfish and marlin bycatches. Catches of albacore were generally low (300-500 t) during 2005-2007. Catches of Pacific bluefin tuna were at a low level (1150-1400 t) in recent years with an increase in 2007. Swordfish catches were at the level of 3,600-4,000 t during 2005-2007, including the catches by foreign-based OSLL that were landed in foreign ports.

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

Discussion

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

The ISC Chairman called attention to the fact that ISC delegation reports should reflect only those data necessary to understanding the status of stocks in the North Pacific, but should provide data on all fisheries taking tuna and tuna-like fishes in this area. He noted that Chinese Taipei had been specifically reminded of this point in last year's Plenary and that this year's submission should have accounted for a wider range of fisheries and species, particularly billfishes. In response, K.N. Chung committed to re-submitting the national report and providing additional data during ISC8 and this was accomplished.

3.3 Korea

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

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

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

of target species of the fishery fleet, the degree of association among Pacific bluefin tuna and oceanographic conditions, and the strength of year classes.

An observer program has been in place for distant-water fisheries since 2002 and for domestic fisheries since 1998. In 2007, six observers were deployed 12 times on Korean distant-water fishing vessels. To reduce by-catch of sea birds and sea turtles guidebooks and posters have been distributed to fishing boats.

Discussion

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

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

3.4 Japan

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

90% of the total tuna and tuna-like species catch of Japanese fisheries in recent years. Japanese research activities on tuna and tuna-like species in 2007 and early 2008 were also briefly described.

Discussion

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

3.5 Mexico

M. Dreyfus presented the national report for Mexico (*ISC/08/PLENARY/09*). The tuna fishery of Mexico developed to its present size in the 1980s after Mexico implemented its 200-mile EEZ. Catch is dominated by yellowfin tuna, and to a lesser extent skipjack tuna. Since 1996 when Pacific bluefin tuna farming started on the west coast of the Baja California peninsula, this species is also an important target of the fisheries. The fleet is mainly composed of purse seine vessels, most of them with observers on board (vessels above 363 t carrying capacity). Data is obtained from observer programs and logbooks. In 2007 the catch of Pacific bluefin tuna was 4,005 t, practically all devoted to farming. A management plan for Pacific bluefin tuna has been developed by the Instituto Nacional de Pesca (INAPESCA) with a review of the fishery, its constraints, goals, research priorities, obligations and management measures. It is being reviewed by the fishing authority before implementation.

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

quality of the data for the ISC Billfish Working Group (BILLWG), in particular with respect to size composition data, seasonal abundance, and species composition.

Discussion

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

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

3.6 United States of America

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

Fisheries monitoring and economics research conducted by the U.S. included a continuing survey of billfish anglers, indicating improved catch rates in recent years.

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

Discussion

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

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

Regarding sea turtle bycatch, C. Boggs clarified that there is not yet any evidence to indicate the oceanographic advisory for sea turtle bycatch avoidance was responsible for the very low turtle bycatch in the Hawaii-based swordfish fishery in 2008. For four years running the rate of sea turtle encounters in this fishery has been kept low due to mandatory use of a combination of large circle hooks and fish for bait.

4 REPORT OF THE ISC CHAIRMAN

The ISC Chairman reported that the Committee had another year of significant progress in achieving ISC objectives and in implementing decisions of the 7th Plenary meeting, but with some disappointments. The year started with workshops organized by the Pacific Bluefin Tuna Working Group (PBFWG), the BILLWG and the ALBWG soon after ISC7 in July 2007 and ended with meetings of the ALBWG, PBFWG and STATWG prior to

this ISC8 Plenary meeting. These ISC intercessional meetings serve as platforms for exchange of stock assessment research results, preparing input data for assessment models, running the models and sharing views on analysis and interpretation of the results. During the past year, significant progress was made in completing a comprehensive review of Pacific bluefin tuna fisheries data and an up-to-date stock assessment, compiling fishery data on swordfish in preparation for a stock assessment in 2009, developing information on striped marlin with respect to its geographic center of stock abundance in the North Pacific Ocean, and preparing for a full stock assessment of albacore in 2010 with the SS2 model. Progress was also made in investigating the use of minimum spawning stock biomass as a biological reference point for albacore and in review of future research focus for the Bycatch Working Group (BCWG).

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

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

5 INTERACTION WITH REGIONAL ORGANIZATIONS

5.1 Interactions between ISC and IATTC

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

is to be continued, it will require clearing with all ISC members before each meeting in order for the IATTC to participate.

It was agreed that ISC members who also hold membership in IATTC and with an interest in this issue would consult with the IATTC Secretariat with regard to this issue. In the meantime, the ISC Chairman will undertake exploration of potential Memorandum of Understanding (MOU) vehicles which could be used to formalize IATTC's involvement in the ISC in a way that strengthens cooperation between the organizations and meets the concerns of the IATTC. Depending on the results of the consultation, either an MOU will be prepared for consideration at ISC9 or the matter will be discussed at ISC9 for an appropriate action. In the meantime, the IATTC's participation in ISC activities will be treated as a non-voting member.

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

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

Discussion

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

5.3 Interactions between ISC and PICES

In response to an invitation for ISC to participate in the PICES XVII meeting to be held in Dalian, China on 23 October – 2 November 2008, C. Boggs agreed to represent ISC as he is already planning to attend part of the meeting for other reasons. While noting that ISC would not be able to cover any expenses associated with this participation, the ISC

Chairman welcomed this offer. C. Boggs will report back to ISC subsequent to this meeting.

6 REPORTS OF WORKING GROUPS

6.1 Albacore

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

Accomplishments of the ALBWG over the past year include:

- An update of national fishery statistics (through 2007);
- Assessment model (SS2) development for the next assessment;
- Development of “Kobe” diagrams using results from the last (2006) stock assessment;
- Consideration of recent NC requests for additional projections associated with the assessment;
- Development of work plans for 2008-2010 in preparation for the next stock assessment;
- Election of a new Working Group Chair (R. Conser);
- Provision of a qualitative update on stock status since the last (2006) assessment;
- Development of a biological research plan designed to improve albacore stock assessment;
- Review of IUU fishing & effects on stock assessment;
- Rescue of historical fishery data pertaining to albacore;
- Consideration of interim management objectives for North Pacific albacore ($F_{SSB-min}$ reference points);
- Quantification of fishery impacts by gear type using results from the last (2006) stock assessment.

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

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

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

Discussion

In the brief discussion which followed R. Conser's presentation participants recognized and appreciated the diligent efforts of the ALBWG over the past year in undertaking a transition from the previous VPA-based modelling methods to the new methods based on the Stock Synthesis 2 (SS2) model and in responding to various requests for conservation advice. It was highlighted that the next full assessment of albacore will occur in 2010.

6.2 Pacific bluefin tuna

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

In addition to completion of the full stock assessment as required by the ISC7 Action Item Plan (*ISC/08/PLENARY/01*), two scientific contributions of the PBFWG are highlighted. One is the on going study that updates age and growth parameters from otoliths readings by T. Shimose of NRIFSF. The other is the development of a capability for future stock projections using SS2 which allows more accurate calculation of

confidence limits by M. Ichinokawa. The method developed by this study also allows the calculation of probability of exceeding biological reference points (such as, $F_{SSB-min}$).

Discussion

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

6.3 Billfish

G. DiNardo, Chairman of the BILLWG, summarized the working group's efforts since the 7th Plenary, including a synopsis of the two BILLWG workshops held during this period (*Annexes 5 and 8*). Workshop goals included the review and update of fishery statistics, development of a billfish biological research plan, estimation and agreement on standardized CPUE time series, and evaluation of the geographic center of striped marlin distribution in the North Pacific Ocean. In addition, the BILLWG assisted with the establishment of a special session on billfish stock structure and habitat requirements for the 5th World Fisheries Congress in October 2008, which was identified as an action item for the BILLWG at the 7th Plenary. While significant progress was made to facilitate the goals, including the updating of Category I, II, and III data and standardization of CPUE time series, further improvements are still needed.

Administrative matters were presented including an increasing amount of work for the BILLWG Chair on data acquisition matters, the need for guidance on the role of observers at WG workshops, and the lack of WG commitment by some ISC members. A proposed schedule for stock assessments was presented which included the completion of a North Pacific swordfish stock assessment in July 2009 and a Pacific-wide blue marlin stock assessment in July 2010. It was pointed out that a collaborative approach will be required to complete the blue marlin assessment and efforts are currently underway to establish the necessary collaboration. Proposed dates and venues for upcoming intercessional workshops are tentatively set for January 13-21, 2009, possibly in Kaohsiung, Taiwan, and April/May 2009 at a location yet to be determined. It was also noted that a special session on billfish stock structure has been scheduled for November 11-14, 2008 in Honolulu, Hawaii, U.S.A.

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

Discussion

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

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

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

6.4 Bycatch

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

Much of the bycatch mitigation work on sea turtles, and to some extent sea birds, that has been reviewed by the BCWG has also been extensively reviewed by many other fora. The BCWG has shied away from discussing technical specifications regarding application of any of available mitigation methods to fisheries. Given the lack of progress by the BCWG in encouraging the collection of much needed bycatch data, in contributing to more accurate estimates of fisheries bycatch, or in making meaningful contributions towards the science of bycatch mitigation, the BCWG requested more guidance about its role from ISC7. Some advice received was to shift away from sea turtles and sea birds and onto sharks, but with the terms of reference remaining the same. This guidance is appreciated, but it raises additional questions. The BCWG Chair, therefore, requested more guidance on this matter from ISC8. More active leadership, more active commitment by members, and more data submission is required for progress on sea birds, sea turtles or sharks. The membership of the BCWG was not organized for conducting stock assessment work although that appears to be the greatest need for shark research. On the other hand, impacts on sharks from fisheries comes from shark directed fisheries, shark finning, and shark bycatch. If stock assessment remains beyond the BCWG current capabilities, should the group limit its focus to estimation of shark discards, the extent of shark finning, or technical specifications for shark conservation measures? Or should a new shark working group be organized to focus on shark stock assessment? The current terms of reference for the BCWG were presented for reconsideration.

Discussion

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

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

In the ensuing discussion, members acknowledged the need to avoid duplication of effort yet still make progress toward eliminating the data gaps which hinder the ability to estimate bycatch and assess bycatch populations. Given the special characteristics of the fisheries in the North Pacific there was support expressed for focusing the BCWG research onto types of mitigation measures that might be suitable for North Pacific fisheries in terms of reducing impacts to sea bird and sea turtle populations. This research would focus on testing of the effectiveness of these mitigation measures,

including experimental design work. It could also include design of observer programs to address bycatch data needs and for monitoring mitigation. It was considered that such work would not be duplicative and in fact would be considered a valuable contribution to RFMOs' deliberations on which mitigation measures might need to be applied.

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

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

7 STOCK STATUS AND CONSERVATION ADVICE

7.1 Albacore

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

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

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

- Total catch in 2006 was slightly greater than in 2005. However, in 2007, catch increased substantially – returning to a level more typical of the past decade.
- Recent values of CPUE were either stable or higher than in 2005.
- Recent information regarding the magnitude of the 2003 year-class was mixed with some data sources appearing to be consistent with a strong 2003 year-class and other sources not.
- Results of the updated projections (using the now known 2006 and 2007 catch) indicated:
 - Estimated probabilities of the SSB remaining above the SSB reference points – as calculated in the last stock assessment (2006) – were modestly underestimated.
 - Because the realized catch in 2007 was less than that assumed in the projections, the F in 2007 may have been less than “current F” (0.75 yr^{-1}).

The ALBWG concluded:

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

Discussion

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

In addition, since new information from the ALBWG indicates that estimates of $F_{\text{SSB-min}}$ are higher in short-term model projections versus long-term ones, it is clear that in some cases the timeframe of the projection is a critical factor influencing the outcome. It was thus suggested that this point be brought to the attention of those requesting conservation advice from the ISC. There was consensus that it would be helpful for the timeframes to

be used in the model projections to be specified in any such requests so that the results are appropriate to the existing management considerations.

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

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

Conservation Advice

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

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

“Previous scientific advice, based on the 2004 stock assessment, recommended that current fishing mortality rate (F) should not be increased. It was noted that management objectives for the IATTC and WCPFC are based on maintaining population levels which produce maximum sustainable yield. Due to updating, and improvements and refinements in data and models used in the 2006 stock assessment, it is now recognized that F_{cur} (0.75) is high relative to most of the F reference points (see Table 5a in Annex 5 of the ISC7 Plenary Report). On the other hand, the same analysis indicates that the current

estimate of the SSB is the second highest in history but that keeping the current F would gradually reduce the SSB to the long-term average by the mid 2010s. Therefore, the recommendation of not increasing F from current level ($F_{cur}(2002-2004)=0.75$) is still valid. However, with the projection based on the continued current high F, the fishing mortality rate will have to be reduced. The degree to which, when and how reductions should occur will depend on which reference points are selected and the desired probability and practicability of success of attaining these reference points in a timeframe to be agreed. The ISC requires additional guidance on these issues from the management authorities in a timely manner to work further on these issues. “

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

- 1. Estimated probabilities of the SSB remaining above the SSB reference points as calculated in the last stock assessment (2006) were modestly underestimated;**
- 2. Because the realized catch in 2007 was less than that assumed in the projections, the F in 2007 may have been less than the “current F” (0.75 yr^{-1});**
- 3. Further guidance on the selection and application of biological reference points (BRPs) and their conditions is requested in order to facilitate response to requests for conservation advice. In particular, clarification of the timeframe (e.g. short-term versus long-term) for projections; and the specific types of reference points to be used (e.g. limit and/or target and based on which parameters) would be useful.**

7.2 Pacific Bluefin Tuna

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

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

The base case model results are summarized as follows:

- SSB has fluctuated with several peaks and the highest occurring around 1960;
- Current SSB is about 20,000 t, which is near the historical (1952-2005) median level;
- Recruitment shows large variation without trends;
- Based on observed SSB and recruitment, there appeared to be no stock-recruitment relationship;
- F for ages 1-3 has been generally higher than for other age classes;
- F for ages 0-3 has an increasing trend in recent years; and
- F for adults has remained relatively low.

Results of future projections with the base case model are summarized as follows:

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

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

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

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

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

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

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

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

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

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

- The assumed natural mortality rate;
- Recruitment strength (and F on recruits) in the terminal year (2005); and
- Short term projection results and the inability of both assessment/projection scenarios to adequately reflect the actual catch in 2005.

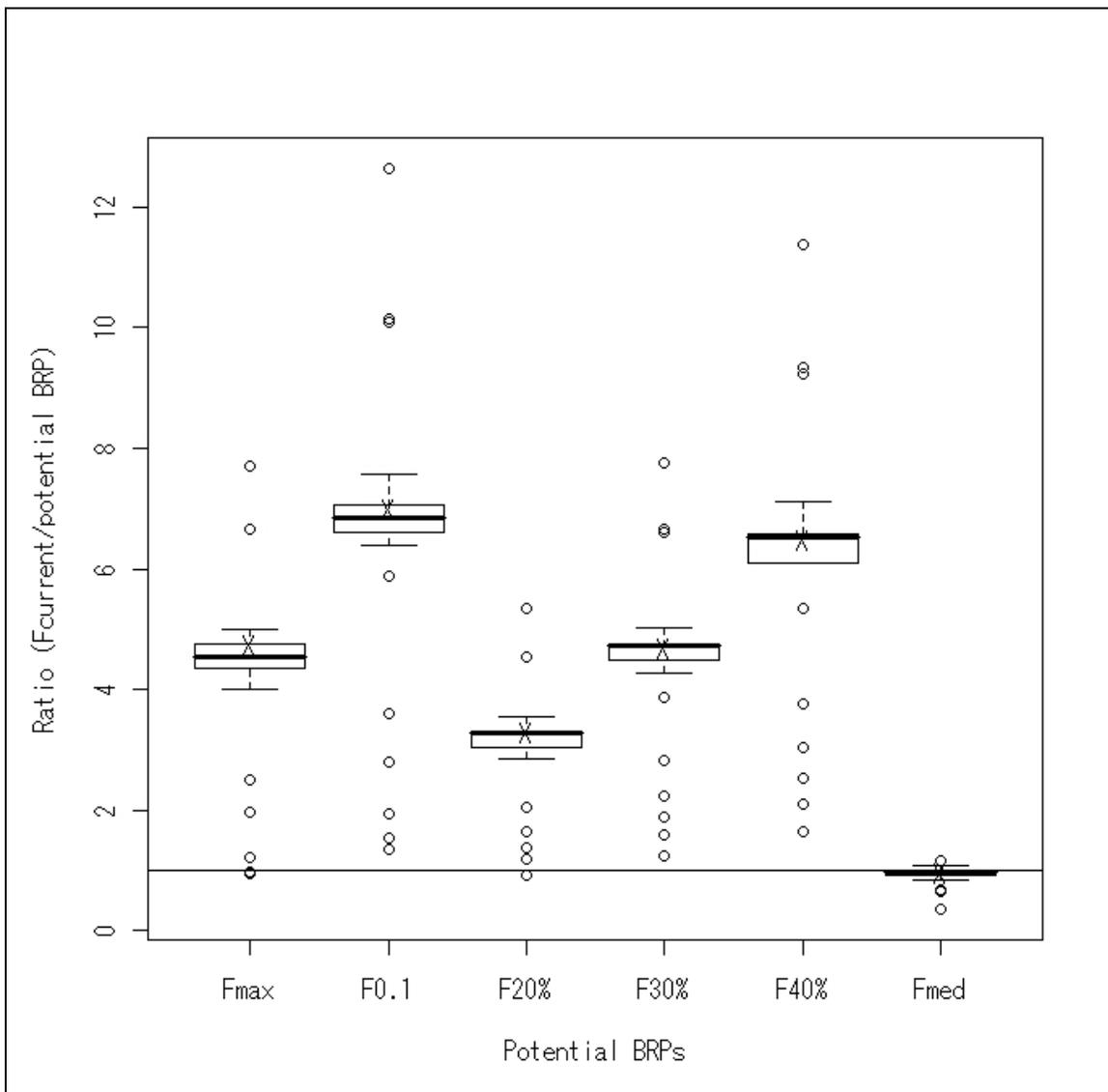


Figure 1. Box-plot of potential biological reference points (F_{\max} , $F_{0.1}$, $F_{20\%}$, $F_{30\%}$, $F_{40\%}$ and F_{med}) deriving from a base case and 33 sensitivity runs considered by the PBFWG (*Annex 7, Appendix Table 8.1*). "X" indicates the point estimate from the base case model. The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

Discussion

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

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

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

1. Recruitment has fluctuated without trend over the assessment period (1952-2004); and does not appear to have been adversely affected by the relatively high rate of exploitation. Recent recruitment (2005-present) is highly uncertain – making short-term forecasting difficult. In particular, the 2005 year class strength may have been underestimated in this assessment.
2. Spawning stock biomass (SSB) in 2005 is near the median level over the assessment period. If the future fishing mortality rate (F) continues at the current F level, the short-term outlook (2009-2010) indicates SSB will either (i) decline until 2010 or (ii) remain at approximately the 2005 level. In the longer term, SSB is expected to be at a level comparable to the SSB in 2005.
3. No relationship between SSB and recruitment is apparent over the range of "observed" SSB from the assessment. The assessment structure tacitly assumes that at least over the SSB levels "observed," recruitment is more environmentally-driven than SSB-driven.
4. Current F (2002-2004) is greater than commonly used biological reference points (BRP) that may serve, in principle, as potential target reference points. This includes F_{MAX} – a BRP that given the assessment structure and assumptions is

theoretically equivalent to F_{MSY} . But the magnitude by which the $F_{current}$ exceeds the target BRPs is variable.

5. Conversely, current F is less than commonly used BRPs that may serve, in principle, as potential recruitment overfishing threshold BRPs, e.g. F_{MED} and $F_{SSB-min}$ (probability based reference point) i.e. F s above which, the likelihood of recruitment failure is high.
6. F s on recruits (age 0) and on juveniles (ages 1-3) have been generally increasing for more than a decade (1990-2005). The catch (in weight) is dominated by recruits and juveniles (ages 0-3).
7. Total catch has fluctuated widely in the range of 9,000-40,000 t during the assessment time period. Recent catch is near the average for the assessment period (~22, 000 t). Over the entire catch history, annual catch has never attained the equilibrium catch at F_{MAX} (45,000 t).

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

Conservation Advice

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

- 1. Given the conclusions of the May-June 2008 stock assessment with regard to the current level of F relative to potential target and limit reference points, and residual uncertainties associated with key model parameters, it is important that the current level of F is not increased.**
- 2. If F remains at the current level and environmental conditions remain favorable, then recruitment should be sufficient to maintain current yield well into the future.**
- 3. A reduction in F , in combination with favorable environmental conditions, should lead to greater Y/R and SPR and, after some lag, greater sustained yield.**
- 4. Increases in F above the current level, and/or unfavourable changes in environmental conditions, may result in recruitment levels which are insufficient to sustain the current productivity of the stock.**

7.3 Billfish

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

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

Discussion

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

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

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

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

Conservation Advice

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

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

7.4 Bycatch

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

8 REVIEW OF STOCK STATUS OF SECONDARY STOCKS

8.1 Eastern Pacific – Yellowfin and Bigeye Tunas

M. Dreyfus presented a review of the status yellowfin and bigeye tunas in the eastern Pacific based on stock assessment work by the IATTC for yellowfin tuna (*ISC/08/PLENARY/INFO/01*) and for bigeye tuna (*ISC/08/PLENARY/INFO/02*). The fishery is predominantly a purse seine fishery (with sets on dolphins, free-swimming

schools and floating objects), with longlines being the next most common gear type. In the case of the purse seine fishery, fleet capacity in cubic meters of well storage space has recently reached a peak of over 200,000 cubic meters. The catch composition is usually led by yellowfin tuna with skipjack tuna in second place, but since 2005 catches of the latter have surpassed catches of yellowfin tuna which are at their lowest level in more than two decades. Catches of bigeye tuna, albacore and Pacific bluefin tuna comprise a smaller proportion of the fisheries' total catch.

Size composition of the catch varies depending on gear type. Longlines target adult tuna whereas the purse seine fishery captures smaller tunas particularly when setting on floating objects. The average weight of yellowfin tuna in the purse seine fishery has been decreasing over time although a slight increase was observed in 2007 (8.3 kg). For yellowfin tuna, based on the assessment model (A-SCALA), spawning biomass ratio is close to the level corresponding to average maximum sustainable yield (AMSY), thus the stock seems to be in better condition than last year when the ratio was less than 1.0. Effort levels are below the ones that would support AMSY. There were record catches in the early 2000s and recruitment was very high, but more recently recruitment has been lower and closer to the long-term average.

Bigeye tuna catches have been predominantly from longline fisheries until 1993 when a purse seine fishery using FADs developed in the southern part of the Eastern Pacific at 10°N and 20°S latitude. The bigeye tuna catch of this purse seine fishery steadily increased. At the present time catches are higher in this purse seine fishery that focuses on juvenile bigeye tuna than in the longline fisheries. The mean weight of bigeye tunas in the purse seine fishery in 2007 was 5.3 kg. Based on the assessment model (SS2), the recent fishing mortality rate is above that corresponding to the AMSY. As a consequence, if fishing effort is not reduced, total biomass and spawning biomass will continue to decline. Diagrams of stock size and fishing mortality rate relative to AMSY reference points show that overall the reference points have not been exceeded until recent years, but the three most recent estimates indicate the stock is overfished and overfishing is occurring.

Discussion

Members thanked M. Dreyfus for making this presentation on behalf of the IATTC. Concerns regarding over-simplification of stock status based on an over-reliance on “Kobe” diagrams were again raised by some members (see Section 7.1 of this report). The ISC Chairman noted that there are as yet no conservation and management measures in place for this year for yellowfin or bigeye tuna in the IATTC area. Although another IATTC meeting will be held in October it is doubtful whether any measure approved at that time can be implemented effectively in 2008 given that most of the fishing season will have already elapsed.

8.2 Western and Central Pacific – Yellowfin and Bigeye Tunas

S.K. Soh of the WCPFC briefed the Plenary on the results of the 2007 yellowfin tuna stock assessment that were presented at the WCPFC SC3 meeting in August 2007 (*ISC/08/PLENARY/INFO/03*). The total catch of yellowfin tuna in the Western and Central Pacific Ocean (WCPO) has ranged between 350,000-450,000 t since 1997. MULTIFAN-CL was used to fit catch and effort, size and tagging data. There were several changes from the 2006 assessment including the addition of new fisheries; separation of Indonesian and Philippine domestic fisheries; revision of the recent annual catch estimates from Indonesian domestic fisheries; spatial subdivision of the longline fishery data in the western equatorial region (Region 3); and reconsideration of the use of size data.

From the assessment, a strong increase in fishing mortality rate was noted since 1990, especially on juvenile fish and as a result catches (by number) were increasingly dominated by young (< 1 yr) fish. Highest exploitation rates (and impacts) occurred within Region 3 but there were lower impacts in other regions. The level of depletion reached 51% of unexploited biomass (a fishery impact of 49%) in 2002–2005 and the Indonesian and Philippines domestic fisheries had the greatest impact. The status of the stock was summarized by a “Kobe” diagram, where B/B_{MSY} was 1.10, that is, the yellowfin tuna stock in the WCPO is not in an overfished state, and F/F_{MSY} was 0.95 with a high probability (47%) of $F > F_{MSY}$. Management implications are that the current exploitation rates are likely to be approaching the F_{MSY} level and any further increase in exploitation rates will not result in an increase in equilibrium yields from the stock.

Discussion

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

9 REVIEW OF STATISTICS AND DATA BASE ISSUES

9.1 Report of the STATWG

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

The annual ISC data submission deadline is July 1st. Data (Category I, II and III) were submitted by all members except China. Submitted data were shown in the form of

summarized tables for different categories. However, the data presented in the tables did not match well with those data maintained by the species WGs. Unfortunately, these inconsistencies were not solved during the meeting since the newly submitted data were not yet verified by WG Chairs as there was little time available prior to the meeting to accomplish this task.

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

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

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

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

- Data request to other RFMOs (not covered by ISC);
- Check metadata including coverage info;
- Hire permanent Data Administrator;
- Rescue historical data;
- Provide oversight for archiving input, output, metadata and software;
- Monitor data reporting;
- Incorporate bycatch data (based on input from the BCWG); and
- Further development of the Website and ISC database.

Discussion

In response to a question, N. Miyabe clarified that even if data are submitted to the species WGs, they should also be submitted again on 1 July to the DA in their updated form, or the DA should be notified as to why they are not submitted. All types of data

(Category I, II and III) should be submitted annually if possible. However, if data are submitted through the website interface, they do not need to also be submitted directly to the Database Administrator.

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

9.2 Data Submission Report Card and Database Administration

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

9.3 Database Administrator Role and Responsibilities

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

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

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

Some members considered that once a Database Administrator was appointed there would be no clear need for the STATWG since there are few, if any, functions it performs which could not be handled by the Database Administrator. It was considered by some members that the STATWG could thus be abolished. Transferring the duties of the STATWG to the Database Administrator was seen by some as beneficial in reducing

duplication of work, shortening the amount of time needed for ISC meetings, and increasing consistency in the data accessed by different species WGs.

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

Accounting for these differing perspectives, the Plenary decided that the administration of the ISC database is in a transitional phase in which the appointment of a dedicated Database Administrator is planned but not yet accomplished. For this reason a decision on this issue at ISC8 is premature. Once a dedicated Database Administrator is in place, it will be easier to determine what functions remain to be served by the continued existence of the STATWG. Therefore, the following points were agreed:

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

9.4 Rescue of Historical Data

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

10 REVIEW OF MEETING SCHEDULE

10.1 Time and Place of ISC9

Provisional dates for ISC9 are 15-20 July 2009. Related working group workshops in conjunction with ISC9 will be held beginning 8 July 2009. These are provisionally

scheduled to include meetings of the albacore, Pacific bluefin tuna and statistics working groups. Chinese Taipei expressed their willingness to host the meeting and committed to providing further details as they become available.

10.2 Working Group Intercessional Meetings

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

11 ADMINISTRATIVE MATTERS

11.1 Procedural Manual

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

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

11.2 Organization Chart and Contact Persons

The ISC Organization Chart (*ISC/08/PLENARY/02*) was tabled and updated through discussion with members. In accordance with the earlier announcement of his appointment by the STATWG, it was agreed that K. Uosaki would be listed on the chart as Data Administrator and Webmaster. K.N. Chung stated that they may be making some changes to the members on the chart but that these could not be confirmed at this time. In response to a question regarding the currency of the SPC representatives, the ISC Chairman committed to contacting SPC to confirm and/or update the listings.

11.3 Website Design

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

this respect the ISC Chairman considered that accelerated progress in developing the website is necessary.

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

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

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

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

11.4 Glossary of Terms

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

11.5 Collaborative Biological Studies

The results of a seminar on biological research needs which was held during a special Plenary session on 24 July were presented by K. Piner. The key conclusion of the seminar was that age and growth and maturity topics are the top research priorities but the details of such research will depend on the species involved and the amount of existing information. It was noted that the ALBWG has already developed a research plan and thus a foundation for initiating further work already exists. The PBFWG has made significant research progress already and has incorporated the results into its stock

assessments. The BILLWG is proceeding with its research plan by collecting samples for ageing and maturity studies but more collaboration will be necessary. It therefore welcomed the offer by Korea to participate in the research program.

In order to promote opportunities for collaborative research between the species WGs, possibly in the form of a unified biological sampling program, it was agreed that each species WG would develop an individual research plan tailored to its needs. These research plans would then be coordinated by a Biological Research Task Force to be led by S.K. Chang, assisted by J. Holmes. The Task Force should begin coordinating with the respective species WG Chairs by correspondence immediately. It will meet for two days immediately following the close of the BILLWG workshop scheduled for April/May 2009. The goal of the two-day Task Force meeting will be to develop a proposal for a multi-species biological sampling program for consideration by ISC9 in July 2009.

11.6 Preparations for Next Meetings

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

11.7 Election of Officers

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

11.8 Other Matters

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

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

12 ADOPTION OF REPORT

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

13 CLOSE OF MEETING

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

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

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

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

Year	Japan							Korea		Chinese-Taipei		
	Purse Seine	Gill Net	Set Net	Pole and Line	Troll	Longline	Other	Gill Net	Longline	Longline		
										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					20
1972	277	1	6	60,569	--	13,022	638		0			0
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
1998	1,554	206	41	22,926	1,190	35,755	104		226			8,617
1999	6,872	289	90	50,369	891	33,339	62		99			8,186
2000	2,408	67	136	21,550	645	29,995	86		15			7,898
2001	974	117	78	29,430	416	28,801	35		64			7,852
2002	3,303	332	109	48,454	787	23,585	85		112			7,055
2003	627	126	69	36,114	922	20,907	85		146			6,454
2004	7,200	61	30	32,255	772	17,341	54		78			4,061
2005	850	154	97	16,133	665	20,549	234		395			3,990
2006	364	221	55	15,400	460	21,606	42		147			3,848
2007	(5,194)	(221)	(55)	(38,289)	(460)	(21,606)	(42)		(91)			(2,465)
												(451)

Table 1. (Continued)

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

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

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

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

- 1 Contains trolling and harpoon but majority of catch obtained by harpoon.
- 2 Distant water and Offshore longline gears combined. Catches by gear for 1952-1970 were estimated roughly using FAO statistics and other data. Catches for 1971-2002 are more reliably estimated.
- 3 For 1952-1970 "Other" refers to catches by other baitfishing methods, trap nets, and various unspecified gears.
- 4 Offshore longline category does not include catches unloaded in foreign ports.
- 5 Includes Offshore Gillnet, Offshore Others, Coastal Harpoon, Coastal Setnet, Coastal Gillnet and Other Net, Coastal Longline, Coastal Others

Table 2. (Continued)

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

6 All gears combined

7 Estimated weight of retained catch. Does not include discards

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

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

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

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

1 Distant water and offshore catches combined

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

3 Estimated from catch in number of fish.

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

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

Table 3. (Continued)

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

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

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

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

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

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

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

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

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

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

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

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

Table 4. (Continued)

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

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

	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	
ISC																							
ALB WG	Update (15-16)							Model Dev (2/24-3/3)	Model Dev (2/24-3/3)				Update? (8-9)			Data Prep. Model Dev. (6-13)						Full Assess (2-9)	
PBF WG	Update (17-18)					Model Dev. Ref. pts. (10-17)							Update? (10-11)					Mod. Dev.					
BILL WG					Stock cond. SWO (11-14)		SWO Rev. (13-21)			SWO Full Stock Assess.								Rev.?					Rev.?
BC WG							Rev. (14-15)																
STAT WG	Rev. (18-21)												Rev. (12-14)										
Plenary	(23-28)												(15-18&20)										

Others			SCRS (29-Oct.3)		Comm. (17-24)																		
IATTC				Workshop (14-17)						Workshop													
WPFC		SC (11-22)	NC (9-11)	TCC (2-7)		Comm. (8-12)								SC (10-21)	NC (15-17)	TCC (1-6)		Comm. (7-11)					
IOTC						SC (1-5)																	
OTHERS				WFC (20-24)						Tuna Conf?													

Explanation:

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

Stock assessment target dates (last full assessment)

2009
 SWO Full
 PBF update (2008)

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

2011
 PBF Full (2008)
 ALB Update (2010)

2012
 SWO Full (2009)