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**Report of the 11th Meeting of the International Scientific Committee for
Tuna and Tuna-like Species in the North Pacific Ocean**

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

PLENARY SESSION

20-25 July 2011
San Francisco, California
U.S.A

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Highlights of the ISC10 Plenary Meeting

The 11th ISC Plenary, held in San Francisco from 20-25 July 2011 was attended by members from Canada, Chinese Taipei, Japan, Korea, Mexico and the United States. The Plenary reviewed results and conclusions, which were based on new data and updated analyses, of the albacore tuna, billfish and Pacific bluefin tuna working groups. The Plenary endorsed the findings that the albacore stock was not experiencing overfishing and that stock is likely not in an overfished condition. It further recommended that the fishing mortality rate on albacore tuna not be increased. Regarding Pacific bluefin tuna, striped marlin and North Pacific stocks of swordfish, the Plenary maintained the conservation advice of ISC10 with minor changes for clarification. The Plenary endorsed the work plan of the shark working group and the prioritized list of ISC shark species of interest, blue and shortfin mako sharks, were ranked high priority. A special seminar on Best Available Scientific Information was held – concepts from which ISC will incorporate into its Operations Manual. The ISC workplan for 2011-2012 includes completing a new stock assessment for striped marlin and Pacific bluefin tuna by ISC12, continuing preparation for a Pacific blue marlin stock assessment in 2012, preparations for an updated blue shark stock assessment in 2012/2013, implementing improved database and website management, and conducting a peer review of its structure. After three years serving as Vice Chairman of ISC, Michel Dreyfus stepped down. The Plenary elected Chi-Lu Sun to serve as Vice Chairman for 2011-2014. The next Plenary will be held in Japan in July 2012.

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 (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 a number of guidelines for its operations. The two main goals of the ISC are (1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes which inhabit the North Pacific Ocean during a part or all of their life cycle; and (2) to establish the scientific groundwork for the conservation and rational utilization of these species in this region. The Committee is made up of voting Members from coastal states and fishing entities of the region as well as 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 Ocean to the Member governments and regional fisheries management organizations. Fishery data tabulated by ISC members and peer-reviewed by the species and statistics Working Groups form the basis for research conducted by the ISC. Although some data for the most recent years are incomplete and provisional, the total amount by ISC Members estimated from available data and information is in excess of 500,000 metric tons (t) annually and dominated by the tropical tuna species. In 2009 the catch of priority species monitored by the ISC was 79,413 t of North Pacific albacore tuna (ALB, *Thunnus alalunga*), 19,928 t of Pacific bluefin tuna (PBF, *T. Orientalis*), 13,930 t of swordfish (SWO, *Xiphias gladius*), and 2,254 t of striped marlin (MLS, *Kajikia audax*). The total estimated catch of these four species is 115,525 t, or an increase of approximately 1.1 % from the 2008 total estimate (estimated to be 100,835 t). Annual catches of priority stocks throughout their ranges are shown in Tables 1-4.

1.2 Opening of the Meeting

The Eleventh Plenary session of the ISC (ISC11) was convened in San Francisco, CA, US at 0900 on 20 July 2011 by the ISC Chairman, G. DiNardo. A role call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea, Mexico and the USA (*Annex 1*). Representatives of the Western and Central Pacific Fisheries Commission (WCPFC) attended as observers. ISC Members China, the Secretariat of the Pacific Community (SPC), the Fisheries and Agriculture Organization of the United Nations (FAO), and the North Pacific Marine Science Organization (PICES), as well as organizations with significant interest including the Inter-American Tropical Tuna Commission (IATTC), did not attend the Plenary.

Dr. Samuel Pooley, Science Center Director, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, delivered the opening address. He welcomed delegates to the Plenary session on behalf of the USA, Dr. Eric Schwaab, Assistant Administrator of National Marine Fisheries Service, and the USA delegation. He affirmed that the USA is committed to ensuring that the management of highly migratory species is based on the best scientific advice, and

consistent with recent recommendations from the July 2011 Kobe 3 meeting in La Jolla, CA, USA. Dr. Pooley wished the delegates a successful and productive meeting.

2 ADOPTION OF AGENDA

The proposed agenda for the session was considered and adopted with no changes (*Annex 2*). C. Dahl was assigned lead rapporteur duties. A list of meeting documents is contained in *Annex 3*.

3 DELEGATION REPORTS ON FISHERY MONITORING, DATA COLLECTION AND RESEARCH

The ISC Chairman noted that delegation reports were submitted by Canada, Chinese Taipei, Japan, Korea, Mexico, and the United States.

3.1 Canada

J. Holmes presented a summary of Category I, II, and III data from the Canadian North Pacific albacore troll fishery in 2010 (*ISC/11/PLENARY/08*). The Canadian fleet of 157 vessels operated primarily within the coastal waters of the United States and Canada and in adjacent high seas areas east of 150 °W. Preliminary estimates of North Pacific albacore tuna catch and effort in 2010 are 6,497 t and 7,532 vessel days (v-d), respectively. These figures represent 15% increases in catch and effort relative to 2009. Approximately 51% of the catch and 53% of the effort occurred in the US EEZ, well below the average for 2000-2009 of 79% and 78%, respectively. In contrast, 36% of the catch and 39% of the effort occurred in Canadian waters and 14% of the catch and 8% of the effort occurred in adjacent highseas waters; in both areas 2010 catch and effort were at least double the long-term (2000-2009) averages. Nominal CPUEs in the majority of 1° x 1° spatial blocks north of 48 °N and in offshore waters were above average in 2010, while CPUEs further south in the US EEZ were mostly below average relative to the 2000-2009 period.

Bycatch of other tuna or billfish species, sharks, sea turtles, and sea birds was negligible and they were released alive. In 2009 more than 4,000 skipjack tuna were reported as bycatch. An investigation concluded that these fish were small albacore that were misidentified as skipjack tuna and identification sheets for common tuna, tuna-like species, and pelagic sharks were developed and distributed to the Canadian fleet to prevent reoccurrence.

Thirty-four vessels recorded size frequency data in 2010 and turned in 9,772 fork length measurements, ranging in size from 51 cm (2.65 kg) to 90 cm (15.25 kg). Two modes are present in these data, 64-66 cm and 74-76 cm, corresponding to 2- and 3-yr old fish, respectively. The above average catch rates of North Pacific albacore tuna in northern waters during 2010 (see *ISC/11/PLENARY/11*, Figure 4), changed in the contribution of different areas to total catch, and the equal dominance of 2- and 3-year old fish in the catch (see *ISC/11/PLENARY/11*, Figure 6) point to a northward shift of the albacore population along the west coast of North America in 2010.

Discussion

Several delegations asked if there was information suggesting that the north and westward shift in fishery effort and catch in 2010 could be explained by environmental factors. While there was no definitive explanation it was suggested that a northward bulge in the frontal zone during July and August 2010, along which albacore aggregated, may have contributed to the shift. Canadian scientists are beginning to look at the influence of environmental factors on distribution and impacts on CPUE. It was also noted that fishermen recorded higher catches in cooler waters than in previous years; SSTs were 14-16°C in 2010 compared to 18-19°C in previous years. While many albacore troll vessels also participate in salmon fisheries, and 2010 was a record year for Fraser River salmon runs, the geographic shift in effort observed in the albacore troll fishery was probably not due to economic reasons or declining revenues in the salmon fisheries.

3.2 Chinese Taipei

The delegation report for Chinese Taipei was presented by Z.-Y. Chen (*ISC/11/PLENARY/09*). There are two principal tuna fisheries of Chinese Taipei operating in the North Pacific Ocean, namely tuna longline fisheries and distant water purse seine fisheries; other offshore and coastal fisheries include the harpoon, set net and gill net fisheries, and account for a small proportion of overall tuna and tuna-like species catch. The catches of longline and purse seine fisheries account for 99% of the total tuna and tuna-like species catches in the North Pacific Ocean by Chinese Taipei. Longline fisheries comprise the large-scale tuna longline (LTLL, vessels larger than 100 GRT) and small-scale tuna longline (STLL, vessels less than 100 GRT) fleets. The total catch of tunas and billfish (including swordfish, striped marlin, blue marlin, black marlin, and sailfish) for the longline fishery (both LTLL and STLL) in the North Pacific Ocean was 32,104 t in 2010. The number of active vessels operating in 2010 was 90 and 1,124 for LTLL and STLL respectively. The total Pacific Ocean (North and South combined) catch of tuna and tuna-like species in the 2010 purse seine fishery was 198,851 t caught by 34 vessels. The tuna and tuna-like species catch by other offshore and coastal fisheries was estimated at 1,872t (harpoon: 610 t, set net: 717 t, gill net: 545 t) in 2010.

For the LTLL fishery, Category I data sources include weekly catch reports and commercial data from individual fishing vessels. Categories II and III data are all compiled from logbook data. Fishermen are required to measure the length of the first 30 fish caught in each set. For the STLL fishery, Category I data sources include landings and auction records of local fish markets, reports of market states and monthly catch reports from individual fishing vessels. For the purse seine fishery, Category I and Category II data are obtained from logbooks.

In March 2010 a catch documentation scheme was established in Taiwan requiring small-scale longline fishermen to attach a tag and to take length and weight measurements of each PBF caught. Beginning in 2011 a new Pacific bluefin tuna sampling program was initiated. Length and weight measurements and otolith samples from Pacific bluefin tuna are collected at landing markets by OFDC samplers. Ovaries from Pacific bluefin tuna were also collected. All Pacific bluefin tuna caught in the small-scale longline fishery are measured for length and weight and otoliths are collected from approximately 20% of the fish.

An observer program has been conducted in the Pacific Ocean since 2002. In accordance with the government's policy in establishing an observer program and availability of budgets to support the increase of observers, the observed trips has gradually increased year by year. The number of observed trips was 25 in 2010.

To advance stock assessments of tuna and tuna-like species in the North Pacific Ocean, Chinese Taipei is conducting the following research:

1. Research on the catch at size/age and CPUE standardization of ALB.
2. Research on CPUE standardization of PBF.
3. Studies on CPUE standardization and stock assessment of SWO and blue marlin.
4. Studies on age and growth, reproduction of striped marlin.
5. Research on CPUE of bigeye tuna (BET) and yellowfin tuna (YFT).
6. Cooperative Billfish tagging program.
7. Estimation of historical catches and standardization of CPUEs for dominant sharks.
8. Estimation on the ratio between fins and body weight, and growth parameters for shark bycatch species in Pacific Ocean.

Discussion

A question was raised about the sharp decrease in PBF catch in the STLL fishery. It was noted that this fishery targets YFT with only seasonal targeting of PBF so no clear explanation can be derived. It was pointed out that a similar decline in PBF catch in Taiwan waters has also been observed. For this reason the question was deferred to the PBFWG.

Chinese Taipei elaborated on the geographic shift in fishing effort by the STLL fleet observed in 2010 (displayed in Figure 5, *ISC/11/PLENARY/09*), noting that some of these vessels used to operate in the south-eastern area waters. While the exact reason for the shift is unknown, there was a decrease in total fishing effort in 2010 which likely contributed to the observed shift. Most STLL vessels operate in the North Pacific and land catches in Taiwan ports.

The Chair of the ALBWG noted a discrepancy between catch in the LTLL reported in the National Report and the Working Group catch table. Chinese Taipei verified that the figures in the National Report are correct and should be added to the ALBWG catch tables. It was also noted that effort in this fishery declined in 2008 and 2009 due to high fuel prices but increased slightly in 2010.

Monitoring and management measures for the STLL fishery were discussed. The logbook recovery rate has increased to over 20% in recent years and vessels larger than 20 GRT must carry a vessel monitoring system (VMS). Some smaller vessels also carry a vessel data recorder but it is not mandatory. It was pointed out that the 25 observed LTLL trips in 2010 (Table 5, *ISC/11/PLENARY/09*) represent about 5.5% of the total number of fishing trips in that year.

Chinese Taipei described their PBF otolith collection program, established in 2011, which has a target coverage level of 20% of the total number of fish tagged in the CDS program; currently more than 170 samples have been taken.

3.3 Japan

H. Nakano presented the delegation report for Japan (*ISC/11/PLENARY/10*). Japanese tuna fisheries consist of the three major fisheries, longline, purse seine, and pole-and-line, as well as other miscellaneous fisheries including troll, drift net, and set net fisheries. The total landings of tunas (excluding skipjack) caught by Japanese fisheries in the North Pacific Ocean in 2009 was 115,482 t and 70,060 t in 2010, which was 61% of the 2009 catch. The total landings of billfish (swordfish and marlins) was 10,323 t in 2009 and 8,132 t in 2010, which was 78% of the 2009 catch. Skipjack tuna landings were 172,961 t in 2009 and 177,549 t in 2010, which represents a 3% increase compared to the 2009 catch.

The Fisheries Agency of Japan has been implementing domestic management actions directed at Pacific bluefin tuna which are consistent with announcements in May 2010 by the Ministry of Agriculture, Forestry and Fisheries (MAFF) on actions toward effective conservation and management for Pacific bluefin tuna, as well as conservation and management measures for Pacific bluefin tuna adopted by the Western and Central Pacific Fisheries Commission (WCPFC) in December 2010.

The nationwide port-sampling project for PBF has collected catch, effort, and size data at the major landing ports since the early 1990s. In addition, there are cooperative projects with prefectural fisheries, experimental stations and universities. Several cooperative studies are also ongoing with foreign countries for the same purpose.

Several research cruises were conducted in 2010: (1) Two research cruises in the Nansei islands (Okinawa) and the Sea of Japan were conducted in 2010 for ecological study of larval PBF; (2) one longline research cruise was conducted in October 2010 for SWO and blue shark in the Kuroshio frontal area mainly to investigate catch relating to environmental factors; (3) To explore safe and effective designs of tori-line in the north Pacific, three types of tori-line were compared in a research study. Other research includes tagging studies using conventional, archival, and popup tags for tuna and tuna-like species, including Pacific bluefin, bigeye, yellowfin, and skipjack tunas, as well as sharks, to investigate migration patterns, swimming behavior, population structure, fishing mortality, and life history parameters. In addition, a troll survey on age-0 PBF was conducted in Tosa Bay, Japan, to develop techniques for timely monitoring of recruitment. There also have been several studies of biological parameters of PBF such as reproduction, growth of age-0 fish, sex-specific growth curves, and the diet of young fish.

Following the mega-earthquake on March 11, 2011, a tsunami hit the east coast of Japan, destroying a number of major fishing ports including Kesen-numa, Ishi-nomaki, and Ofunato. Countless fishermen were killed and their boats and fishing gear were also damaged or lost. It is believed that more than 30,000 fishing boats were lost in the tsunami. Most of the set nets in that area, which frequently catch PBF from summer to autumn (approximately 25% of the annual catch by set net), were destroyed. In addition, fishing facilities and processing factories were also heavily damaged. The loss of vessels and gear, as well as damage to the infrastructure is having a

significant negative impact on the tuna fisheries in the North Pacific Ocean. It is expected that fishing effort and catch in that area will remain low for years to come.

Discussion

There was discussion and clarification of the research programs described in the National Report. It was clarified that the 2,000 t catch limit for adult Pacific bluefin tuna caught in the purse seine fishery is based on the average recent years' catch in the Sea of Japan. In the Sea of Japan there is a Pacific bluefin tuna catch limit of 4,500 t for fish weighing less than 30 kg and a catch limit of 2,000 t for fish weighing more than 30 kg during the spawning season. It was noted that the SKJ catch has fallen in coastal waters in the western part of Japan, prompting tagging studies to investigate the phenomenon.

The effects of the 2011 earthquake and tsunami on future fishing effort were discussed. While many of the larger vessels were at sea and escaped damage, the loss of shoreside infrastructure and other factors have led to the bankrupting of many fishing-related companies, which will likely result in a prolonged decline in fishing effort in the northeast region of Japan.

3.4 Korea

J. Lee presented the Korean delegation report (*ISC/11/PLENARY/11*). Two Korean fisheries, distant-water tuna longline and purse seine, engage in fishing for tuna and tuna-like species in the North Pacific Ocean. In the north and south, the number of active longline fishing vessels was 184 in 2002, 122 in 2007, 108 in 2008, 111 in 2009, and 122 in 2010, while the number of active purse seine fishing vessels was 39 in 1990, 28 in 2007, 28 in 2008, 27 in 2009, and 29 in 2010. The main target species of the longliners were bigeye, and yellowfin tunas, and for purse seiners skipjack and yellowfin tunas. The annual catches of bigeye tuna by longline has increased since the 1980s, ranging from 5,411 t in 1982 to 15,425 t in 1998. While the catch of yellowfin tuna by longline was steady at around 4,000 t since the mid 1970s, yellowfin tuna catch gradually decreased after a peak in 1995 at 7,107 t. The average longline catch of North Pacific albacore during the past 5 years was 169 t, and for billfishes in the 2000s catch was 1,633 t. The annual catch of skipjack tuna by purse seiners has steadily increased to reach the peak of 88,654 t in 2003, and then sharply decreased with large fluctuations in recent years. Yellowfin tuna catches by purse seiners showed a steady increase until 1993, but thereafter had a decreasing trend. The main fishing grounds of longliners was between 20°N and 20°S latitude and west of 150°W longitude, and purse seiners operated in the tropical area of the Western and Central Pacific between 10°S and 10°N latitude and between 140°E and 160°W longitude. The annual catch of Pacific bluefin tuna by the Korean domestic purse seiners after 1994 tended to increase with large annual fluctuations, peaking at 2,141 t in 2003. In contrast, the number of offshore purse seiners has gradually decreased to 25 in 2010. More data were collected in order to enhance information on Pacific bluefin tuna catch by domestic purse seiners, for example the number of boxes used in the auction of Pacific bluefin tuna, the actual weight of catch per box, the number of Pacific bluefin tuna by size, detailed data from daily sales slips, etc. Korea revised the purse seine historical Pacific bluefin tuna catch for 2005-2010. The fishing grounds for Pacific bluefin tuna in 2009 and 2010 were mainly around Jeju Island in the spring. The catch level of Pacific bluefin tuna by set net was below 1 t in 2010.

Discussion

The ALBWG Chair noted that North Pacific albacore catch statistics in Table 1 (*ISC/11/PLENARY/11*) for 2006-2009 differ from the ALBWG Report catch table. It was verified that the data in the National Report is the most accurate. It was noted that the apparent reduction in fishing effort in 2010 may be an artefact of the provisional nature of the data.

3.5 Mexico

M. Dreyfus presented the delegation report for Mexico (*ISC/11/PLENARY/12*). The Mexican purse seine fishery is the most important HMS fishery in Mexico. The major development in this fishery that affected catch was the implementation of the EEZ in the late 1970s. Most of the catch is yellowfin tuna, which in 2010 was 100,000 t out the total of 120,000 t of tunas caught in Mexican fisheries (yellowfin, bigeye, skipjack, Pacific bluefin tunas, and others). Onboard observers are required on all purse seiners greater than 363 tons carrying capacity. For smaller vessels (purse seiners and bait boats) monitoring is achieved through logbooks.

Most purse seine sets target yellowfin tuna associated with dolphins. Sets on free-swimming schools of tuna in coastal areas are second in importance; these include Pacific bluefin tuna sets in northern Baja California.

Pacific bluefin tuna started to become a main target for the Mexican fleet with the development of the tuna farming industry in northern Baja California. Catches in the EPO have a long history with record catches in the 1960s by the USA fleet, mainly in the present Mexican EEZ. Mexico had three record catches of PBF, 2004, 2006 and 2010, the latest being 7,745 t. Other catches of Pacific bluefin tuna as well as North Pacific albacore tuna involve the US sport fishery that fishes mainly in Mexican waters under permit. In commercial fisheries North Pacific albacore is considered an opportunistic catch by vessels targeting Pacific bluefin tuna and remains low.

There are 34 vessels located along the Baja California peninsula that catch swordfish; at present all except one vessel uses longline. Almost all of the catch is within the Mexican EEZ and most of the catch (61% of total catch in 2010) is blue shark; swordfish is secondary in importance (13% of the 2010 catch).

With the exception of swordfish, all billfishes are reserved for catch and release by the sport fishery (mainly in La Paz and Los Cabos, Baja California Sur, and Mazatlan, Sinaloa).

Discussion

There was discussion of the status of the tuna-dolphin fishery. The decline in exports to the USA due to the dolphin-safe issue has actually produced some benefits for Mexico. First, a healthy domestic market for tuna has developed. Second the establishment of the International Agreement for Dolphin Conservation Program (IADCP) has resulted in a decline in dolphin mortality related to tuna fisheries to insignificant levels.

3.6 United States

S. Pooley presented the delegation report for the USA (*ISC/11/PLENARY/13*). The two major US fisheries are of interest to the ISC – the Hawaii longline fishery and the albacore troll fishery – were stable in 2010. The longline fishery consists of 125 vessels targeting bigeye tuna (5,242 t in 2010) and swordfish (1,654 t in 2010) both with significant incidental catches of marlins and other pelagic species, and a significant bycatch of sharks. The albacore trolling fishery consists of 653 vessels with a catch primarily of North Pacific albacore tuna (10,130 t in 2010).

The longline fisheries in the US are regulated in terms of landings of some target species, such as bigeye tuna under the Western and Central Pacific Fisheries Convention, and in terms of bycatch of protected species such as loggerhead and leatherback turtles. The Hawaii longline fishery for swordfish has closed several times in the past ten years for exceeding its allowed take of turtles, while the Hawaii longline fishery for bigeye tuna west of 150° W longitude was closed in November 2010 for reaching the WCPFC imposed limit on bigeye tuna. In the latter case, some fishing effort moved to the east of 150° W longitude but some effort was lost and the fresh seafood markets were substantially disrupted. The US is in the midst of considering new regulations on these longline fisheries to reduce the likelihood of interactions with marine mammals, particularly false killer whales.

A variety of pelagic research projects were conducted in the past year which span pelagic research in the areas of fishery monitoring, abundance surveys, socio-economics, life history studies, oceanography, and bycatch mitigation. Most of the USA stock assessment research on pelagic species is conducted in conjunction with the ISC or the IATTC and is thus reported elsewhere. Over 50 manuscripts were published in the past year on studies related to ISC objectives, including studies on CPUE of shark species in the Hawaii longline fishery, North Pacific albacore tuna age and growth and population structure, striped marlin age and growth, and an effort to integrate studies of swordfish and leatherback sea turtles to inform management and conservation efforts, as well as cooperative studies with both the Japan and the USA albacore industry.

Discussion

The Chair of the ALBWG pointed out a discrepancy between the 2009 and 2010 catch data in the National Report and the ALBWG report. It was pointed out that the ALBWG catch table was finalized June 8, 2011 and the National Report catch table finalized the week of July 11, 2011, and that this difference in reporting dates likely attributed to the observed difference. The longline catch of North Pacific albacore in 2010 was 201 t as reported in the US National Report.

A discrepancy in the 2009 and 2010 Pacific bluefin tuna catch data was also identified. It was noted that Pacific bluefin tuna sport catch was updated at the PBFWG meeting, but the update was inadvertently omitted from the National Report. The updated values are 177 t (176 t recreational catch and 1 t “other”) for 2009 and 117 t for 2010. Also, the US will not report sport catch estimates for skipjack, yellowfin, and bigeye tunas, as well as billfish, until the best data sources can be determined. It should also be noted that the catch table in the National Report combines some gears (e.g., sport and “other”) that are disaggregated in the PBFWG report catch tables.

Responding to queries on bycatch regulations on the longline fishery in the US, it was noted that state and Federal restrictions on the landing and sale of sharks and shark fins and current regulations related to seabird mitigation on domestic longline vessels are currently in place.

4 REPORT OF THE ISC CHAIRMAN

G. DiNardo presented the ISC Chairman's report. The ISC had another busy year since the ISC Plenary met in Victoria, B.C., Canada in July 2010. The year was spent completing a benchmark assessment for North Pacific albacore tuna and working on preparations for new stock assessments for striped marlin and Pacific bluefin tuna in 2012. Preparatory work consisted of collecting fishery and biological data, compiling and analyzing data, testing of hypotheses and stock assessment model assumptions, and exploring new models or variations of standard models for use in the upcoming assessments. Progress was made with investigating striped marlin stock structure issues, compiling a catalogue and inventory of the ISC database, advancing development of the website, and database structure and administration. Three new Working Group Chairs were also elected, Jon Brodziak for Billfish, Suzanne Kohin for Shark, and Ren-fen Wu for Statistics. In addition, the framework for a peer review of the ISC function was developed, which is a requirement of the organization. Six intercessional workshops were held to facilitate collaboration among Member scientists in implementing ISC work plans and coordinating research on the stocks.

At the conclusion of this 11th meeting of the ISC, I will have completed my first year of service as Chairman. While the task on occasion is consuming, your support and patience is appreciated and acknowledged. Achieving the objectives stated in the charter and contributing relevant science-based information for shaping policies that allow for conservation, sustainable fisheries and healthy HMS stocks is paramount to the ISC. Continuation of this direction and especially maintaining relevance, however, will require continued vigilance to avoid diluting the scientific information and interpretation with fishery policy considerations and arguments. Furthermore, all aspects of the organization, especially the operating framework need to be reviewed from time to time and adjustments adopted to promote efficiency and effectiveness in the operations and continued relevance of ISC's advice.

I close this report by thanking all my colleagues who have worked on ISC tasks and who have provided the support to ISC and me in advancing the objectives and purpose of the organization. The service of Michel Dreyfus, Vice Chairman, for support and insightful advice is acknowledged. A special thanks and appreciation is owed to the Chairs of the Working Groups, namely Shui-Kai Chang, Jon Brodziak, John Holmes, Yukio Takeuchi, Ren-fen Wu, and Suzy Kohin, who provided unselfish leadership in guiding the work of the Working Groups. In addition, the leadership role of Hideki Nakano with respect to the Data Administrator and Webmaster is appreciated. The Chairman extends special thanks and appreciation to Chinese Taipei for hosting the ISC Shark Working Group Workshop in April 2011. Initially scheduled for March 2011 in Japan, the workshop was cancelled due to the devastating earthquake and tsunami on 11 March 2011. The Chairman reached out to Chinese Taipei as an alternate host, and without hesitation they graciously accepted. Finally, I acknowledge the professional assistance of Roszella (Rose) Sanford, Sarah Shoffler, and Lyn Wagatsuma for their dedicated service to ISC and for assistance in completing tasks assigned to the Chairman. In that capacity, they served as point of contact for the office of the Chairman, led in organizing the facilities for

annual meetings, led in writing and assembling information required for agenda items of meetings and for responding to inquires, and served as advisors to me on aspects of ISC operations. Thanks to all of you for contributing to another successful year for ISC and for the support and service provided.

5 INTERACTION WITH REGIONAL ORGANIZATIONS

5.1 IATTC-ISC Memorandum of Cooperation (MOC)

In introducing this item, the ISC Chairman pointed out that the signed MOC between ISC and IATTC (*ISC/11/Plenary/02*) was circulated to all Members shortly after ISC10. The MOC provides a mechanism to allow IATTC to participate in all of the ISC meetings without having to apply for observer status on a case-by-case basis. Given the IATTC's important role in managing stocks in the North Pacific Ocean the MOC provides a framework for mutual cooperation. In particular the ISC and IATTC will:

- Encourage reciprocal consultations and regular contacts on matters of common interest regarding scientific research on highly migratory tuna and tuna-like fish resources.
- Regularly exchange meeting reports, information, project plans, documents, and publications regarding matters of common interest.
- Cooperate in research and assessment of stocks that occur in the north eastern Pacific Ocean during part or all of their life cycle, as appropriate.
- Routinely exchange fishery data (Category I, II, and III) from the north eastern Pacific Ocean, in accordance with the rules and procedures for data confidentiality adopted by each organization, to minimize duplicative data collection efforts and enhance fishery monitoring and stock assessment; and
- Strive to develop compatible data codes and data standards to facilitate data exchange, to the extent practicable.

It was noted that these collaborations routinely occur, particularly in the ISC species Working Groups.

5.2 PICES

5.2.1 Report from the Executive Secretary of PICES

S. Shoffler provided an oral summary of the PICES Report to ISC (*ISC/11/PLENARY/14*) on behalf of Dr. Alexander Bychkov, Executive Director of PICES.

PICES and ISC have very similar charters and have overlapping membership, making them natural partners. PICES has initiated a new science program called FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems). The purpose of this program is to understand how North Pacific ecosystems respond to climate changes and communicate this information to various constituencies. Multidisciplinary and large-scale activities of FUTURE meld well with ISC activities directed toward understanding

the scientific basis for the conservation and management of tuna and tuna-like species, and both organizations would benefit from collaboration within this program. The PICES Rules of Procedure would allow ISC scientists to participate in PICES Technical Committees and subsidiary bodies as ex-officio members and PICES encourages this form of participation. PICES invited the ISC to send an observer to the 2011 Annual Meeting to address PICES on collaborative issues. In addition, Dr. Bychkov invited ISC to co-sponsor a session at the 2nd PICES/ICES/IOC Symposium on Effects of Climate Change on the World's Oceans scheduled for May 14-18, 2012 in Yeosu, Korea. Finally, Dr. Bychkov suggested ISC and PICES explore convening joint topic sessions at future PICES Annual Meetings.

5.2.2 Report of the 2010 PICES meeting

J. Lee reported on the proceedings of the nineteenth annual meeting of PICES (PICES-2010) convened from 22-31 October 2010 in Portland, USA. The theme for PICES-2010 was “North Pacific ecosystems today and challenges in understanding and forecasting change.”

J. Lee attended the meeting as an observer on behalf of ISC and prepared a presentation on ISC activities for the meeting. Lee highlighted PICES research activities that might be of interest to ISC, including characterizing changes in oceanographic conditions and understanding causal mechanisms, development of environmental time series, and development of bioeconomic reference points.

Discussion

It was agreed that the ISC should participate in the 2012 PICES/ICES/IOC Symposium and the other forums described in the PICES Report. It was noted that the ecology and oceanography oriented initiatives of PICES would benefit understanding of the dynamics of tuna and tuna-like species stocks. The Chair will work with PICES to explore greater collaboration as outlined in their Report.

5.2.3 Invitation to 2011 PICES meeting

The ISC Chairman noted receipt of an invitation for ISC to participate in the annual meeting of PICES to be held in Khabarovsk, Russia in 14-23 October 2011. In response to the request, the ISC Chairman appointed C.-L. Sun to represent ISC at the 2011 PICES meeting. This nomination was accepted by the Plenary. Sun will attend and report any noteworthy information and opportunities for collaboration back to the Plenary at the ISC12 meeting.

5.3 WCPFC

T. Beeching presented a report on WCPFC activities. From a science perspective a priority is to update the current 5 year Strategic Research Plan, which expires this year, and an increased focus on shark issues will be reflected in the new plan. SPC is conducting stock assessments for yellowfin, bigeye, and skipjack tunas in the WCPO, as well as South Pacific Ocean albacore tuna, and it is anticipated that they will be completed by mid-July. The stock assessors will meet in Pohnpei in early August prior to the SC meeting to agree and finalise presentations to the SC, for approval and comments, and formulate advice for the Commission meeting in Palau in December.

The Commission is proceeding with a peer review of the bigeye tuna stock assessment, bigeye tuna being the only managed tuna species in the WCPFC region that is considered to be experiencing overfishing at this time. Reflecting concerns for the status of bigeye tuna, the West Pacific East Asia Oceanic Fisheries Management Project is delivering technical assistance in stock assessment and gathering of associated data for tuna fisheries in Indonesia, the Philippines, and Vietnam. The project ends in 2012.

In response to relatively high catches of juvenile yellowfin and bigeye tunas on FADs, the purse seine fishery on the permitted high seas areas, and in the EEZs of the WCPFC Convention area bounded by 20°N and 20°S latitude, shall be closed to fishing on FADs between 0000 (GMT/UTC) hours from 1 July to 30 September 2011. CMM 2008-01 provides that during this period, a vessel may only engage in fishing operations if the vessel carries an observer from the Regional Observer Programme on board to monitor that at no time does the vessel deploy or service any FAD or associated electronic devices or fish on schools in association with FADs. In December 2010 management and conservation measures were adopted for application to fishing vessels operating in the Eastern High Seas Pocket Special Management Area (SMA). Vessels are required to report fish on board when entering and leaving the SMA, and their movements are tracked with satellite technology.

WCPFC now has a formal agreement with IATTC to exchange data so both organizations will have Pacific-wide databases (<http://www.wcpfc.int/node/2684>).

GEOEYE (<http://www.geoeeye.com/CorpSite/>) has conducted trials (at no cost to the Commission) for real time observer data entry at sea, with potential benefits including: 1) a panic button for observers, 2) real time data reporting, and c) transmission of GPS position (to enhance scientific data collection and observer safety). Noting that core data is currently verified ashore, a potential result of close-to-real time verification of data is a faster turnaround of observers and real time dialogue to correct observer reporting issues.

Discussion

The recent Center for Independent Experts (CIE) external review of the WCPFC yellowfin tuna assessment was discussed. Because it was a desktop review a number of problems emerged in relation to its timing and the provision of conservation advice. In sum, by the time the results of such a review are available the assessment results are already in use by managers. An interactive review would be superior but it would be costly.

Clarification was provided regarding the external review process for the North Pacific albacore stock assessment. It was pointed out that a table top review of the assessment will be conducted by the CIE shortly after ISC11. Staff at NOAA Fisheries, PIFSC, are working with the ALBWG Chair to develop Terms of Reference for the review.

6 REPORTS OF WORKING GROUPS AND REVIEW OF ASSIGNMENTS

6.1 Albacore

J. Holmes reported on the activities of the ALBWG over the past year (*ISC/11/ANNEX/04*, *ISC/11/ANNEX/09*). The ALBWG was tasked with completing a full assessment of the current

status and future trends of ALB and developing recommendations for conservation. The Working Group met at a data preparation workshop, 11-19 October 2010 in La Jolla, California, USA, and for the stock assessment workshop, 28 May-11 June 2011 in Shimizu, Japan to achieve these objectives. The October 2010 meeting focused on completing fishery spatial/temporal definition work for the upcoming assessment; reviewed input data series (catch, size composition, CPUE) for consistency with the new fishery definitions and conflicts in primary data sources; explored the Stock Synthesis III (SS3) model to assess the impact and develop solutions to parameterization issues; and determined the role of the VPA model in the assessment. The stock assessment workshop developed the base-case model; conducted sensitivity analyses; and developed advice on stock status, future trends, and conservation measures as well as partially updated national fisheries data for 2010.

Accomplishments of the ALBWG over the past year include:

1. The Working Group completed the transition from an age-structured VPA to length-based SS3 assessment model;
2. Developed a consensus base-case assessment model for SS3, which includes new age and growth data;
3. Assessed the current status and future trends in the albacore stock and developed recommendations on status and conservation advice;
4. Updated national fishery statistics through 2010 for member countries attending the stock assessment workshop;
5. Decided to submit the assessment to external desktop review of the methodology, results, interpretation, and conservation advice; and
6. Developed and prioritized a list of research needs to improve future assessments.

The successful completion of this assessment is the result of substantial ongoing collaboration and cooperation among WG members to understand and develop solutions to problems as they arose during the model transition period. Simon Hoyle (SPC) and Alexandre Aires-da-Silva (IATTC) made important contributions to the assessment. The cooperation and hard work of all WG members ensured that the assessment was completed on-time.

The ALBWG brings forward the following issues to the ISC Plenary:

- The need to develop efficient protocols for the archiving of assessment models and datasets used in assessments, including what should be archived (base-case models, sensitivity runs, input data, biological data, etc.), the format in which files should be archived, where they are archived, etc.;
- How the need for external review of assessments can be accomplished; and
- The absence of data submissions directly from China, although ALB catches are minor.

Discussion

The difficulties caused by the lack of 2010 data submission by China were discussed. This is not only a problem for the completion of ALBWG tasks, but for other WGs as well. It was noted that the BILLWG resorted to obtaining catch data from the WCPFC because of the lack of data submission from China. The ISC Chair needs to work with China to encourage full participation in ISC activities, especially in relation to the provision of catch data.

There was discussion of peer review of ISC assessments. It is both expensive and time consuming so that, as noted earlier, the results lag behind the provision of conservation advice. This is a difficult issue and there are no clear solutions right now. However, if peer review results are only considered advisory, and are used to improve future stock assessments this timing problem becomes less of an issue.

The ISC Chairman thanked J. Holmes for his thorough presentation.

6.2 Pacific bluefin tuna

Y. Takeuchi, Chairman of the PBFWG, presented the summary of the activities of the group since ISC10 (*ISC/10/ANNEX/07*). The PBFWG met on 6-9 January 2011 in Shimizu, Japan. At this workshop, 13 working papers and seven oral presentations were made with the participation of 37 scientists from Chinese Taipei, Japan, Korea, USA, and the IATTC. The PBFWG reviewed fishery data for its stock assessment at this meeting. The PBFWG also tested new ideas for its stock assessment model, such as a new stock recruitment relationship and hybrid VPA-SS model.

The PBFWG also met 16 July 2011 in San Francisco, California to update the catch table. Korea revised their historical purse seine Pacific bluefin tuna catch from 2005 to 2010, which was supported by a working paper explaining the rationale for the revisions. The PBFWG reviewed the proposed revision and recognized that the working paper was useful so that it was registered as one of official working paper of January workshop. The USA updated and presented the estimated USA catches of Pacific bluefin tuna for 2009 and 2010 respectively. The USA recreational catches for 2009 and 2010 were estimated to be 176 and 117 mt respectively. Total USA commercial catches for 2009 and 2010 were estimated to be 415 and <1 mt respectively. USA catches of Pacific bluefin tuna in 2009 and 2010 are considered to be provisional. Japan also revised their purse seine catch time series since 2002 because of change to its logbook data. Japan also updated recent Pacific bluefin tuna catch of the other gears. Chinese Taipei and Mexico also presented their recent catch updates.

The PBFWG work plan for 2011 and 2012 was reviewed, including the schedule of the next full stock assessment. The WG plans to hold two workshops in January 2012 and May-June 2012. The objective of the first workshop is to finalize stock assessment input data. The second workshop will conduct a full stock assessment of the stock. The WG may also meet in July 2012 in conjunction with ISC12 Plenary if necessary.

Discussion

The ISC Chairman thanked Y. Takeuchi for his insightful presentation.

6.3 Billfish

J. Brodziak, Chairman of the BILLWG presented the Billfish Working Group report (*ISC/11/ANNEX/07, ISC/11/ANNEX/08*). The report provided current information on the status of WG assignments, recent work on billfish fishery and life history research, and the preparation and finalization of data for conducting the WCPO striped marlin stock assessment. The report also described the future work plan for the WG.

Activities of the January 2011 workshop in Honolulu, Hawaii, USA described in detail in Annex 7. The meeting included a review and update of billfish fishery data for the following member countries: Chinese Taipei, Korea, Japan, and the US. The WG also reviewed CPUE standardization analyses for striped marlin conducted by Chinese Taipei, the US, and Japan. The WG agreed to accept CPUE standardizations conducted by Chinese Taipei and the US for use in the WCPO striped marlin stock assessment. The WG also reviewed new research on MLS life history parameters. This included studies of the natural mortality rate (US), the growth rate and expected size at age (Chinese Taipei), the sexual maturity at age (Chinese Taipei), and the weight-specific fecundity (Chinese Taipei) of North Pacific striped marlin (MLS). Overall, the WG adopted the new research on life history parameters as the best available scientific information available for the WCPO striped marlin stock assessment.

The meeting was also attended by a representative of the SPC who provided valuable information on striped marlin catch data submitted to the WCPFC. This was a positive outcome and helped ensure that the WG would have access to the best available catch data of non-ISC countries for the WCPO striped marlin stock assessment.

The WG also considered some recent socioeconomic research on the estimation of the maximum economic yield reference level of the Japanese coastal longline fishery for swordfish and received a presentation on the IATTC efforts to assess the Eastern North Pacific striped marlin stock (east of 145° W longitude and north of 5° S latitude). The WG also planned a collaborative review of the IATTC assessment model.

The BILLWG held a meeting in May 2011 in Chinese Taipei. The activities of this meeting are described in detail in Annex 8. The work plan leading up to this meeting included the finalizing of working papers from the January 2011 meeting. The work plan also called for the submission of the late striped marlin data by 15 February 2011, the finalization of data tables for the WCPO striped marlin stock assessment by 28 February 2011, and the updating of the most recent striped marlin data by 15 May 2011. The WG members also continued to submit Category I Data for all billfish to the WG Chair.

The WG accomplishments from the May 2011 meeting included the acquisition of new data for billfishes. In particular, the WG was able to incorporate the non-ISC member countries catch data of striped marlin into the stock assessment data set. The WG also received some new biological information on striped marlin catches from China and updated information on US catches of billfishes in North Pacific including striped marlin and swordfish. Some striped marlin stock assessment data that were expected to be ready for the May 2011 meeting were not provided on time. As a result, the deadline for the submission of standardized CPUE and quarterly catch and size composition data was rescheduled to be 30 June 2011.

The WG also conducted and reviewed several CPUE standardization analyses for Japanese striped marlin fisheries. These included standardizations for offshore and long-distance longline, coastal large-mesh drift net, high seas large-mesh drift net, and coastal longline fisheries.

The WG also considered some additional life history research for the WCPO striped marlin stock assessment. In particular, the WG reviewed a revised growth study and a natural mortality rate study that used the revised growth information. The WG also considered new research to

estimate stock-recruitment steepness of North Pacific striped marlin based on reproductive ecology. The WG adopted the new life history research for use in the WCPO striped marlin stock assessment.

The WG received a presentation on the progress of a multinational Pacific billfish tagging program and reviewed a report on the ISC Billfish WG and IATTC collaboration on sensitivity analyses for the EPO striped marlin stock assessment.

The WG meeting was attended by a representative of the SPC. This representative provided valuable insights and helped the WG review the best available scientific information for the assessment of the WCPO striped marlin stock.

Following the May 2011 meeting, the WG continued work on the compilation of the striped marlin stock assessment data. All late stock assessment data and working papers were received by the WG Chairman by the 30 June 2011 deadline. As a result, the review and completion of the WCPO striped marlin stock assessment was rescheduled for December 2011.

The WG Chairman discussed the issue of data availability for BILLWG stock assessments. In particular, the following problems for recent ISC Billfish WG stock assessments were noted: (1) ISC member countries not providing catch data; (2) data provided late and after the agreed-upon deadline including catch, standardized CPUE, and size composition data; and (3) member countries not participating in WG meetings. It was emphasized that the lack of current data decreases the relevance of stock assessments.

The future work plan of the Billfish WG included two major tasks. These were:

1. Completion of the draft stock assessment of North Pacific WCPO striped marlin by December 2011 for review and adoption at ISC12
2. Preparation of data for the upcoming Pacific blue marlin stock assessment.

Discussion

The BILLWG Chair stressed the need to provide data in a timely fashion. The delay in the provision of data, which delayed completion of the current striped marlin stock assessment, negatively affects the ISC's credibility and relationship with scientific and management organizations. The USA noted that postponing any assessment affects domestic management requirements, as well.

The ISC Chairman thanked J. Brodziak for his comprehensive presentation.

6.4 Shark

S. Kohin, Chairperson of the Shark Working Group presented the SHARKWG report (*ISC/11/ANNEX/06*). At ISC10, the SHARKWG was formed to conduct stock assessments on species of interest as required, similar to the responsibilities of the other existing species WGs of the ISC. The SHARKWG will focus on monitoring shark fisheries particularly for blue, shortfin mako, bigeye thresher, pelagic thresher, silky, oceanic whitetip, hammerhead, and any other shark species for which stock assessments may be needed. The first meeting of the SHARKWG

was held 19-21 April 2011 in Keelung, Taiwan. Highlights from the meeting include: (1) reviewing nine working group and ten background documents on shark fisheries and life history studies; (2) development of a work plan for assessing blue and shortfin makos in 2012 and 2013, respectively; and (3) election of Suzanne Kohin as SHARKWG Chair.

The work plan is presented in Annex 6, *Report of the Shark Working Group Workshop* and includes four topics of focus for future work: (1) Fisheries Statistics; (2) Biological Research; (3) Ecological Research; and (4) Shark Stock Assessments. With respect to shark stock assessments, the SHARKWG will first conduct a stock assessment on blue sharks in the North Pacific Ocean. The work will build upon data and modelling efforts from the last blue shark stock assessment in the North Pacific conducted collaboratively by US and Japan scientists, as well as other interested scientists (Kleiber et al., 2009). A data meeting is planned for November 30 - December 6, 2011, in Honolulu, HI USA and the SHARKWG Chair will soon put out a request for National Category I, II and III data for blue and shortfin mako sharks. It is expected that another intercessional meeting in mid-2012 and a final meeting near the end of 2012 will be needed to complete the blue shark assessment. Work on the other species of interest will be conducted collaboratively with other RFMO shark working groups or within the ISC SHARKWG as deemed necessary.

Discussion

It was noted that there is elevated concern among all RFMOs on the status of sharks so the proposed assessments are timely. While timely completion is important, the data need to be reviewed carefully because sharks are a bycatch species and the collection of pertinent data have been treated differently over time. Other organizations are planning to assess sharks so ISC needs to avoid duplication of effort, which was highlighted at the 2010 Shark Task Force meeting and subsequent discussion with SPC and IATTC staff.

In relation to the data issue, Mexico noted that historically their catch data grouped all shark species together, partly because they were caught in artisanal fisheries. Since 2007 there is a regulation requiring the report of catches by species. While this means recent data are more accurate, the shortcomings of historical data will have to be addressed. Given similar issues in other countries a practical comprise on the treatment of historical data will have to be found.

The ISC Chairman thanked S. Kohin for the insightful presentation.

6.5 Seminar

J. Brodziak presented a brief overview of the seminar on the use of the best available scientific information, held during a break in the Plenary on 22 July 2011 (*ISC/10/ANNEX/11*). The seminar covered four topic areas: 1) Information needs for stock assessments; 2) Best available scientific information; 3) Minimal components for a structured stock assessment; and 5) Best practices for management advice. The results of the seminar are captured in five tables included in Annex 11. In particular, Tables 4 and 5 provide guidance to ISC WGs on the components of stock assessment reports and executive summaries for such reports intended to crystallize information on stock status for consideration by managers.

Discussion

The overall objective of this exercise is to encourage a basic level of consistency across ISC documents so as to make them easier to review and be understood by fishery managers. It was clarified that the tables (specifically Tables 4 and 5) are for guidance and not meant to be prescriptive, for example by specifying particular methodologies that should be used. It was noted that the production of reports documenting fisheries exploiting fish stock of interest would be very useful (per Table 2, item 1). There was discussion of the process for incorporating the workshop results into the ISC Operations Manual. It was agreed that the intent of tables in Annex 11 will be incorporated into a revised draft of the ISC Operations Plan, which will be circulated as a formal recommendation for ISC Members to review. The goal is to adopt these additions to the Operations Plan at ISC12.

The topic of “best practices for management advice” (*Annex 11*, Section 4) was discussed at length in light of the ISC’s mission to provide scientific information on which management advice may be based, but not making management recommendations per se. This directly relates to Table 5, which lists the proposed contents for stock assessment executive summaries. It was emphasized that ISC would not be making management recommendations in executive summaries; rather, the executive summary should clearly and concisely describe the status of the stock—the basic facts resulting from the stock assessment—for fishery managers to use when developing management proposals. It was agreed that in consultation with the WG Chairs the terminology describing this task would be modified to clarify that ISC’s role is to provide scientific information in support of fishery management decision making. At the same time, it was emphasized that the executive summaries are a WG product and should summarize stock status in relation to biological reference points.

A separate issue raised in this discussion was the possibility that the ISC could in the future conduct management strategy evaluations. These exercises evaluate the effectiveness of management measures in light of science-based policy objectives. While dealing with management measures, such exercises would not place ISC in a policy-making role and should be undertaken.

The Chair thanked J. Brodziak for the thorough and insightful presentation.

7 STOCK STATUS AND CONSERVATION ADVICE

7.1 Albacore

J. Holmes presented the recently completed North Pacific albacore stock assessment (*ISC/11/ANNEX/09*). The assessment was completed in June 2011 using fishery data through 2009. The assessment was conducted using a seasonal, length-based, age-structured, forward-simulation population model developed within the Stock Synthesis modelling platform (Version 3.11b) and was based on the assumption that there is a single well-mixed stock of albacore in the north Pacific Ocean (base-case model). The model used quarterly catch-at-length data; 16 age-aggregated fisheries defined by gear, location, season, and catch units (weight or number); a new growth curve estimated within the model; and use of conditional age-at-length (otoliths) data not previously available.

Analyses were carried out to assess the sensitivity of the results to assumptions including data-weighting (both between data types and relative weightings of different sources within a data type), biology (stock-recruitment relationship, natural mortality, growth), and fishery selectivity patterns. Stochastic future projections of the stock were conducted to estimate the probability that future spawning stock biomass (SSB) will fall below the average of the ten historically lowest estimated SSBs (SSB-ATHL) in at least one year of a 25-yr (2010-2035) projection period. The base-case scenario for projections assumed average recruitment and constant F (at the current F level, $F_{2006-2008}$), but sensitivity of the results to alternative harvest scenarios (constant catch and constant $F_{2002-2004}$), two recruitment scenarios (high and low levels), and alternative structural assumptions (down-weighting of the length composition data, stock-recruitment relationship, growth) was investigated. Retrospective analyses were conducted to assess the level of bias and uncertainty in terminal year estimates of biomass, recruitment, and fishing mortality. A reference run of the VPA model configured as in the 2006 assessment, but with updated catch-at-age and age-aggregated CPUE indices, was conducted to compare important estimated quantities for model-related changes.

The base-case model estimated that SSB likely fluctuated between 300,000 and 500,000 mt between 1966 and 2009 and that recruitment averaged 48 million fish annually during this period (Figure 7-1C). The pattern of F-at-age showed fishing mortality increasing to its highest level on 3-yr old fish and then declining to a much lower and stable level in mature fish (Figure 7-2). Current F (geometric mean of 2006 to 2008, $F_{2006-2008}$) is lower than $F_{2002-2004}$ (current F in the 2006 assessment). Future SSB is expected to fluctuate around the historical median SSB (~400,000 t) assuming F remains constant at $F_{2006-2008}$ and average historical recruitment levels persist (Figure 7-3A). $F_{2006-2008}$ is approximately 30% below $F_{SSB-ATHL\ 50\%}$ and there is about a 1% risk that future SSB will fall below the SSB-ATHL threshold in at least one year in the projection period assuming average historical recruitment and constant $F_{2006-2008}$, i.e., current F is well below the 50% probability level. However, if recruitment is about 25% lower than the historical average and F remains constant at $F_{2006-2008}$, then the risk of future SSB falling below the threshold by the end of the projection period increases to as high as 54%.

Sensitivity and retrospective analyses evaluated the impact of alternative assumptions on the assessment results. These analyses revealed scaling differences in estimated biomass (total and SSB) and, to a lesser extent, recruitment, but few differences in overall trends. Relative F-at-age patterns were not affected by different assumptions, except when the growth curve parameters from the 2006 assessment were used, and $F_{2006-2008}$ was consistently lower than $F_{2002-2004}$. Although there was considerable uncertainty in absolute estimates of biomass and fishing mortality, the estimated trends in both quantities were robust and advice based on F_{SSB} was not affected by this uncertainty. Terminal year estimates of biomass and recruitment show no bias, but there was a high level of uncertainty in the most recent recruitment estimates. Given these findings, the WG believes that the current parameterization of the base-case model is appropriate.

Both the SS3 base-case model and the VPA reference run estimated similar historical trends in SSB and recruitment, but with different scaling for biomass. The scaling difference was largely attributable to the different growth curves used in SS3 base-case model and the VPA reference run. A sensitivity run of the base-case model in which growth parameters were fixed to those used in the VPA, reduced the scaling of biomass to the level of the VPA reference run. Sensitivity analyses of future projections showed that stock status and conservation advice is

relatively insensitive to these scaling differences (Figure 7-3B). The WG concluded that the growth curve used in the 2006 assessment was not representative of growth in North Pacific albacore. The WG also concluded the SS3 model will replace the VPA as the principal model in future North Pacific albacore assessments.

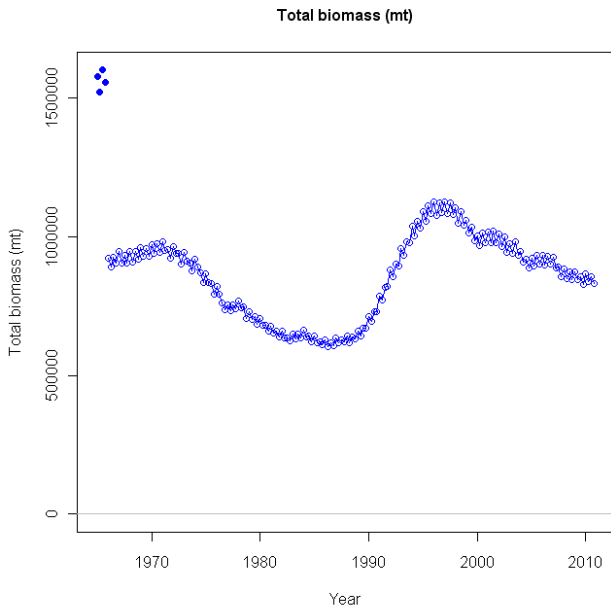
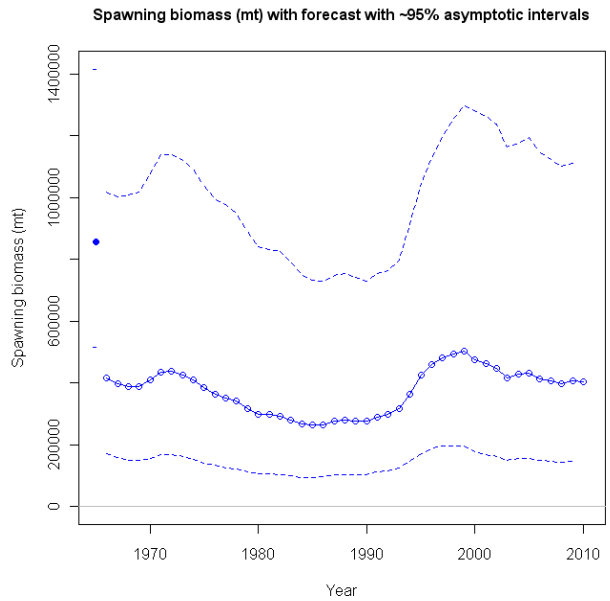
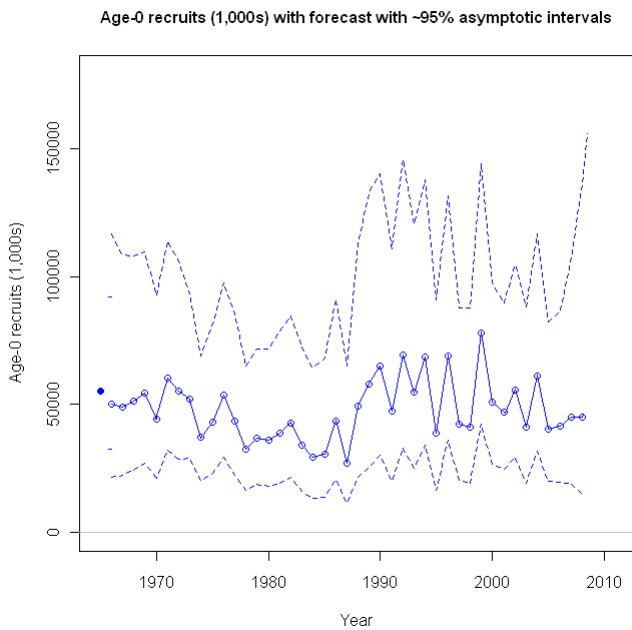
A.**B.****C.**

Figure 7-1. Estimated total biomass (A), spawning biomass (B), and age-0 recruitment (C) of albacore tuna in the north Pacific Ocean. The open circles represent the maximum likelihood estimates of each quantity and the dashed lines in the SSB (B) and recruitment (C) plots are the 95% asymptotic intervals of the estimates (± 2 standard deviations) in lognormal (SSB – B) and arithmetic (recruitment – C) space. Since the assessment model represents time on a quarterly basis, there are four estimates of total biomass for each year, but only one annual estimate of spawning biomass and recruitment.

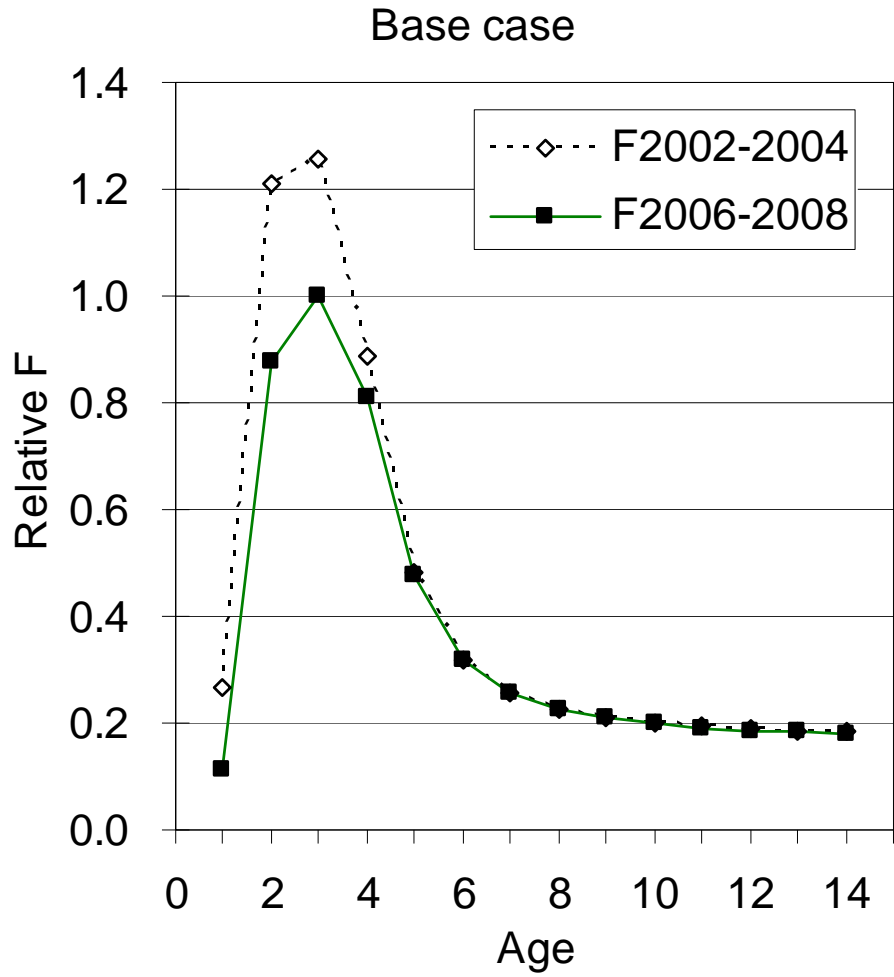


Figure 7-2. Estimated fishing mortality-at-age for the base-case scenario ($F_{2006-2008}$) and $F_{2002-2004}$ (current F in the 2006 assessment). Results are scaled to the highest F -at-age in the $F_{2006-2008}$ series at age-3 (0.16 yr^{-1}).

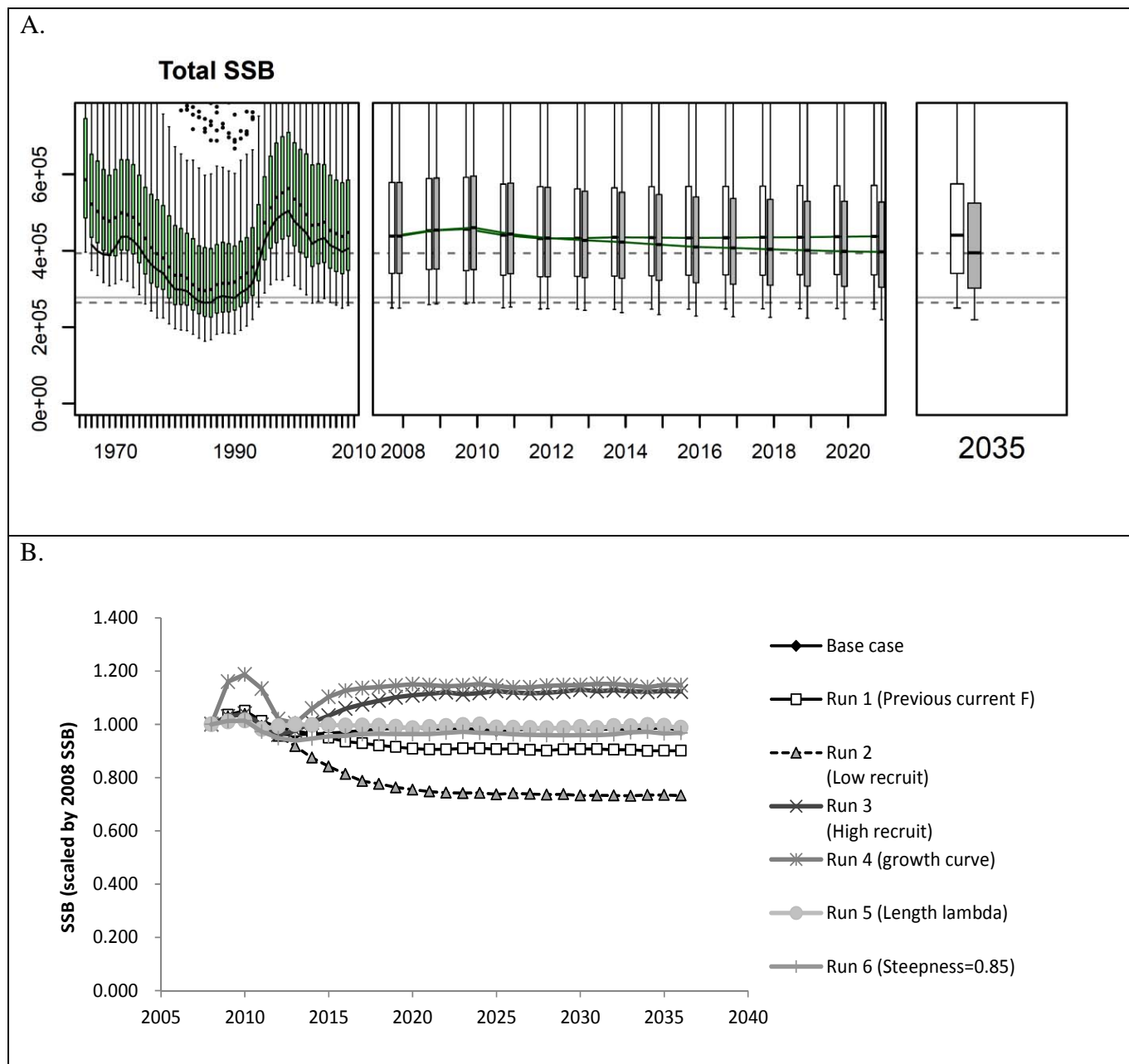


Figure 7-3. A. - Past (left) and future (right) trajectories of SSB estimated with two harvesting scenarios, base-case ($F_{2006-2008}$) and $F_{2002-2004}$. The lines from the boxes represent 90% confidence intervals, and lower and upper end of boxes represent 25th and 75th percentiles. Open circles are extreme values. B. - Comparison of SSB trajectories of among 7 future projection runs testing harvesting and recruitment scenarios and assessing structural sensitivities. Results are scaled to SSB_{2008} , which is approximately the long-term median SSB during the modeled period, 1966-2009.

Working Group Conclusions on Stock Status

Although there is uncertainty in the absolute estimates of biomass (total and SSB) and fishing mortality, the stock status and conservation advice based on the $F_{SSB-ATHL}$ reference point are

relatively insensitive to these uncertainties as trends in SSB and recruitment are robust to the different plausible assumptions tested by the WG (Figure 7-3B). Estimates of $F_{2006-2008}$ (current F) expressed as a ratio relative to several potential F-based reference points (F_{MAX} , $F_{0.1}$, F_{MED} , $F_{20-50\%}$) are less than 1.0 (Table 7-1) and SSB is currently around the long-term median of the stock and is expected to fluctuate around the historical median SSB in the future assuming constant $F_{2006-2008}$ and average historical recruitment. The ratio $F_{2006-2008}/F_{SSB-ATHL}$ is 0.71, which means current F is well below the fishing mortality that would lead SSB to fall below the SSB-ATHL threshold. The WG concludes that overfishing is not occurring and that the stock likely is not in an overfished condition, (e.g., $F_{20-50\%} < 1.0$), although biomass-based reference points have not been established for this stock.

Table 7-1. . Potential reference points and estimated F-ratio using $F_{current}$ ($F_{2006-2008}$), associated spawning biomass and equilibrium yield. $F_{SSB-ATHL}$ is not an equilibrium concept so SSB and yield are given as median levels.

Reference Point	$F_{2006-2008}/F_{RP}$	SSB (t)	Equilibrium Yield (t)
$F_{SSB-ATHL}$	0.71	346,382	101,426
F_{MAX}	0.14	11,186	185,913
$F_{0.1}$	0.29	107,130	170,334
F_{MED}	0.99	452,897	94,080
$F_{20\%}$	0.38	171,427	156,922
$F_{30\%}$	0.52	257,140	138,248
$F_{40\%}$	0.68	342,854	119,094
$F_{50\%}$	0.91	428,567	99,643

Working Group Recommendation on Conservation Advice

The North Pacific albacore stock is considered to be healthy at the average historical recruitment and current fishing mortality ($F_{2006-2008}$). The sustainability of the stock is not threatened by overfishing as current $F_{2006-2008}$ is about 71% of $F_{SSB-ATHL}$ and the stock is expected to fluctuate around the long-term median SSB (~400,000 t) in the short- and long-term future. However, recruitment is a key driver of the dynamics in this stock and a more pessimistic recruitment scenario (25% below average historical recruitment) increases the probability that the stock will not achieve the management objective of remaining above SSB-ATHL threshold in the 25-year projection period to 54%. The impact of $F_{2006-2008}$ on the stock is unlikely to be sustainable with this lower recruitment. Therefore, the WG recommends maintaining the present management measure (no increase in effort beyond “current” levels (2002-2004)).

Discussion

There was a discussion of the reasons for the difference between the previous (2006) assessment, which used a VPA approach, and the current (2011) assessment. Key factors are the replacement of the Suda growth curve, which the WG concluded was not representative of growth in this stock, with a relationship generated by the model based on fishery size composition data and otolith derived conditional age-at-length estimates; and the VPA reference run aggregated fisheries into fewer categories than used in the 2006 assessment. An additional concern is that the use of $h=1$ in the stock-recruit relationship is implausible. Improving the estimate is a subject for future work.

There was a discussion of the selectivity curves used for various fisheries. It was noted that the size composition of the Chinese Taipei longline fishery was made up mostly of smaller fish (a dome shaped selectivity pattern rather than logistic as assumed in the 2006 assessment).

The ALBWG Chair pointed out that the albacore assessment will be presented at WCPFC-SC7 by Dr. S. Teo. The presentation is being done as a courtesy and does not constitute a review. An independent review of the assessment is scheduled to occur in late 2011 using the CIE process.

Stock Status and Conservation Advice

Concern was raised that the last point in the ALBWG's list of proposed conservation recommendations strayed too closely into management advice, which is not in the competence of ISC, rather than being strictly science-based conservation advice. It was noted that $F_{2006-2008}$ is significantly below $F_{2002-2004}$. The ISC accepts the WG recommendation with a modification to bullet 5 as shown below:

- 1. The stock is considered to be healthy at average historical recruitment levels and fishing mortality ($F_{2006-2008}$).**
- 2. Sustainability is not threatened by overfishing as the $F_{2006-2008}$ level (current F) is about 71% of FSSB-ATHL and the stock is expected to fluctuate around the long-term median SSB (~400,000 t) in the short- and long-term future.**
- 3. If future recruitment declines by about 25% below average historical recruitment levels, then the risk of SSB falling below the SSB-ATHL threshold with 2006-2008 F levels increases to 54% indicating that the impact on the stock is unlikely to be sustainable.**
- 4. Increasing F beyond $F_{2006-2008}$ levels (current F) will not result in proportional increases in yield as a result of the population dynamics of this stock.**
- 5. The current assessment results confirm that F has declined relative to the 2006 assessment, which is consistent with the intent of the previous (2006) WG recommendation.**

Research Needs

The ALBWG identified the following research priorities:

1. Age and growth modelling – need sampling of small (<60 cm) and large fish (>120 cm) to advance growth modelling

2. Spatial Pattern Analyses – movement patterns; spatial size patterns to support appropriate selectivity pattern choices
3. CPUE Analyses – investigate discrepancies among indices
4. Maturity – develop length-based maturity schedule
5. Data Issues – size comp anomalies, socio-economic factors affecting fisheries, national sampling programs
6. Model Improvements – weighting of info sources, stock-recruitment relationship, explicit spatial structure, environmental covariates

All of these are considered of high priority but the WG Chair stressed that not all of these projects can be completed in time to be incorporated in the next stock assessment. The discussion in the WG Report includes a prioritization and an indication of which projects will be completed for the next assessment. This represents a *de facto* work plan.

It was noted that the forward projection to estimate the probability of exceeding SSB-ATHL over the next 25 years assumes constant recruitment while historical data show that recruitment for this stock is quite variable. For this reason, developing a better understanding of environmental factors affecting recruitment should also be a research topic. The ISC Chairman noted this would be a fruitful topic for PICES collaboration.

7.2 Pacific Bluefin Tuna

Y. Takeuchi summarized the recent stock assessment work of the PBFWG on Pacific bluefin tuna stock status (*ISC/11/ANNEX/07*). Since ISC10, there was no new stock assessment. The latest stock assessment was conducted in July 2010 (2010 Update). The current conservation advice was adopted at ISC10 based on the 2010 Update.

A summary of latest stock assessment (2010 update) is as follows

1. A number of sensitivity runs were conducted in 2010 to investigate uncertainties in biological assumptions and fishery data. Results indicate that the assumption of adult M is particularly influential on the estimate of absolute spawning biomass and fishing mortality. Although absolute estimates from the stock assessment model were sensitive to different assumptions of M , relative measures were less sensitive.
2. The estimate of spawning biomass in 2008 (at the end of the 2007 fishing year) declined from 2006 and is estimated to be in the range of the 40-60th percentile of the historically observed spawning biomasses.
3. Average Fishing Mortality 2004-2006 ($F_{2004-2006}$) increased from $F_{2002-2004}$ by 6% for age-0, approximately 30% for ages 1-4, and 6% for ages 5+.
4. Thirty-year projections predict that at $F_{2004-2006}$ median spawning biomass is likely to decline to levels around the 25th percentile of historical spawning biomass with approximately 5% of the projections declining to or below the lowest previously observed spawning biomass. At $F_{2002-2004}$ median spawning biomass is likely to decline in subsequent years but recover to levels near the median of the historically observed levels. In contrast to $F_{2004-2006}$, $F_{2002-2004}$ had no projections (0%) declining to the lowest observed spawning biomass. In both projections long-term average yield is expected to be lower than recent levels.

Because no new stock assessment was conducted after ISC10 and also because the next full stock assessment is scheduled in 2012, the PBFWG recommended maintaining the ISC10 conservation advice until ISC12 with necessary editorial changes.

Discussion

The challenge presented by the PBFWG's commitment to use data through June 2011 for the 2012 assessment was noted.

Conservation Advice

ISC11 agreed to maintain the conservation advice from ISC10:

Given the conclusions of the July 2010 PBFWG workshop (ISC/10/ANNEX/07), the current (2004 -2006) level of F relative to potential biological reference points, and the increasing trend of F, it is important that the level of F is decreased below the 2002-2004 levels, particularly on juvenile age classes.

7.3 Striped Marlin

J. Brodziak presented the status of striped marlin stocks in the North Pacific and associated conservation advice (ISC/11/ANNEX/08). Since there is no new assessment for this species the WG recommends that the stock status and conservation advice from ISC10 be adopted for ISC11. A draft North Pacific striped marlin stock assessment is scheduled to be completed in late 2011 and reviewed at ISC12 at which time stock status and conservation advice will be provided.

Discussion

It was reiterated that the striped marlin assessment remains in draft form until review and adoption at ISC12.

Conservation Advice

After reviewing the conservation advice recommended at ISC10 the Plenary adopted modifications to the ISC10 advice to increase clarity, and agreed to the following:

A striped marlin stock assessment is scheduled for completion in 2012. Until this time the fishing mortality rate should not be increased above the current reference years (2001-2003) as specified in the latest assessment.

7.4 Swordfish

J. Brodziak presented the status of the Western and Central North Pacific (WCPO) and Eastern North Pacific (EPO) swordfish stocks as estimated in the 2009 stock assessment and the 2010 stock assessment update. The exploitable biomass of the WCPO stock was estimated to be about 75,000 mt in 2006, roughly 30% above BMSY. The exploitation rate on the WCPO stock in 2006 was estimated to be 14% with a total catch of roughly 9,900 mt or roughly 69% of MSY (MSY=14,400 mt). There was very high probability that B_{2006} was above B_{MSY} , a 93% chance,

and there was a 0% chance that the exploitation rate in 2006 exceeded the rate to produce MSY. Stochastic projections of stock status at the recent average fishing mortality rate indicated that the WCPO stock would be projected to be above B_{MSY} in 2010.

Based on the 2010 stock assessment update results for the EPO stock only, the exploitable biomass of the EPO stock was estimated to be about 69,000 t in 2006, over 200% above B_{MSY} . Exploitation rate on the EPO stock in 2006 was estimated to be 6% with a total catch of roughly 3,900 t or roughly 78% of MSY (MSY=5,000 t). There was very high probability that B_{2006} was above B_{MSY} , a 99% chance, and there was a 2% chance that the exploitation rate in 2006 exceeded the rate to produce MSY. Stochastic projections of stock status at the recent average fishing mortality rate indicated that the EPO stock would be projected to be above B_{MSY} in 2010.

Given the projection information, the relative magnitude of recent reported catches (*ISC/11/ANNEX/08*), and the probable decline in WCPO swordfish harvest by Japan, the WG recommends that the conservation advice for swordfish from ISC10 be adopted for ISC11.

Discussion

The involvement of IATTC in the assessment process was discussed and it was pointed out that scientists from IATTC were fully engaged in the swordfish stock assessment process.

Conservation Advice

The conservation advice adopted at ISC10 was reviewed. It was agreed that the advice from ISC10 be adopted for ISC 11.

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

8 REVIEW OF STOCK STATUS OF SECONDARY STOCKS

8.1 Eastern Pacific – Yellowfin, Bigeye and Skipjack Tunas

M. Dreyfus presented summaries of stock status for yellowfin, bigeye, and skipjack tunas in the EPO. The EPO fishery for yellowfin, skipjack, and bigeye tunas is dominated by the purse seine fleets that achieved a maximum fleet capacity in 2007, decreasing slightly afterward. In contrast, the longline fishery has seen decreasing effort (in number of hooks) from a record level in 2002. The most important species component of catch in the EPO in weight is yellowfin and skipjack tunas. For yellowfin tuna, sets associated with dolphins produce the highest catch. For bigeye tuna, the FAD fishery has eclipsed longline as the main gear in terms of catch since 1994. For skipjack tuna both floating objects and unassociated sets in the purse seine fishery account for the majority of the catch.

EPO catches for yellowfin tuna in 2010 in the EPO increased from the average in 2005-2009 (205,000 t) to 251,000 t for purse seiners, and at the same time, skipjack tuna catches decreased to 147,000 t and bigeye tuna to 58,000 t. The total number of purse seine sets is between 25 to 30 thousand in recent years.

IATTC recruitment estimates indicate that yellowfin tuna had a period of high recruitment from 1984 to 2002 and after that, recruitment may have declined to average levels since 1975. SSB is below the level to obtain MSY and fishing mortality is also below F_{MSY} . Projections assuming the current F indicate that SSB will increase.

Recent recruitment estimates for bigeye tuna are above average, SSB is above SSB_{MSY} , and fishing mortality is also above F_{MSY} . While current F projections into the future show a decrease in SSB levels, the decrease is attenuated by the recent above average recruitment. The highest impact to the resource is produced by the floating object fishery.

The skipjack assessment is based on relative reference points; although several of those variables are at high levels there is no concern for this stock at present.

Discussion

The ISC Chairman thanked M. Dreyfus for the presentation.

8.2 Western and Central Pacific Ocean –Bigeye and Skipjack Tunas

H. Nakano on behalf of N. Miyabe, Chairman of the WCPFC Science Committee (SC) Chairman, presented summaries of tuna stock status in the WCPO based on the 2010 tuna stock assessments for bigeye and skipjack tunas in the WCPO. No assessments for other species were conducted in 2010. The WCPFC relies on the SPC for conducting the stock assessments for these stocks.

Bigeye Tuna Stock Assessment

The 2009 bigeye tuna stock assessment was conducted using Multifan-CL and presented at WCPFC-SC6. This assessment was updated from the 2008 assessment. Stock status estimates for the base case model concluded that overfishing is occurring (with 100% probability), but the stock is not in an overfished state, and that fishing mortality has increased substantially since 2001-2004.

Based on these results, it was concluded by the WCPFC that current levels of catch are unlikely to be sustainable in the long term, even at the recent (high) levels of recruitment estimated for the last decade.

Skipjack Tuna Stock Assessment

The 2010 assessment of skipjack tuna in the WCPO relies on Multifan-CL as the modelling platform and is age (16 quarterly age-classes) and spatially structured. Catch, effort, size composition, and tagging data used in the model are grouped into 17 fisheries (a change from 24 fisheries used in the 2008 assessment) and quarterly time periods from 1952 through 2009. Overall, the main assessment results and conclusions are as follows.

As with other tropical tunas, estimates of natural mortality are strongly age-specific, with higher rates estimated for younger skipjack tuna.

Based on estimates from the base-case model and associated sensitivity grid, it was concluded by the WCPFC that overfishing of skipjack tuna is not occurring in the WCPO, nor is the stock in an overfished state.

Discussion

The content of the current conservation measure (CMM 2008-01) in relation to conservation of bigeye and yellowfin tunas was discussed. It was noted that under this measure longline fisheries are managed by catch limits while purse seine fisheries are principally managed by time-area closures and other effort-based methods, with the objective of reducing F by 30% for 2009-2011. This objective has not been met in part because of various exemptions included in the measure.

The current skipjack tuna assessment incorporated a CPUE index for northern fisheries, which contributed to the declining biomass estimate. This decline is consistent with the low skipjack tuna catches experienced by the Japanese pole-and-line fishery.

9 REVIEW OF STATISTICS AND DATA BASE ISSUES

9.1 STATWG Report

R. Wu reported on the STATWG meeting held 17-19 July 2011 in San Francisco, USA (*ISC/11/ANNEX/12*). The issues discussed included: (1) Data inventory and metadata; (2) Review of data reporting protocol and member performance; (3) Review of data requirements for stock assessment and fishery monitoring; (4) Review of ISC data management functions and STATWG performance; (5) future work plan; and (6) Recommendations to the Plenary.

The Data Administrator (DA) compared annual catch tables in National Reports, Plenary Reports, and Species Working Group Reports, and identified discrepancies. WG Chairs agreed to address the discrepancies, and together with Member Data Correspondents, assist the DA to resolve catch tables discrepancies by 1 January 2012.

The DA will complete the ISC data inventory and forward it to the WCPFC Secretariat by 31 July 2011. It was recommended that the STATWG do a data inventory exchange with IATTC.

ISC Category I data are staged in the public domain and can be accessed online on the ISC website. It was reiterated that non-ISC member catch data would not be maintained in the ISC database and would not be available on the ISC website. ISC public domain data will consist of ISC member data in the North Pacific only; currently data are posted for Pacific bluefin and albacore tunas, striped marlin, and swordfish.

Data correspondents and species WGs Chairs were requested to provide missing metadata, complete the metadata tables, and submit them to the DA by 31 October 2011.

At the STATWG meeting Chinese Taipei gave a presentation on their PBF otolith sampling program conducted in 2011 and all the members provided updates on the usage of electronic logbook information.

At ISC10, it was recommended that the STATWG revise the data report card to provide information on the completeness and timeliness of members' data submissions. The STATWG Chairman presented the data report card used by the IOTC, which assigns grades for timeliness and completeness for Category I, II, and III data, and recommended incorporating similar matrices into the ISC report card.

Chairpersons of the ALBWG, PBFWG, BILLWG, and SHARKWG were given the opportunity to address specific data needs and concerns, and describe how the STATWG could support their WG. The chairpersons of species WGs expressed concern that China is not providing data according to their obligation as an ISC member.

The STATWG tabled 13 future plans that need to be finished before ISC12 and proposed four recommendations to the Plenary.

Discussion

The STATWG requests to the Plenary were reviewed. With respect to the request for formal arrangements to acquire non-ISC members' catch data from WCPFC and IATTC for stock assessment purposes, it was pointed out that data exchange agreements between the ISC and both the WCPFC and IATTC already exist precluding the need for formal arrangements. When non-ISC members catch data are acquired, it was agreed that these data would not be housed in the ISC database. Species WG chairs will communicate their data requests to the STATWG Chair who will consolidate them into a single request to the appropriate RFMO. This may be an iterative process to ensure the consolidated request is properly formulated. The WGs would then work with the data received. It was suggested that this request be elaborated to include requests for data from ISC members that have not submitted data directly.

With respect to the request for Members to provide Category I, II, and III data for shark species, there was a discussion of prioritizing species for which to request enhanced data reporting. Initially blue shark and shortfin mako are the highest priority, because the SHARKWG is planning stock assessments for these species in the short term. The SHARKWG meeting will be held in December 2011 and will prioritize other species for which enhanced data should be requested in the future. It was emphasized, however, that the initial data request should focus on the two identified high priority species.

With respect to the request for Members to provide observer data to species WGs for scientific purposes, the STATWG Chair noted that there is very little information about sharks in the ISC database so it was thought that observer programs could be a source of additional data. The issue of national data confidentiality requirements was discussed. It was agreed that in cases where confidentiality requirements prohibit the provision of disaggregated data the WGs should work with their members to develop reports or analyses that result in sufficient data summarization while providing results of use to the WG. If additional data analyses are needed, the WGs could work with the data provider to accomplish them. An important step in obtaining observer data would be to document national observer data holdings. This would facilitate appropriately targeted data requests.

With respect to amending the data reporting protocol for discard data it was agreed that the recommendation should be revised to read “Amend the data reporting protocol to add discard data in Category I and II data provision, and if available, include the shark sex information in Category III data, if available.” It was noted that the provision of shark sex information was premised on the relative ease of sex determination for these species, but in cases where the fish are immediately discarded fulfilling such a request may be difficult. A poll of members indicated that some discard data may be available from logbook or observer programs.

The future work plan was reviewed. It is viewed as an ambitious set of objectives but the STATWG believes they are achievable.

9.2 Data Administrator and Performance

H. Nakano reported on the performance of the DA, Izumi Yamasaki, for the past year, including data management accomplishments and challenges. It was reported that the activities of the DA from July 2010 – July 2011 were commendable and that all assignments were completed.

Discussion

The Plenary acknowledged the DA’s efforts and accomplishments over the past year. It was noted that the WGs need to assist the DA to address inconsistencies in data holdings. The ISC Chairman recommended forming a small Ad hoc Committee that includes the DA, Webmaster, STATWG Chairman, and other key individuals to meet regularly to ensure successfully accomplishing ISC data management objectives. The Plenary agreed this was a sound idea and endorsed the formation of the Ad hoc Committee.

9.3 Data Submission Report Card

R. Wu presented the current data submission report card. He noted that a new report card format is being developed based on what is in use at the IOTC. The new report card format will be discussed further at the first meeting of the STATWG Ad hoc Committee in August 2011.

Discussion

The current data submission report card was adopted as presented. The STATWG Chair suggested reporting on each fishery rather than each member in the report card system. There was no agreement on this matter at this time.

9.4 Total Catch Tables

I. Yamasaki, DA, reviewed the current catch tables noting revisions from last year’s tables and that there are many years classified as provisional other than 2010. These years will need to be finalized as soon as practical.

Discussion

It was noted that it would be very useful to cross-check reported catch data for ISC species in the ISC database with ISC member countries' catch reported to the WCPFC. To accomplish this task requires use of Category II and III data. The DA verified that the task has already accomplished.

Discrepancies in 2009 catch data between that presented in the ISC10 Plenary Report and the current Report were noted and ascribed to the provisional status of 2009 catch data.

The catch tables lack data from China due to non-reporting. The ISC Chairman was tasked with corresponding with China to resolve this issue.

9.5 North Pacific-wide catch and bycatch

The Chair noted that with the dissolution of the ISC BYCATCHWG and formation of the SHARKWG there is a question of whether the ISC still considers other, non-shark bycatch within its competence and whether such data should be incorporated into the ISC database. ISC has previously agreed that non-fish bycatch (e.g., sea turtles, seabirds) would not be within its competence since the RFMOs are addressing this issue, but it is not clear whether non-shark finfish bycatch should still be addressed. It was noted that as scientists and managers direct more attention to the ecosystem-related effects of fishing, bycatch becomes an important consideration. While in the short term the ISC may put less emphasis on non-shark finfish it may require more attention in the future. For that reason it was agreed for the time being to focus data acquisitions on the principal species of interest (as indicated by the current species WGs). In the future, once the remaining improvements to the ISC database are completed, attention could be turned to incorporating data on other non-shark finfish species.

9.6 Rescue of historical data

Data have been obtained from WCPFC to fill historical gaps, principally for catches by China. It was noted that a single Mexico flagged vessel historically fished in the Western Pacific and catch data for it can be obtained from WCPFC since they are not reported to Mexico. It was also noted that several South Pacific Island States catch ISC species in the North Pacific and their 2010 catches can be obtained from WCPFC.

10 REVIEW OF MEETING SCHEDULE

10.1 Time and Place of ISC12

Provisional dates and location for the 12th ISC meeting are 18-23 July 2012 in Sapporo, Japan.

10.2 Working Group Intercessional Meetings

The Plenary discussed schedules for WG intercessional meetings and agreed on the tentative schedule presented in Table 10-1

Table 10-1. Tentative schedule of ISC meetings for 2010-2012

Date	Meeting	Contact
2011		
30 Nov – 8 Dec	SHARKWG – Honolulu, HI (Data prep and 2-day ageing workshop)	S. Kohin Suzanne.Kohin@noaa.gov
6 – 16 Dec	BILLWG – Honolulu, HI (Striped marlin assessment)	J. Brodziak Jon.Brodziak@noaa.gov
2012		
31 Jan – 7 Feb	PBFWG – La Jolla, CA (Data prep)	Y. Takeuchi Yukiot@fra.affrc.go.jp
Apr	BILLWG Workshop– TBD (Blue marlin data preparation)	J. Brodziak
Apr	SHARKWG Workshop – TBD (Data preparation)	S. Kohin
May	PBFWG Workshop– Japan (Full stock assessment)	Y. Takeuchi
11 – 12 Jul	STATWG – Sapporo, Japan (Workshop)	R.-F. Wu
13 Jul	SHARKWG – Sapporo, Japan	S. Kohin
14 – 15 Jul	ALBWG Workshop – Sapporo, Japan (Review)	J. Holmes John.Holmes@dfo-mpo.gc.ca
16 – 17 Jul	BILLWG – Sapporo (Results prep workshop)	J. Brodziak
16 – 17 Jul	PBFWG – Sapporo (Results prep workshop)	Y. Takeuchi
18 – 23 Jul	ISC12 – Sapporo (Plenary)	G. DiNardo Gerard.Dinardo@noaa.gov
Nov/Dec	SHARKWG workshop – TBD (Blue shark assessment)	S. Kohin

[BILLWG= Billfish Working Group; PBFWG= Pacific Bluefin Tuna WG; SHARKWG = Shark WG; ALBWG = Albacore WG, STATWG = Statistics WG]

11 ADMINISTRATIVE MATTERS

11.1 Peer review of function and process

The ISC Rules and Procedures require peer review of ISC function and process every 5 years. Based on the outcome of ISC10, a task team composed of ISC Members drafted a framework for the peer review process (*ISC/11/PLENARY/04*). The Framework calls for three members to act as

sponsors by nominating candidates for the Peer Review Team and to cover the costs for participation by their selected team member. According to the proposed schedule the Peer Review Team would be formed by October 2011 and the first draft of their report is to be reviewed at ISC12.

To meet this goal, the Plenary needs to (1) review, modify (if necessary), and adopt the framework, (2) identify three Members to act as sponsors, and (3) develop Terms of Reference (TOR) for the Peer Review. To expedite development of the TOR while at Plenary an ad hoc working group was formed consisting of Yen-Ju Lin (Chinese Taipei), Peter Miyake (Japan), Jae-Bong Lee (Korea), Michel Dreyfus (Mexico), and Cisco Werner (USA).

Discussion

The framework was reviewed and adopted as presented [Plenary document expanding on this section].

Japan, Korea, and the USA agreed to be peer-review sponsors.

Draft TOR were developed by the working group and presented. The discussion focused on the need for the peer reviewers to consider the ISC's relationship with other international organizations outside the scope of those specified in the Operations Manual. It was agreed that consideration of these relationships would be added to the TOR.

11.2 Status of the NC Research Proposals

The ISC Chairman submitted four funding proposals to WCPFC NC5 in September 2009 for: (1) a biological sampling research program, (2) North Pacific albacore sampling program, (3) database administration, and (4) website administration. During ISC10, S.K. Soh (WCPFC) circulated a Commission Circular (2009/16) regarding a "draft administrative arrangement" developed by WCPFC Secretariat to secure financial contributions from NC Members. The document was adopted at WCPFC 6, thus allowing voluntary contributions from NC Members. At this point no voluntary contributions have occurred and the proposals remain unfunded.

11.3 Organizational chart and contact persons

The ISC Organization Chart was considered and updated through discussion with members (Figure 11-1). The participants listed on the Organization Chart serve as the points of contact for the respective WGs. They also serve as points of contact for respective Delegation Leaders in keeping abreast of WG activities and workshop results, and for serving as team leaders of national scientists to intercessional WG workshops.

ISC Organizational Chart (July 2011)

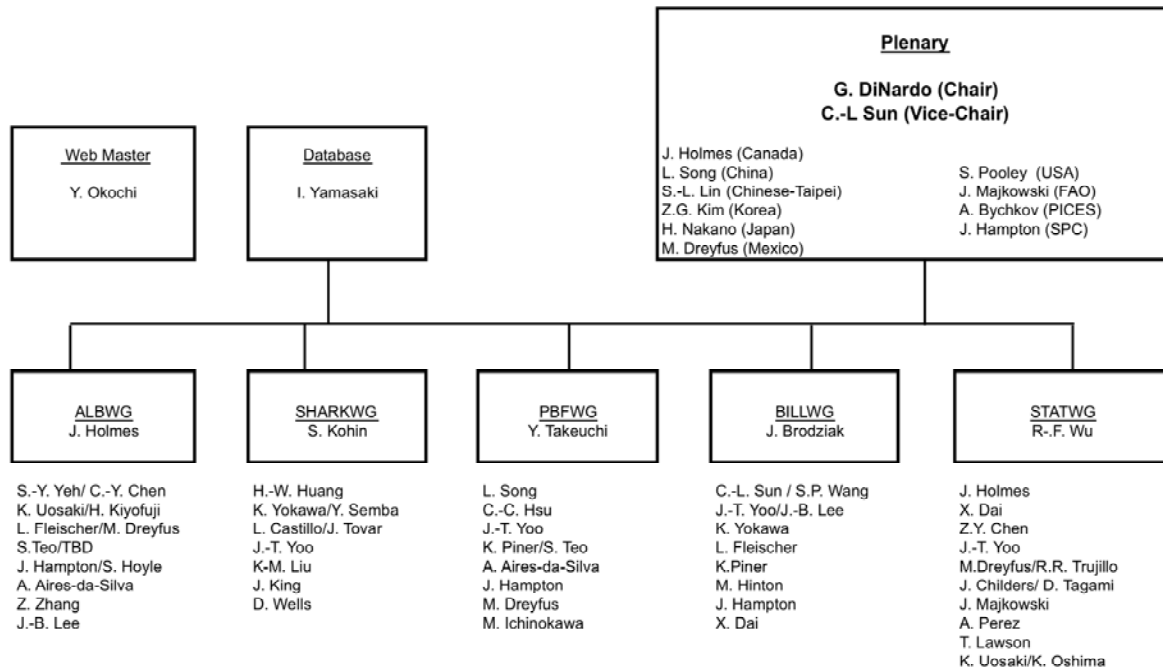


Figure 11-1. ISC Organizational Chart (July 2011).

11.4 Website

Y. Okochi, ISC Webmaster, reviewed recent improvements to the ISC website. These include pages for the public to access WG and Plenary Reports, a fishery statistics page featuring public domain catch data, and a page showing recommendations from past Plenary meetings. She has worked with the Chair of the PBFWG to develop an example template of pages for each of the WGs. The species WGs chairpersons were asked to provide feedback on the WGs' page structure and to provide fish profile and research information for species in which the WG is interested. These pages display the WG's mission statement; stock assessment schedule; information on species' biology distribution, catch, fisheries, etc.; current research topics; and a link to WG reports.

The work plan for the coming year includes a variety of updates to the website based on new information from the plenary, updating public domain catch data, and completing the WG pages.

11.4.1 Webmaster and Performance

H. Nakano reported on the performance of the Webmaster, Y. Okuchi, for the past year, including accomplishments and challenges. It was reported that the activities of the Webmaster from July 2010 – July 2011 were commendable and that all assignments were completed, including access to public domain catch data.

Discussion

The Chair thanked the Webmaster for the substantial progress made over the past year. The ISC has been criticized for its lack of transparency; making reports and other information sources available through the website improves public accessibility to the workings of the organization. It was noted that the fisheries statistics page should make clear that only catch by ISC countries will be available.

11.5 Update of Operations Manual

The ISC Chairman reported that proposed changes to the Operations Manual at ISC10 have been incorporated. Additional changes to the Operations Manual stemming from the ISC11 seminar on Best Available Scientific Information were proposed. The ISC Chairman will develop potential changes to the manual for review and adoption at ISC12.

R. Wu, STATWG Chair, reviewed proposed revisions to the description of data categories in the Operations Manual. Category I and II data would include both retained catch and discards (including bycatch species) to estimate total catch. The description of Category III data would additionally include collection of sex data from shark species.

Discussion

The meaning of “catch” in relation to retained catch and landings was discussed. In addition to landed catch and discards, catch may include transshipments, direct sales, personal consumption, etc. Discard mortality should be recorded or estimated. As part of fishing mortality estimation WGs may come up with a conversion factor for total discards to account for discard mortality. “Catch” should refer to total catch, which is equivalent to fishing mortality but usage should be consistent with definitions used by other organizations and RFMOs. The different meanings of the term “bycatch” were also discussed (e.g., retained non-target catch, discarded catch). It was agreed that the statistics Steering Committee will take up the question of the proper definition of these terms, consistent with their use by other organizations.

It was agreed that the proposed modification of the definition of Category III data should be revised so that the collection of sex data would refer to “billfish and sharks” rather than enumerating only striped and blue marlin and a general category for sharks. However, the SHARKWG should compile a list of species of interest to supplement this description of Category III data. It was recognized that the WCPFC NC (the principal ISC client) has just North Pacific albacore, Pacific bluefin tuna, and swordfish within its competence but that does not mean that ISC is restricted to considering only these species.

After further discussion it was agreed that the Operations Manual would be revised to remove references to the collection of data on sea turtles and seabirds, consistent with previous Plenary discussion, and references to bycatch or discards would be narrowed to finfish species.

11.6 Vice Chair Election

M. Dreyfus indicated he would not run for reelection as ISC Vice Chairman after serving 3 years. An election was held according to ISC rules and procedures (Operations manual pages 12 and 13) and Chi-Lu Sun was elected to a 3-year term, 2012-2014. Sun will assume the role of ISC Vice Chairman after this ISC11 session. The ISC Chair welcomed C. Sun and thanked M. Dreyfus for his service as outgoing Vice Chair.

11.7 Other Administrative Matters

The ISC Chairman stressed the need for timely submission of documents and proposed a July 1 deadline for the submission of National Reports and other documents to be presented at the Plenary. This allows sufficient time for advance distribution via the ISC Website. It was noted that currently the Operations Manual specifies that Workshop Reports and other intercessional documents must be submitted within 30 days of the end of the workshop, and in most cases these reports would be available by July 1.

12 ADOPTION OF REPORT

A draft Report of the Eleventh session 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 approved by the ISC11 Plenary, subject to editorial corrections to be made by the ISC Chairman.

13 CLOSE OF MEETING

G. DiNardo thanked NOAA National Marine Fisheries Service for hosting the meeting, especially Roszella Sanford, who has served on the Office of the Chair for 6 years and has informed ISC this will be her last. He wishes her luck in the future. He thanked Michel Dreyfus for his excellent service to ISC and support and advice to the Chairs. He thanked sponsors, including the Monterey Bay Aquarium for hosting receptions and welcomed the new Vice-chair elect, Chi-Lu Sun. G. DiNardo closed the successful 11th meeting of the ISC on 25 July 2011.

14 CATCH TABLES

Table 14-1. ¹Annual catch of North Pacific albacore (*Thunnus alalunga*) in metric tons for fisheries monitored by ISC for assessments of North Pacific Ocean stocks, 1952-2010.
Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric t

Year	Japan							Korea		Chinese-Taipei		
	Purse Seine	Gill Net	Set Net	Pole and Line	Troll	Longline	Other	Gill Net	Longline	Gill Net	Distant Water Longline	Offshore Longline
1952	154		55	41,787	--	26,687	182					
1953	38		88	32,921	--	27,777	44					
1954	23		6	28,069	--	20,958	32					
1955	8		28	24,236	--	16,277	108					
1956			23	42,810	--	14,341	34					
1957	83		13	49,500	--	21,053	138					
1958	8		38	22,175	--	18,432	86					
1959			48	14,252	--	15,802	19					
1960			23	25,156	--	17,369	53					
1961	7		111	18,639	--	17,437	157					
1962	53		20	8,729	--	15,764	171					
1963	59		4	26,420	--	13,464	214					
1964	128		50	23,858	--	15,458	269					
1965	11		70	41,491	--	13,701	51					
1966	111		64	22,830	--	25,050	521					
1967	89		43	30,481	--	28,869	477				330	
1968	267		58	16,597	--	23,961	1,051					216
1969	521		34	31,912	--	18,006	925					65
1970	317		19	24,263	--	16,222	498					34
1971	902		5	52,957	--	11,473	354		0			20
1972	277	1	6	60,569	--	13,022	638		0			187
1973	1,353	39	44	68,767	--	16,760	486		3			--
1974	161	224	13	73,564	--	13,384	891		114			486
1975	159	166	13	52,152	--	10,303	230		9,575			1,240
1976	1,109	1,070	15	85,336	--	15,812	270		2,576			686
1977	669	688	5	31,934	--	15,681	365		459			572
1978	1,115	4,029	21	59,877	--	13,007	2,073		1,006			6
1979	125	2,856	16	44,662	--	14,186	1,139	0				81
1980	329	2,986	10	46,742	--	14,681	1,177	6	402	--		249
1981	252	10,348	8	27,426	--	17,878	699	16		--		143
1982	561	12,511	11	29,614	--	16,714	482	113	5,462	--		38
1983	350	6,852	22	21,098	--	15,094	99	233	911	--		8
1984	3,380	8,988	24	26,013	--	15,053	494	516	2,490	--		--
1985	1,533	11,204	68	20,714	--	14,249	339	576	1,188	--		--
1986	1,542	7,813	15	16,096	--	12,899	640	726	923	--		--
1987	1,205	6,698	16	19,082	--	14,668	173	817	607	2,514	--	--
1988	1,208	9,074	7	6,216	--	14,688	170	1,016	175	7,389	--	--
1989	2,521	7,437	33	8,629	--	13,031	433	1,023	27	8,350	40	--
1990	1,995	6,064	5	8,532	--	15,785	248	1,016	1	16,701	4	--
1991	2,652	3,401	4	7,103	--	17,039	395	852	0	3,398	12	--
1992	4,104	2,721	12	13,888	--	19,042	1,522	271	1	7,866	--	--
1993	2,889	287	3	12,797	--	29,933	897		21			5
1994	2,026	263	11	26,389	--	29,565	823		54			83
1995	1,177	282	28	20,981	856	29,050	78		14			4,280
1996	581	116	43	20,272	815	32,440	127		158			7,596
1997	1,068	359	40	32,238	1,585	38,899	135		404			9,119 337
1998	1,554	206	41	22,926	1,190	35,755	104		226			8,617 193
1999	6,872	289	90	50,369	891	33,339	62		99			8,186 207
2000	2,408	67	136	21,550	645	29,995	86		15			7,898 944
2001	974	117	78	29,430	416	28,801	35		64			7,852 832
2002	3,303	332	109	48,454	787	23,585	85		112			7,055 910
2003	627	126	69	36,114	922	20,907	85		146			6,454 712
2004	7,200	61	30	32,255	772	17,341	54		78			4,061 927
2005	850	154	97	16,133	665	20,420	234		420			3,990 483
2006	364	221	55	15,400	460	21,027	42		135			3,848 469
2007	5,682	226	30	37,768	519	22,336	44		93			2,465 451
2008	825	1,531	101	19,060	549	19,092	15		394			2,490 579
2009	2,076	149	33	31,172	410	21,995	43		102			1,866 512
2010	(308)	(149)	(33)	(21,757)	(410)	(22,434)	(43)		(122)			(2,281) (537)

¹ Data are from the ISC albacore working group July 12 2010, except as noted

² Albacore pole-and-line catches for 2008 and 2009 are estimated from new procedures.

³ Albacore troll catches prior to 2008 contain an unknown proportion of pole and line catch.

⁴ Mexico Pole and line catches for 1999 and 2000 include 34 and 4 metric tons, respectively from longline.

⁵ Other troll catches are from vessels registered in Belize, Cook Islands, Tonga, and Ecuador.

⁶ Updates for Other Longline 2004-2009 from Peter Williams, pers. com.

* Catch of other gears are included in Sport

Blue cell indicate the updated from last year (e.g new data and corrected value)

Table 14-1 (continued)

Year	United States								Mexico		Canada	Other		Grand Total
	Purse Seine	Gill Net	Pole and Line ²	Albacore Troll ³	Tropical Troll & Handline	Sport	Longline	Other	Purse Seine	Pole and Line ⁴	Troll	Troll ⁵	Longline ⁶	
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				141			63,403
1961			2,837	12,055		1,355	5	1	2	39	4			52,649
1962			1,085	19,752		1,681	7	1	0	0	1			47,264
1963			2,432	25,140		1,161	7		31	0	5			68,937
1964			3,411	18,388		824	4		0		3			62,393
1965			417	16,542		731	3	1	0		15			73,033
1966			1,600	15,333		588	8		0		44			66,149
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	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	1,331			115,227
1975			3,243	18,932		640	33	10	1	0	111			96,808
1976			2,700	15,905		713	23	4	36	5	278			126,538
1977			1,497	9,969		537	37		3	0	53			62,649
1978			950	16,613		810	54	15	1	0	23			99,600
1979			303	6,781		74	--		1	0	521			70,745
1980			382	7,556		168	--		31	0	212			74,931
1981			748	12,637		195	25		8	0	200			70,583
1982			425	6,609		257	105	21	0	0	104			73,027
1983			607	9,359		87	6		0	0	225			54,951
1984	3,728		1,030	9,304		1,427	2		107	6	50			72,612
1985	26	2	1,498	6,415	7	1,176	0		14	35	56			59,100
1986	47	3	432	4,708	5	196			3	0	30			46,078
1987	1	5	158	2,766	6	74	150		7	0	104			49,051
1988	17	15	598	4,212	9	64	307	10	15	0	155			45,345
1989	1	4	54	1,860	36	160	248	23	2	0	140			44,052
1990	71	29	115	2,603	15	24	177	4	2	0	302			53,693
1991	0	17	0	1,845	72	6	312	71	2	0	139			37,320
1992	0	0	0	4,572	54	2	334	72	10	0	363			54,833
1993		0	0	6,254	71	25	438		11	0	494			54,125
1994		38	0	10,978	90	106	544	213	6	0	1,998	158		73,345
1995		52	80	8,045	177	102	882	1	5	0	1,763	94		67,947
1996	11	83	24	16,938	188	88	1,185		21	0	3,316	469	1,735	86,207
1997	2	60	73	14,252	133	1,018	1,653	1	53	0	2,168	336	2,824	106,756
1998	33	80	79	14,410	88	1,208	1,120	2	8	0	4,177	341	5,871	98,229
1999	48	149	60	10,060	331	3,621	1,542	1	0	57	2,734	228	6,307	125,542
2000	4	55	69	9,645	120	1,798	940	3	70	33	4,531	386	3,654	85,052
2001	51	94	139	11,210	194	1,635	1,295		5	18	5,248	230	1,471	90,189
2002	4	30	381	10,387	235	2,357	525		28	0	5,379	466	700	105,224
2003	44	16	59	14,102	85	2,214	524		28	0	6,861	378	(2,400)	92,804
2004	1	12	127	13,346	157	1,506	361		104	0	7,856	--	4,096	90,316
2005		20	66	8,413	175	1,719	296		0	0	4,845	--	4,315	63,199
2006		3	23	12,524	95	385	270		109	0	5,832	--	5,136	66,343
2007		4	21	11,887	98	1,225	250		40	0	6,075	--	3,539	92,753
2008	0	1	1,472	10,289	29	415	353	0	10		5,446		2,812	65,463
2009	39	3	2,218	10,575	100	678	201	0	17		5,643		1,581	79,413
2010	(18)	(3)	(1,874)	(10,130)	(25)	(689)	(409)	(2)	(25)		(6,497)		(1,581)	69,327

Table 14-2. Annual catch of Pacific bluefin tuna (*Thunnus orientalis*) in metric tons for fisheries monitored by ISC for assessments of North Pacific Ocean stocks, 1952-2010.
 Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric t

Year	Japan ¹								Korea ³		
	Purse Seine		Pole and Line	Set Net	Troll ²	Distant Water & Offshore Longline		Coastal Longline	Others	Purse Seine	Trawl
	Tuna PS	Small PS				NP	SP				
1952	7,680		2,198	2,145	667	2,694	9		1,700		
1953	5,570		3,052	2,335	1,472	3,040	8		160		
1954	5,366		3,044	5,579	1,656	3,088	28		266		
1955	14,016		2,841	3,256	1,507	2,951	17		1,151		
1956	20,979		4,060	4,170	1,763	2,672	238		385		
1957	18,147		1,795	2,822	2,392	1,685	48		414		
1958	8,586		2,337	1,187	1,497	818	25		215		
1959	9,996		586	1,575	736	3,136	565		167		
1960	10,541		600	2,032	1,885	5,910	193		369		
1961	9,124		662	2,710	3,193	6,364	427		599		
1962	10,657		747	2,545	1,683	5,769	413		293		
1963	9,786		1,256	2,797	2,542	6,077	449		294		
1964	8,973		1,037	1,475	2,784	3,140	114		1,884		
1965	11,496		831	2,121	1,963	2,569	194		1,106		
1966	10,082		613	1,261	1,614	1,370	174		129		
1967	6,462		1,210	2,603	3,273	878	44		302		
1968	9,268		983	3,058	1,568	500	7		217		
1969	3,236		721	2,187	2,219	313	20	565	195		
1970	2,907		723	1,779	1,198	181	11	426	224		
1971	3,721		938	1,555	1,492	280	51	417	317		
1972	4,212		944	1,107	842	107	27	405	197		
1973	2,266		526	2,351	2,108	110	63	728	636		
1974	4,106		1,192	6,019	1,656	108	43	1,069	754		
1975	4,491		1,401	2,433	1,031	215	41	846	808		
1976	2,148		1,082	2,996	830	87	83	233	1,237		
1977	5,110		2,256	2,257	2,166	155	23	183	1,052		
1978	10,427		1,154	2,546	4,517	444	7	204	2,276		
1979	13,881		1,250	4,558	2,655	220	35	509	2,429		
1980	11,327		1,392	2,521	1,531	140	40	671	1,953		
1981	25,422		754	2,129	1,777	313	29	277	2,653		
1982	19,234		1,777	1,667	864	206	20	512	1,709	31	
1983	14,774		356	972	2,028	87	8	130	1,117	13	
1984	4,433		587	2,234	1,874	57	22	85	868	4	
1985	4,154		1,817	2,562	1,850	38	9	67	1,175	1	
1986	7,412		1,086	2,914	1,467	30	14	72	719	344	
1987	8,653		1,565	2,198	880	30	33	181	445	89	
1988	3,583	22	907	843	1,124	51	30	106	498	32	
1989	6,077	113	754	748	903	37	32	172	283	71	
1990	2,834	155	536	716	1,250	42	27	267	455	132	
1991	4,336	5,472	286	1,485	2,069	48	20	170	650	265	
1992	4,255	2,907	166	1,208	915	85	16	428	1,081	288	
1993	5,156	1,444	129	848	546	145	10	667	365	40	
1994	7,345	786	162	1,158	4,111	238	20	968	398	50	
1995	5,334	13,575	270	1,859	4,778	107	10	571	586	821	
1996	5,540	2,104	94	1,149	3,640	123	9	778	570	102	
1997	6,137	7,015	34	803	2,740	142	12	1,158	811	1,054	
1998	2,715	2,676	85	874	2,865	169	10	1,086	700	188	
1999	11,619	4,554	35	1,097	3,387	127	17	1,030	709	256	
2000	8,193	8,293	102	1,125	5,121	121	7	832	689	1,976	0
2001	3,139	4,481	180	1,366	3,329	63	6	728	782	968	10
2002	3,922	4,981	99	1,100	2,427	47	5	794	631	767	1
2003	956	4,812	44	839	1,839	85	12	1,152	446	2,141	0
2004	4,934	3,323	132	896	2,182	231	9	1,616	514	636	0
2005	4,061	8,783	549	2,182	3,406	107	14	1,818	548	1,318	
2006	3,644	5,236	108	1,421	1,544	63	11	1,058	777	1,012	
2007	2,965	3,875	236	1,503	2,385	83	8	2,004	1,209	1,281	
2008	3,029	7,192	64	2,358	2,074	19	8	1,476	1,192	1,866	
2009	2,127	5,950	50	2,236	1,875	8	7	1,304	913	936	
2010	1,122	2,620	83	1,047	1,301	(-) ⁷	(-) ⁷	(806)	918	1,196	

1 Part of Japanese catch is estimated by the WG from best available source for the stock assessment use.
 2 The troll catch for farming estimating 10 - 20 mt since 2000, is excluded.
 3 Catch statistics of Korea derived from Japanese Import statistics for 1982-1999.
 4 US in 1952-1958 contains catch from other countries - primarily Mexico. Other includes catches from gillnet, troll, pole-and-line, and longline
 5 Catches by NZ are derived from the Ministry of Fisheries, Science Group (Compilers) 2006: Report from the Fishery Assessment Plenary, May 2006: stock assessments and yield estimates. 875 p. (Unpublished report held
 6 Other countries include AUS, Cooks, Palau and so on. Catches derived from Japanese Import Statistics as minimum estimates.
 7 The catch for Japanese coastal longline in 2008 includes that of the distant water and offshore longliners.
 8 Catches in New Zealand and Other countries since 2007 are carry-over of that in 2005
 Blue cell indicate the updated from last year (e.g new data and corrected value)

Table 14-2 (continued)

Year	Chinese-Taipei				United States ⁴			Mexico		non-ISC members		Grand Total
	Purse Seine	Distant Driftnet	Longline	Others	Purse Seine	Sport	Others	Purse Seine	Others	New Zealand ⁵	Others ⁶	
1952					2,076	2						19,172
1953					4,433	48						20,117
1954					9,537	11						28,575
1955					6,173	93						32,005
1956					5,727	388						40,383
1957					9,215	73						36,590
1958					13,934	10						28,610
1959					3,506	13	56	171	32			20,539
1960					4,547	1	0					26,079
1961					7,989	23	16	130				31,236
1962					10,769	25	0	294				33,195
1963					11,832	7	28	412				35,481
1964					9,047	7	39	131				28,631
1965			54		6,523	1	77	289				27,224
1966					15,450	20	12	435				31,161
1967			53		5,517	32	0	371				20,745
1968			33		5,773	12	8	195				21,623
1969			23		6,657	15	9	260				16,419
1970					3,873	19	0	92				11,432
1971			1		7,804	8	0	555				17,140
1972			14		11,656	15	45	1,646				21,216
1973			33		9,639	54	21	1,084				19,619
1974			47	15	5,243	58	30	344				20,685
1975			61	5	7,353	34	84	2,145				20,948
1976			17	2	8,652	21	25	1,968				19,381
1977			131	2	3,259	19	13	2,186				18,811
1978			66	2	4,663	5	6	545				26,863
1979			58		5,889	11	6	213				31,715
1980			114	5	2,327	7	24	582				22,634
1981			179		867	9	14	218				34,641
1982		2	207		2,639	11	2	506				29,387
1983	9	2	175		629	33	11	214				20,557
1984	5		477	8	673	49	29	166				11,573
1985	80	11	210		3,320	89	28	676				16,089
1986	16	13	70		4,851	12	57	189				19,266
1987	21	14	365		861	34	20	119				15,507
1988	197	37	108	25	923	6	50	447	1			8,989
1989	259	51	205	3	1,046	112	21	57				10,943
1990	149	299	189	16	1,380	65	92	50				8,653
1991		107	342	12	410	92	6	9		2		15,781
1992	73	3	464	5	1,928	110	61	0		0		13,995
1993	1		471	3	580	298	103				6	10,811
1994			559		906	89	59	63	2		2	16,916
1995			335	2	657	258	49	11			2	29,225
1996			956		4,639	40	70	3,700			4	23,519
1997			1,814		2,240	156	133	367			14	24,632
1998			1,910		1,771	413	281	1	0		20	15,763
1999			3,089		184	441	184	2,369	35		21	29,153
2000			2,780	2	693	342	61	3,019	99		21	33,475
2001			1,839	4	292	356	48	863			50	18,504
2002			1,523	4	50	654	12	1,708	2		55	18,794
2003			1,863	21	22	394	18	3,211	43		41	17,958
2004			1,714	3		49	11	8,880	14		67	25,221
2005			1,368	2	201	79	7	4,542			20	29,013
2006			1,149	1		96	2	9,806			21	25,952
2007			1,401	10	42	14	2	4,147		(21) ⁸	(3) ⁸	(21,189)
2008			979	2		93	1	4,392	15	(21) ⁸	(3) ⁸	(24,784)
2009			877	11	(410)	(176)	(5)	3,019		(21) ⁸	(3) ⁸	(19,928)
2010			(373)			(117)	(0)	(7,745)		(21) ⁸	(3) ⁸	(17,352)

Table 14-3. Annual catch of Swordfish (*Xiphias gladius*) in metric tons for fisheries monitored by ISC for assessments of North Pacific Ocean stocks, 1951-2010. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional

Year	Japan							Chinese Taipei									
	Distant Water& Offshore Longline ²	Coastal Longline	Driftnet	Harpoon ³	Bait fishing	Trapnet	Other ⁴	Distant Water Longline	Offshore ⁵ Longline	Offshore Gillnet	Offshore Others	Coastal Harpoon	Coastal Setnet	Coastal Gillnet & Other net	Coastal Longline	Coastal Others	Other
1951	7,246	115	10	4,131	88	78	10	-	-								-
1952	8,890	152	0	2,569	6	68	6	-	-								-
1953	10,796	77	0	1,407	20	21	87	-	-								-
1954	12,563	96	0	813	104	18	17	-	-								-
1955	13,064	29	0	821	119	37	41	-	-								-
1956	14,596	10	0	775	66	31	7	-	-								-
1957	14,268	37	0	858	59	18	11	-	-								-
1958	18,525	42	0	1,069	46	31	21	-	-								-
1959	17,236	66	0	891	34	31	10	-	427								91
1960	20,058	51	1	1,191	23	67	7	-	520								127
1961	19,715	51	2	1,335	19	15	11	-	318								73
1962	10,607	78	0	1,371	26	15	18	-	494								62
1963	10,322	98	0	747	43	17	16	-	343								18
1964	7,669	91	4	1,006	40	16	26	-	358								10
1965	8,742	119	0	1,908	26	14	182	-	331								27
1966	9,866	113	0	1,728	41	11	4	-	489								31
1967	10,883	184	0	891	33	12	5	-	646								35
1968	9,810	236	0	1,539	41	14	9	-	763								12
1969	9,416	296	0	1,557	42	11	14	0	843								7
1970	7,324	427	0	1,748	36	9	3	-	904								5
1971	7,037	350	1	473	17	37	31	-	992								3
1972	6,796	531	55	282	20	1	2	-	862								11
1973	7,123	414	720	121	27	23	2	-	860								119
1974	5,983	654	1,304	190	27	16	2	1	880								136
1975	7,031	620	2,672	205	58	18	2	29	899								153
1976	8,054	750	3,488	313	170	14	12	23	613								194
1977	8,383	880	2,344	201	71	7	2	36	542								141
1978	8,001	1,031	2,475	130	110	22	1	-	546								12
1979	8,602	1,038	983	161	45	15	4	7	661								33
1980	6,005	849	1,746	398	29	15	1	10	603								76
1981	7,039	727	1,848	129	58	9	3	2	656								25
1982	6,064	874	1,257	195	58	7	1	1	855								49
1983	7,692	999	1,033	166	30	9	2	0	783								166
1984	7,177	1,177	1,053	117	98	13	0	-	733								264
1985	9,335	999	1,133	191	69	10	0	-	566								259
1986	8,721	1,037	1,264	123	47	9	0	-	456								211
1987	9,495	860	1,051	87	45	11	0	3	1,328								190
1988	8,574	678	1,234	173	19	8	0	-	777								263
1989	6,690	752	1,596	362	21	10	0	50	1,491								38
1990	5,833	690	1,074	128	13	4	0	143	1,309								154
1991	4,809	807	498	153	20	5	0	40	1,390								180
1992	7,234	1,181	887	381	16	6	0	21	1,473								243
1993	8,298	1,394	292	309	43	4	1	54	1,174								310
1994	7,366	1,357	421	308	37	4	0	-	1,155								219
1995	6,422	1,387	561	423	34	7	0	50	1,135								225
1996	6,916	1,067	428	597	45	4	0	9	701	2	-	19	10	-	-	-	
1997	7,002	1,214	365	346	62	5	0	15	1,358	1	1	27	8	-	24	-	
1998	6,233	1,190	471	476	68	2	0	20	1,178	8	-	17	15	1	-	-	
1999	5,557	1,049	724	416	47	5	0	70	1,385	4	-	51	5	1	-	-	
2000	6,180	1,121	808	497	49	5	0	325	1,531	5	-	74	5	1	1	-	
2001	6,932	908	732	230	30	15	0	1,039	1,691	17	-	64	8	1	1	-	
2002	6,230	965	1,164	201	29	11	0	1,633	1,557	7	1	1	16	1	1	-	
2003	5,376	1,063	1,198	149	28	4	0	1,084	2,196	3	-	-	8	-	-	-	
2004	5,395	1,509	1,062	229	30	4	0	884	1,828	5	-	-	7	1	-	3	
2005	5,359	1,295	956	187	337	3	0	437	1,813	1	-	-	5	2	-	18	
2006	6,181	1,507	796	244	342	5	1	438	3,944	-	-	-	-	-	-	-	
2007	6,109	2,016	829	122	367	2	1	345	3,754	-	-	-	-	-	-	-	
2008	4402 ¹	1780 ¹	648 ¹	173 ¹	349 ¹	3 ¹	0 ¹	338	3,407	-	-	-	-	-	-	-	
2009	4400 ¹	1548 ¹	682 ¹	239 ¹	249 ¹	3 ¹	0 ¹	373	3,177	-	-	-	-	-	-	-	
2010	-	-	-	-	-	-	-	(531)	(2,313)	-	-	-	-	-	-	-	

¹ Catch data a Philippin and some other countries catching swordfish in the North Pacific.

² Catches by gear for 1952-1970 were estimated roughly using FAO statistics and other data. Catches for 1971-2002 are more reliably estimated.

³ Constrains trolling and harpoon but majority of catch obtained by harpoon.

⁴ For 1952-1970 "Other" refers to catches by net fishing and various unspecified gears.

⁵ Offshore longline category includes some catches from harpoon and other fisheries but does not include catches unloaded in foreign ports.

⁶ Estimated round weight of retained catch. Does not include discards.

⁷ Unknown in purse sei: troll and troll half ring and unspecified gears.

⁸ Only one vessel fished so combined with Hawaii lonline

Blue cell indicate the updated from last year (e.g new data and corrected value)

ITALIC There is no data for working group. The value was retrieved from ISC11 national report.

Table 14-3 (continued)

Year	Korea		Mexico	United States					Grand Total
	Longline	Hi-seas Driftnet	All Gears	Hawaii Longline	California Longline	California Gill Net	California Harpoon	California Unknown ⁷	
1951	-	-	-	-	-	-	-	-	11,678
1952	-	-	-	-	-	-	-	-	11,691
1953	-	-	-	-	-	-	-	-	12,408
1954	-	-	-	-	-	-	-	-	13,610
1955	-	-	-	-	-	-	-	-	14,111
1956	-	-	-	-	-	-	-	-	15,486
1957	-	-	-	-	-	-	-	-	15,251
1958	-	-	-	-	-	-	-	-	19,734
1959	-	-	-	-	-	-	-	-	18,785
1960	-	-	-	-	-	-	-	-	22,047
1961	-	-	-	-	-	-	-	-	21,538
1962	-	-	-	-	-	-	-	-	12,671
1963	-	-	-	-	-	-	-	-	11,605
1964	-	-	-	-	-	-	-	-	9,220
1965	-	-	-	-	-	-	-	-	11,349
1966	-	-	-	-	-	-	-	-	12,283
1967	-	-	-	-	-	-	-	-	12,689
1968	-	-	-	-	-	-	-	-	12,424
1969	-	-	-	-	-	-	-	-	12,186
1970	-	-	-	5	-	-	612	10	11,083
1971	0	-	-	1	-	-	99	3	9,044
1972	0	-	2	0	-	-	171	4	8,737
1973	0	-	4	0	-	-	399	4	9,816
1974	0	-	6	0	-	-	406	22	9,627
1975	0	-	-	0	-	-	557	13	12,257
1976	0	-	-	0	-	-	42	13	13,686
1977	219	-	-	17	-	-	318	19	13,180
1978	68	-	-	9	-	-	1,699	13	14,117
1979	-	-	7	7	-	-	329	57	11,949
1980	64	-	380	5	-	160	566	62	10,969
1981	-	-	1,575	3	0	473	271	2	12,820
1982	48	-	1,365	5	0	945	156	10	11,890
1983	11	-	120	5	0	1,693	58	7	12,774
1984	48	-	47	3	12	2,647	104	75	13,568
1985	24	-	18	2	0	2,990	305	104	16,005
1986	9	-	422	2	0	2,069	291	109	14,770
1987	44	-	550	24	0	1,529	235	31	15,483
1988	27	-	613	24	0	1,376	198	64	14,028
1989	40	-	690	218	0	1,243	62	56	13,319
1990	61	-	2,650	2,436	0	1,131	64	43	15,733
1991	5	-	861	4,508	27	944	20	44	14,311
1992	8	-	1,160	5,700	62	1,356	75	47	19,850
1993	15	-	812	5,909	27	1,412	168	161	20,383
1994	66	-	581	3,176	631	792	157	24	16,294
1995	10	-	437	2,713	268	771	97	29	14,569
1996	15	-	439	2,502	346	761	81	15	13,957
1997	100	-	2,365	2,881	512	708	84	11	17,089
1998	153	-	3,603	3,263	418	931	48	19	18,114
1999	132	-	1,136	3,100	1,229	606	81	27	15,625
2000	202	-	2,216	2,949	1,885	646	90	9	18,599
2001	438	-	780	220	1,749	375	52	5	15,287
2002	439	-	465	204	1,320	302	90	3	14,640
2003	381	-	671	147	1,812	216	107	0	14,443
2004	410	-	270	213	898	169	62	37	13,016
2005	434	-	235	1,622	*	220	76	0	13,000
2006	477	-	347	1,211	*	444	71	2	16,010
2007	452	-	383	1,735	*	484	58	0	(12,267)
2008	(773)	-	84	1,980	*	280	33	1	(7,441)
2009	(989)	-	250	1,813	*	172 ¹	34 ¹	1 ¹	(13,930)
2010	(704)	-	(150)	1,654	*	33 ¹	22 ¹	4 ¹	

Table 14-4. Annual catch of striped marlin (*Kajikia audax*) in metric tons for fisheries monitored by ISC for assessments of North Pacific Ocean stocks, 1951-2011. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provision

Year	Japan						Chinese Taipei											
	Distant Water & Offshore Longline	Coastal Longline	Other Longline	Gill Net Small Mesh	Gill Net Large Mesh	Other ²	Distant Water Longline	High-sea DriftGillnet	Offshore Longline	Offshore Gillnet	Offshore Others	Coastal Harpoon	Coastal Setnet	Coastal Gillnet & Other net	Coastal Longline	Coastal Others	Other	
1951	2,494	-	673	-	0	1,281												
1952	2,901	-	722	-	0	1,564												
1953	2,138	-	47	-	0	954												
1954	3,068	-	52	-	0	1,088												
1955	3,082	-	28	-	0	1,038												
1956	3,729	-	59	-	0	1,996												
1957	3,189	-	119	-	0	2,459												
1958	4,106	-	277	-	3	2,914			543									387
1959	4,152	-	156	-	2	3,191			391									354
1960	3,862	-	101	-	4	1,937			398									350
1961	4,420	-	169	-	2	1,797			306									342
1962	5,739	-	110	-	8	1,912			332									211
1963	6,135	-	62	-	17	1,910			560									199
1964	14,304	-	42	-	2	2,344			392									175
1965	11,602	-	19	0	1	2,794			355									157
1966	8,419	-	112	0	2	1,570			370									180
1967	11,698	-	127	0	3	1,551	2		385									204
1968	15,913	-	230	0	0	1,043	1		332									208
1969	8,544	600	3	0	3	2,668	2		571									192
1970	12,996	690	181	0	3	1,032	0		495									189
1971	10,965	667	259	0	10	2,042	0		449									135
1972	7,006	837	145	0	243	993	9		380									126
1973	6,357	632	118	0	3,265	702	1		568									139
1974	6,700	327	49	0	3,112	775	24		650									118
1975	5,281	286	38	0	6,534	686	64		732									96
1976	5,136	244	34	0	3,561	585	32		347									140
1977	3,019	256	15	0	4,424	547	17		524									219
1978	3,957	243	27	0	5,593	546	0		618									78
1979	5,561	366	21	0	2,532	526	26		432									122
1980	6,378	607	5	0	3,467	536	61		223									132
1981	4,106	259	12	0	3,866	542	17		491									95
1982	5,383	270	13	0	2,351	656	7		397									138
1983	3,722	320	10	22	1,845	827	0		555									214
1984	3,506	386	9	76	2,257	719	0		965									330
1985	3,897	711	24	40	2,323	733	0		513									181
1986	6,402	901	33	48	3,536	577	0		179									148
1987	7,538	1,187	6	32	1,856	513	31		383									151
1988	6,271	752	7	54	2,157	668	7		457									169
1989	4,740	1,081	13	102	1,562	537	8		184									157
1990	2,368	1,125	3	19	1,926	545	2		137									256
1991	2,845	1,197	3	27	1,302	507	36		254									286
1992	2,955	1,247	10	35	1,169	303	1		219									197
1993	3,476	1,723	1	-	828	708	5		221									142
1994	2,911	1,284	1	-	1,443	383	1		137									196
1995	3,494	1,840	3	-	970	283	27		83									82
1996	1,951	1,836	4	-	703	152	26		162	8	6	30	3	-	-	-	-	-
1997	2,120	1,400	3	-	813	163	59		290	9	-	33	3	-	2	-	-	-
1998	1,784	1,975	2	-	1,092	304	90		205	15	-	19	6	1	9	-	-	-
1999	1,608	1,551	4	-	1,126	184	66		128	7	-	26	5	1	3	-	-	-
2000	1,152	1,109	8	-	1,062	297	153		161	17	1	29	6	1	1	-	-	-
2001	985	1,326	11	-	1,077	237	121		129	16	-	30	5	-	-	-	-	-
2002	764	796	5	-	1,264	290	251		226	14	-	6	8	1	-	-	-	-
2003	1,013	842	3	-	1,064	203	241		91	26	-	11	5	1	-	-	-	-
2004	699	1,000	2	-	1,339	92	261		95	8	1	7	5	2	-	-	1	-
2005	562	668	1	0	1,214	98	176		76	1	-	5	9	9	-	-	8	-
2006	623	539	1	0	1,190	95	204	-	537	-	-	-	-	-	-	-	-	-
2007	306	860	5	-	970	79	102	-	199	-	-	-	-	-	-	-	-	-
2008	(390)	(609)	(10)	(-)	(1,302)	(97)	78	-	192	-	-	-	-	-	-	-	-	-
2009	(166)	(606)	(21)	-	(821)	(90)	37	-	225	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	(53)	-	(200)	-	-	-	-	-	-	-	-	-

¹ Estimated from catch in number of fish

² Contrains bait fishing, net fishing, tarpnet, trolling, harpoon, etc

Blue cell indicate the updated from last year (e.g new data and corrected value)

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The value was retrieved from ISC11 national report. No data for working group.

Table 14-4 (continued)

Year	Costa Rica		Korea		Mexico		United States				Grand Total
	Sport ¹	Longline	Hi-seas DriftGillnet	Longline	Sport ¹	Longline	Troll	Handline	Sport ¹		
1951			-								4,448
1952		-	-							23	5,210
1953		-	-							5	3,144
1954		-	-							16	4,223
1955		-	-							5	4,153
1956		-	-							34	5,819
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	14,951
1966		-	-							36	10,689
1967		-	-							49	14,019
1968		-	-							51	17,778
1969		-	-							30	12,613
1970		-	-							18	15,604
1971		0	-							17	14,544
1972		0	-							21	9,760
1973		0	-							9	11,791
1974		0	-							55	11,810
1975		0	-							27	13,744
1976		0	-							31	10,110
1977		43	-							41	9,105
1978		28	-							37	11,127
1979		-	-							36	9,622
1980		37	-							33	11,479
1981		-	-							60	9,448
1982		39	-							41	9,295
1983		19	-							39	7,573
1984		23	-							36	8,307
1985		16	-					18		42	8,498
1986		61	-	-				19		19	11,923
1987		1	-	-			272	30	1	28	12,029
1988		11	-	-			504	54		30	11,141
1989		26	-	-			612	24	0	52	9,098
1990		315	-	-	181		538	27	0	23	7,465
1991	106	141	-	-	75		663	41	0	12	7,495
1992	281	318	-	-	142		459	38	1	25	7,400
1993	438	388	-	-	159		471	68	1	11	8,640
1994	521	1,045	-	-	179		326	35	0	17	8,479
1995	153	307	-	-	190		543	52	0	14	8,041
1996	122	429	-	-	237		418	54	1	20	6,162
1997	138	1,017	-	-	193		352	38	1	21	6,655
1998	144	635	-	-	345		378	26	0	23	7,053
1999	166	433	-	-	266		364	28	1	12	5,979
2000	97	537	-	-	312		200	14	1	10	5,168
2001	151	254	-	-	237		351	42	2		4,974
2002	76	188	-	-	305		226	30	0		4,450
2003	79	206	-	-	322		552	29	0		4,687
2004	(19)	75	-	-	0		376	34	1		4,017
2005	(-)	141	-	-	0		511	20	0		(3,499)
2006	-	56	-	-	-		611	21	0		(3,877)
2007	-	28	-	-	-		276	13	0		(2,838)
2008	-	(29)	-	-	-		426	14	0		(3,147)
2009	-	(22)	-	-	-		(256)	(10)	(0)	-	(2,254)
2010	-	(18)	-	-	-		(158)	(5)	(0)	-	(434)