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

PLENARY SESSION

18-23 July 2012
Sapporo, Hokkaido
Japan

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXES

ACRONYMS AND ABBERVIATIONS

Names and FAO Codes of ISC Species of Interest in the North Pacific Ocean

FAO Code	Common English Name	Scientific Name
	TUNAS	
ALB	Albacore	*Thunnus alalunga*
BET	Bigeye tuna	*Thunnus obesus*
PBF	Pacific bluefin tuna	*Thunnus orientalis*
SKJ	Skipjack tuna	*Katsuwonus pelamis*
YFT	Yellowfin tuna	*Thunnus albacares*
	BILLFISHES	
BIL	Other billfish	Family *Istiophoridae*
BLM	Black marlin	*Makaira indica*
BLZ	Blue marlin	*Makaira nigricans*
MLS	Striped marlin	*Kajikia audax*
SFA	Sailfish	*Istiophorus platypterus*
SSP	Shortbill spearfish	*Tetrapturus angustirostris*
SWO	Swordfish	*Xiphias gladius*
	SHARKS	
ALV	Common thresher shark	*Alopias vulpinus*
BSH	Blue shark	*Prionace glauca*
BTH	Bigeye thresher shark	*Alopias superciliosus*
FAL	Silky shark	*Carcharhinus falciformis*
LMA	Longfin mako	*Isurus paucus*
LMD	Salmon shark	*Lamna ditropis*
OCS	Oceanic white tip	*Carcharhinus longimanus*
PSK	Crocodile shark	*Pseudocarcharias kamonharai*
PTH	Pelagic thresher shark	*Alopias pelagicus*
SMA	Shortfin mako shark	*Isurus oxyrinchus*
SPN	Hammerhead spp.	*Sphyrna* spp.

ISC Working Groups

Acronym	Name	Chair (Member Country)
ALBWG	Albacore Working Group	John Holmes (Canada)
BILLWG	Billifsh Working Group	Jon Brodziak (USA)
PBFWG	Pacific Bluefin Working Group	Yukio Takeuchi (Japan)
SHARKWG	Shark Working Group	Suzanne Kohin (USA)
STATWG	Statistics Working Group	Ren-Fen Wu (Chinese Taipei)

Other Abbreviations and Acronyms Used in the Report

CDS	Catch documentation scheme
CIE	Center for Independent Experts
CPUE	Catch-per-unit-of-effort
DWLL	Distant-water longline (Rep. of Korea
DWPS	Distant-water purse seine (Rep. of Korea)
EEZ	Exclusive economic zone
EPO	Eastern Pacific Ocean
F	Fishing mortality rate
FAD	Fish aggregation device
FAO	Fisheries and Agriculture Organization of the United Nations
FL	Fork length
HMS	Highly migratory species
IATTC	Inter-American Tropical Tuna Commission
ISC	International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean
LTLL	Large-scale tuna longline (Chinese Taipei)
NC	Northern Committee (WCPFC)
NRIFSF	National Research Institute of Far Seas Fisheries of Japan
OFDC	Overseas Fisheries Development Council (Chinese Taipei)
PICES	North Pacific Marine Science Organization
SAC	Scientific Advisory Committee (IATTC)
SC	Scientific Committee (WCPFC)
SPC-OFP	Oceanic Fisheries Programme, Secretariat of the Pacific Community
SSB	Spawning stock biomass
STLL	Small-scale tuna longline (Chinese Taipei)
t	Metric tons, tonnes
WCNPO	Western Central and North Pacific Ocean
WCPFC	Western and Central Pacific Fisheries Commission

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

PLENARY SESSION

18-23 July 2012
Sapporo, Hokkaido
Japan

Highlights of the ISC12 Plenary Meeting

The 12th ISC Plenary, held in Sapporo, Japan from 18-23 July 2012 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 billfish and Pacific bluefin tuna working groups. The Plenary endorsed the findings that the striped marlin stock was overfished and experiencing overfishing. It further provided projection information for managers to consider in crafting management measures. The Plenary also reviewed progress on Pacific bluefin tuna stock assessment. Regarding albacore and North Pacific stocks of swordfish, the Plenary maintained the conservation advice of ISC11. The Plenary reviewed the progress of the shark working group and endorsed the assessment schedule of a blue shark assessment for the ISC13 to review. A special seminar on Population Resilience was held. Plenary also noted the strides WGs had made in incorporating best available scientific information (BASI) into stock assessment work. The ISC workplan for 2012-2013 includes completing a new stock assessment for Pacific Bluefin tuna by the end of 2012, assessments of blue shark and blue marlin by ISC13, continuing preparation for a mako shark stock assessment in 2013/2014, implementing improved database and website management, and completing a peer review of its structure. The Albacore Working Group re-elected John Holmes for a second term as Working Group Chair. The next Plenary will be held in Korea in July 2013.

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 that 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 (WGs) form the basis for research conducted by the ISC. Although some data for the most recent years are incomplete and provisional, the total catch of highly migratory species (HMS) by ISC Members estimated from available information is in excess of 500,000 metric tons (t) annually and dominated by the tropical tuna species. In 2010 the landings by ISC Members of ISC priority species were 65,075 t of North Pacific albacore tuna (ALB, *Thunnus alalunga*), 18,027 t of Pacific bluefin tuna (PBF, *T. Orientalis*), 10,671 t of swordfish (SWO, *Xiphias gladius*), and 4,642 t of striped marlin (MLS, *Kajikia audax*). The total estimated catch of these four species is 98,415 t, or approximately 87% of the 2009 total estimate (estimated to be 113,426 t). Annual landings of priority stocks throughout their ranges are shown in Tables 1-4.[1]

1.2 Opening of the Meeting

The Twelfth Plenary session of the ISC (ISC12) was convened in Sapporo Japan at 0900 on 18 July 2012 by the ISC Chairman, G. DiNardo. A roll call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea, Mexico, and USA (*Annex* 1). The Chair noted that the North Pacific Marine Science Organization (PICES) representative would join the Plenary later in the week. A representative of the Western and Central Pacific Fisheries Commission (WCPFC) attended as an observer. ISC Members China, the Secretariat of the Pacific Community (SPC), the Fisheries and Agriculture Organization of the United Nations (FAO), as well as organizations with significant interest including the Inter-American Tropical Tuna Commission (IATTC), did not attend the Plenary.

[1] FAO three-letter species codes are used throughout this report interchangeably with common names. See the list of acronyms and abbreviations for common and scientific names associated with these codes.

Dr. Yuji Uozumi, General Director of National Research Institute of Far Seas Fisheries of Japan (NRIFSF) gave the welcoming address.

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 2011 (*ISC/12/PLENARY/06*). The Canadian fleet of 177 vessels operated primarily within the coastal waters of the United States and Canada and in adjacent high seas areas; all but 1 t of catch occurred east of 150°W. Preliminary estimates of North Pacific albacore catch and effort in 2011 are 5,393 t and 8,568 vessel days, respectively. These figures represent an 18% decrease in catch and 13% increase in effort relative to 2010. Approximately 86% of the catch and 76% of the effort occurred in US waters and the majority of catch occurred in slightly cooler waters (14-18°C) than in previous years (15-19°C). The seasonal pattern of catch differed from normal (nominal catch rate peaks in late July, then declines to low values by late October) in that a small peak by mid-July was followed by an increase to the highest average catch rates by the end of October, i.e., availability was highest late in the season. Forty-three vessels participated in the on-board size sampling program and measured 14,373 fork lengths for a sampling rate of 1.72% of the reported catch (N = 831,299 fish). These measurements were dominated by a single mode corresponding to 2-year old fish at 64-68 cm fork length (FL) in the highseas and US waters, but in Canadian waters a second mode corresponding to 3-year old fish at 74-78 cm was also prominent.

Canada also reported that a recent reanalysis of catch and effort data resulted in small revisions to these data prior to 2005 (± 5 t or vessel-days, ± 2 vessels in the fleet) and larger changes in data collected since 2005 (up to 590 t of catch). These revised data are shown in its National Report and were reviewed by the ALBWG, which agreed that these were the best available scientific catch data from Canada. The primary cause of revision is due to late reporting of logbooks, which has occurred over several years, and the need to reconcile preliminary estimates of catch weight based on logbook estimates with more accurate and reliable sales slip weights, which are the basis for payment between a buyer and the fisherman. Since 2005, there have been delays in obtaining sales slip data owing to the way they are processed by the Catch Statistics Unit of Fisheries and Oceans Canada. Although these delays are expected to continue in the future, they will be shorter as Canada will monitor this process more closely.

Discussion

It was explained that albacore reported as bycatch in the Canada troll fishery is composed of small fish released alive because they are unmarketable. In spite of a bounty offered to obtain small albacore to use in aging studies, none were obtained. The U.S. offered to assist in obtaining small albacore for these studies.

3.2 Chinese Taipei

Y. J. Lin presented the National Report for Chinese Taipei (*ISC/12/PLENARY/07*). There are two principal tuna fisheries of Chinese-Taipei operating in the North Pacific Ocean, namely a tuna longline fishery and a distant-water purse seine fishery; other offshore and coastal fisheries include the harpoon, set net and gillnet fisheries that 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 LTLL and STLL fisheries in the North Pacific Ocean was 31,774 t in 2011. There were 95 active LTLL vessels and 1,376 STLL vessels operating in the Pacific Ocean in 2011. The total catch in the purse-seine fishery was 175,935 t caught by 34 vessels in the Pacific Ocean in 2011. The catch of tuna and tuna-like species by other offshore and coastal fisheries was estimated at 3,320 t.

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. Category II data are collected from logbooks. Category III data for major species are collected from sampling. For the purse-seine fishery, Category I and Category II data are obtained from logbooks and no Category III data collected.

In March 2010 a catch documentation scheme (CDS) 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 PBF sampling program was initiated and length and weight measurements of PBF are collected at landing markets by the Overseas Fisheries Development Council (OFDC) samplers. In both 2010 and 2011, 100% of caught PBF were sampled for length and weight.

Chinese Taipei has had an observer program in the Pacific Ocean since 2002. In accordance with the government's policy of establishing an observer program and availability of budgets to support the increase in the number of observers, the observed trips have gradually increased annually to 19 in 2011.

Taiwanese scientists are conducting biological and stock assessment research on tuna and tuna-like species in the North Pacific Ocean to promote sustainable utilization of the resource.

Discussion

It was noted that shark catch in the STLL and coastal fisheries reported in the National Report has not been provided to the SHARKWG. Chinese Taipei will do so henceforth.

It was clarified that the large increase in catch in the STLL fishery between 2002 and 2003 is due to improvements in the data collection system for foreign-based vessels. Chinese Taipei is currently trying to obtain data for earlier years through requests to relevant organizations.

3.3 Japan

H. Nakano presented the National Report for Japan *(ISC/12/PLENARY/08*). Japanese tuna fisheries consist of three major fisheries—longline, purse-seine, and pole-and-line—and other miscellaneous fisheries like troll, driftnet, setnet fisheries. In recent years longline, purse seine, pole-and-line have accounted for approximately 99% of the total tuna catch by Japanese fisheries. The National Report describes the recent trend of Japanese tuna fisheries in the North Pacific Ocean and updates the statistics given in the previous National Report for ISC11 (*ISC/11/PLENARY/10*). Total landings of tunas (excluding skipjack) caught by Japanese fisheries in the North Pacific Ocean in 2010 was 107,539 t and 107,703 t in 2011. The total landing of swordfish and billfishes was 6,395 t in 2010 and 5,795 t in 2011, which was 90.6% of the 2010 catch. Skipjack tuna landings were 189,423 t in 2010 and 147,092 t in 2011, 77.6% of the 2010 catch. In addition to the fisheries description, the Report includes a brief description of Japanese research activities on tuna and tuna-like species in the Pacific Ocean in 2011 and 2012. Current management and conservation measures for PBF were also described.

Discussion

In response to a question about the term “voluntary measure” relating to catch reduction of PBF fisheries described the National Report, Japan explained that—although it is a voluntary measure from a legal perspective—this measure is implemented by the fishing industry in accordance with guidelines set by the national government, and any violation will be subject to punitive administrative actions applied to the industry. This provides a strong incentive for effective compliance and prevents violations.

In response to a question about the distribution of PBF spawning areas, Japan suggested that spawning is continuous from the area south of Taiwan to the northern extent of the Sea of Japan with areas of higher density within this larger region. In the southern spawning area around Okinawa, 5-year old and older fish are usually caught compared to 3-5-year old fish in the Sea of Japan. Also, in the area around Okinawa spawning occurs from May to June while in the Sea of Japan it occurs from July to August. These age differences and seasonality in spawning suggest that the spatio-temporal structure of the spawning ground is complex and deserves more study.

It was explained that the apparent change in size distribution of ALB seen in the longline fishery between 2009 and 2010 cannot be ascribed to a change in the sampling scheme. Rather the

change is thought to be due to strong year classes from 2004 or 2005 entering into the fishery. Further investigation of these data is warranted.

3.4 Korea

Z. G. Kim presented the National Report for the Republic of Korea (*ISC/12/PLENARY/09*). Korean fisheries fishing for tunas and tuna-like species in the North Pacific are distant water tuna longlines (DWLL) and distant-water tuna purse seines (DWPS). Domestic fisheries—offshore large purse seine, setnet, and troll—are also involved in the catch of PBF in Korean waters.

DWLL and DWPS fleets generally fish in the North Pacific Ocean south of 20°N and are managed by the Distant Water Fisheries Development Act. Since 26 May 2011 domestic fisheries have come under management pursuant to a Ministerial Directive addressing PBF fisheries in the exclusive economic zone (EEZ).

DWLL catch was 15,254 t in 2011, representing a 23.1% decrease from the peak in 2004. DWPS catch was 23,801 t in 2011, representing a 76.4% decline from the peak in 2003. In the longline fishery the species composition of the catch in 2011was: BET 60.0%, YFT 21.0%, SWO 6.4%, BLZ 1.0%, ALB 0.6%, and MLS 0.3%. In the purse seine fishery the species composition of the catch in 2011was: SKJ 77%, YFT 22.1%, and BET 1 %. DWLL fishing effort decreased from 42,485 to 33,147 hooks and was deployed higher in the central area and the eastern area in 2011. DWPS fishing effort decreased from 2,876 sets in 2003 to 771 sets and concentrated on the western areas in 2011.

PBF catch by offshore large purse seiners declined from 1,196 t in 2010 to 670 t in 2011. This was 53.3 % of the average catch of the last five years. Catches occurred throughout the year with the highest catch of 100-140 t in May and June but catches were less than 10 t from July to November and almost all were juveniles. In accordance with the Ministerial Directive, 134 individuals (94.4 kg, 25.0-40.0 cm in length) were reported caught by the troll fishery targeting Spanish mackerel and yellowtail and all were transferred to fattening farms in 2011. Data collection, sampling, and verification of the catch were conducted at landing ports and auction markets in 2011. A PBF tagging program is scheduled in the near future.

Discussion

It was confirmed that the catch data presented in Table 2 of the National Report (ISC/12/PLENARY/09) are the most definitive data available and should be incorporated into the ISC catch tables.

Catch reports from the Korean DWLL fisheries show higher catch of black marlin versus blue marlin in the tropical longline fishery, which differs from Japanese longline fisheries where blue marlin catch is higher than black marlin. Since black marlin tends to be more abundant in coastal areas, the Korean report of catch by species may be due to errors in species identification by fishermen. Korea will review these data in light of this difference from the Japanese fishery.

It was noted that the “converted catch” column in Table 4 of the National Report that reports PBF catch, reflects changes in the estimate of the average weight of boxes of fish sold at auction.

Because counts of DWLL vessels in the report are for the entire Pacific, there is an apparent discrepancy between the decline in the number of longline vessels shown in National Report Figure 1 and stable catch in Figure 2. It was verified that the decline in vessel numbers occurred primarily in the South Pacific.

PBF catch data for the troll fishery has only been collected since 2011 under the Ministerial Directive and has not yet been submitted to the ISC database. Korea is continuing to review and correct these data and will submit them to the ISC database once this is done.

Although fisheries statistics on Korea's DWLL fisheries have been collected since the 1970s, they are incomplete through 2008. More comprehensive data have been collected in response to requirements imposed by tuna RFMOs.

The spatio-temporal distribution of catch in 2011, shown in National Report Figures 7 and 9, is representative of general patterns across years. The seasonal drop-off in catch is due to availability rather than a fishery impact.

3.5 Mexico

M. Dreyfus presented the National Report for Mexico (*ISC/12/PLENARY/09*). The Mexican purse-seine fishery is the most important HMS fishery in Mexico. Major development of this fleet is related to the implementation of the EEZ in the late 1970s. Most of the catch is YFT and the total catch for 2011 was 124,947 t of tunas (YFT, SKJ, PBF and others). Purse seiners with carrying capacities of 363 t or more have 100% onboard observer coverage. The rest of the fleet (smaller purse seiners and bait boats) are monitored with log books.

Most of the purse-seine sets are dolphin-associated sets, targeting YFT. Second in importance in terms of set type are those that set on free swimming schools in coastal areas, which include PBF sets in northern Baja California.

PBF started to become a main target for the Mexican fleet with the development of the farming industry in northern Baja California. Catches in the Eastern Pacific Ocean (EPO) have a long history with record catches in the 1960s by the US fleet mainly in the present Mexican EEZ. Mexico had three record catches of PBF in 2004, 2006, and 2010 with catch of 8,880 t, 9,928 t 7,745 t, respectively. Other catches of PBF and ALB involve the US sport fishery occurring in Mexican waters. ALB is considered an opportunistic catch by vessels targeting PBF and remains low. In 2011 there were no reported catches of this species.

In the SWO fishery, also located in Baja California peninsula, 31 longliners fish for SWO as well as sharks. In 2011, 67 t of SWO were reported, shark remaining the main component of the catch.

The seasonal abundance of diverse shark species in the coastal and oceanic waters of the Mexican Pacific, including the Gulf of California, has permitted the development of artisanal and pelagic shark fisheries along the coastal states of Mexico. Shark meat (for domestic human consumption) and fins (for international trade) have been the principal products obtained from sharks. Important regions for shark fisheries are the Gulf of California, Gulf of Tehuantepec, and the west coast of the Baja California peninsula. In 2010, total shark catch in the Pacific and Gulf of California fisheries was 24,726 t.

Discussion

Mexico further described the PBF weight estimation methodology used by the net pen industry. These data will be provided to the *Instituto Nacional de Pesca*, which will compile the data working backward from 2011. These weight estimates are made when the fish are captured and not after fattening.

For small-scale shark fisheries, data collection is through logbooks from longline vessels beginning in 2007 and through monthly data reports submitted by small-scale coastal fisheries.

3.6 United States

S. Pooley presented the National Report for the USA (*ISC/12/PLENARY/11*). US purse-seine activity in the North Pacific Ocean decreased in 2011 compared to recent years to 22 vessels (35 vessels in 2010); catch was 42,000 t (16.4% decrease from 2010) of which SKJ accounted for 35,700 t. US longline activity increased to 129 vessels (125 vessels in 2010), and landing of 10,000 t (15.7% increase from 2010) of which BET was 5,600 t. Other US fisheries were relatively stable.

NOAA Pacific Islands and Southwest Fisheries Science Centers conduct research on tunas, billfishes, sharks, and bycatch (with an emphasis on sea turtles and marine mammals). Areas of investigation include fishery monitoring; socio-economics of fisheries, markets, and fishing communities; life history studies and oceanography; bycatch mitigation (turtles, sharks, marine mammals); fishery-independent surveys, and stock assessment methodology. Forty-nine manuscripts were published last year related to ISC objectives.

Highlights of research activities include:

- Albacore: Age and growth studies of albacore were conducted using otoliths and dorsal fin spines, including analysis of otoliths provided by Japan. In addition, population structure was investigated using stable isotopes.
- Swordfish: The Swordfish and Leatherback Use of Temperate Habitat (SLUTH) project investigated migratory patterns, foraging ecology, and local stock structure of these species in the California Current Large Marine Ecosystem.
- Economic studies: These included the Hawaii longline and small boat fishery cost-earnings analysis, an investigation of Hawaii retail seafood monitoring, an *ahi* (BET) pricing analysis, and research on the spillover effects of swordfish by-catch regulation. The latter was a case study of the Hawaii shallow-set longline fishery's effort to reduce sea turtle bycatch.
- Oceanography: A variety of studies have been conducted; an example was research on climate effects on productivity. This paired a climate model with a size-based ecosystem model. Results suggest a decline in the catch of large pelagic fish in areas of the North Pacific possibly due to climate change.
- Bycatch: Research was conducted on the effect of hook size on bycatch in longline fisheries.

Discussion

It was noted that the regulatory impact on catch in the shallow-set longline fishery for swordfish was accounted for in the most recent stock assessment and will be addressed in the next stock assessment as well.

The US discussed domestic efforts to clearly segregate the provision of scientific information from the development of management measures and suggested that the ISC should consider this approach. The ISC Chair reiterated the importance of this separation and noted that this issue would be discussed later in the meeting.

4 REPORT OF THE ISC CHAIRMAN

The ISC had another busy year since the ISC Plenary met in San Francisco, California, USA in July 2011. While there were numerous accomplishments and successes that advanced the scientific integrity of ISC, there were setbacks that could erode the scientific credibility of the organization. The year was spent completing a benchmark assessment for striped marlin and working on preparations for new stock assessments for blue shark and Pacific blue marlin in 2013. Preparatory work consisted of collecting fishery and biological data, compiling and analyzing data, testing 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 shark aging issues, improving best practices and scientific reporting procedures, compiling a catalogue and inventory of the ISC database, advancing development of the website and data enterprise system, and optimizing administration. Six intercessional workshops were held to facilitate collaboration among Member scientists in implementing ISC work plans and coordinating research on the stocks. A peer review of the ISC function was initiated with support from Japan, Republic of Korea and the USA, and John Holmes was reelected as Chair of the ISC ALBWG. Plans to complete the much anticipated Pacific bluefin tuna stock assessment for ISC12 were not accomplished due to differing interpretations of input data and assessment model assumptions. The failure of ISC to complete assessments on time has far-reaching implications. At a time when the ISC is gaining scientific credibility and stature among tuna RFMOs, we cannot afford to waiver from our mission due to differences in opinion and “advocacy creep.”

Managing ISC activities continued to be a challenge during the past year. As before, the challenge is an inherent consequence of the ISC framework adopted by the Members. That is, ISC relies on in-kind contributions from its Members rather than monetary contribution to support a “secretariat” to oversee day-to-day operations of the organization. Given this framework, the Office of the Chairman takes on the role of a secretariat, but not a full-service one at that, owing to uncertain support from the Chairman’s funding source. Likewise, the working groups depend on in-kind contributions from Members who elect to participate in specific working groups. This support is uneven among the Members and Members with insufficient support cannot participate actively; this can delay progress of a working group in completing assignments. To date, the support for administration of ISC activities has been provided solely by the US for day-to-day operations of the office of the Chairman, and by Japan for operating the ISC website and database. Member countries with scientists serving as

chairpersons of the working groups have contributed to supporting administrative services of the working groups. All of the support is appreciated and acknowledged.

The Chairman closed his report by thanking all colleagues who have worked on ISC tasks and who have provided the support to ISC in advancing the objectives and purpose of the organization. The service of Chi-lu Sun, vice Chairman, for support and insightful advice is acknowledged. A special thanks and appreciation is owed to the Chairs of the Working Groups, namely Ren-Fen Wu, Jon Brodziak, John Holmes, Yukio Takeuchi, and Suzanne 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, Izumi Yamasaki, and Webmaster, Yumi Okochi, is appreciated. Finally, he acknowledged the professional assistance of Lyn Katahira and Sarah Shoffler 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 on aspects of ISC operations. He thanked all for contributing to another successful year for ISC and for the support and services provided.

5 INTERACTION WITH REGIONAL ORGANIZATIONS

5.1 IATTC

The ISC Chair reported on interactions between ISC and IATTC since ISC11. J. Holmes, ALBWG Chair, attended the IATTC Scientific Advisory Committee (SAC) meeting, 15-18 May 2012 and presented the current North Pacific albacore assessment. This is the first time an ISC stock assessment has been presented to the IATTC SAC. In addition, the ISC Chair attended the 83rd Meeting of the IATTC, 25-29 June 2012 as an observer for ISC.

5.2 PICES

5.2.1 Report from the Executive Secretary of PICES

M. Kaeriyama presented an oral summary of the PICES Report to ISC on behalf of Dr. Alexander Bychkov, Executive Secretary 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.

Discussion

The ISC Chair thanked M. Kaeriyama for his presentation and PICES for their continued support of ISC.

5.2.2 Report of the 2011 PICES Meeting

C-L. Sun reported on the proceedings of the twentieth annual meeting of PICES (PICES-2011) convened from 14-23 October 2011 in Khabarovsk, Russia. The theme for PICES-2011 was "Mechanisms of the marine ecosystem reorganization in the North Pacific Ocean."

C-L. Sun attended the meeting as an observer on behalf of ISC and prepared a presentation on ISC activities for the meeting. Sun highlighted PICES research activities that might be of interest to ISC, including characterizing changes in oceanographic conditions and understanding causal mechanisms, as well as development of environmental time series.

Discussion

The ISC Chair thanked C-L. Sun for his presentation and for taking on this responsibility. 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 continue to work with PICES to explore greater collaborations.

5.2.3 Invitation to 2012 PICES Meeting

The ISC Chair reviewed the invitation from PICES to attend its Twenty-First Annual Meeting in October 2012 in Hiroshima, Japan (*ISC/12/PLENARY/02*), noting that PICES invites greater participation from the ISC. The invitation requests a report on the activities of the ISC during the Science Program and a second report on potential collaborations between the two organizations. The ISC will contact the PICES Executive Director to confirm ISC involvement.

It was agreed that H. Nakano would present activities of ISC at the Science Program. F. Werner has agreed to report on potential collaborations between ISC and PICES. A draft report on potential collaborations with PICES will be circulated to Members by 30 August for review and comment.

5.2.4 Prospective PICES Collaborations

Plenary identified three potential opportunities for collaboration between ISC and PICES. These represent relatively near-term activities and Plenary recognized that deepening ties with PICES will be a longer-term process. In general, PICES's focus on environmental and ecological processes could contribute to the development of more sophisticated stock assessments (for example, by incorporating biophysical processes into CPUE standardization models) while ISC may be able to provide PICES with information about open ocean fish stock dynamics. Three potential areas for near-term collaboration were identified:

1. Presenting potential collaborative activities to the PICES Science Board such as ISC-PICES collaborations with respect to the Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems (FUTURE) program initiated by PICES in 2009.

2. Inviting PICES representatives to participate in future ISC Plenary seminars.

3. Inviting PICES representatives to the ISC *Aging and Growth Estimation of Pacific Bluefin and North Pacific Albacore* Technical Workshop planned for November-December 2013 (see Section 11.8).

5.3 WCPFC

A. Beeching of the WCPFC reported on interactions between ISC and WCPFC since ISC11. Principal interactions between WCPFC and ISC occur during their respective science meetings for which each organization sends representatives, and through cooperation and data exchange through the WCPFC science provider (Oceanic Fisheries Programme, Secretariat of the Pacific Community (SPC-OFP)). Scientists from the WCPFC science provider participated in some ISC species working group workshops, assisting with data preparation and stock assessment modeling. It was also reported that the ISC Chair participated in the WCPFC Annual Meeting in March 2012. The Seventh Scientific Committee meeting (SC7) requested ISC to complete a stock assessment for North Pacific swordfish, based on the SC7 Report. WCPFC requested additional research on potential references points for North Pacific albacore, based on a request from the WCPFC Northern Committee (NC). The status of NC research proposals was briefly discussed, upcoming WCPFC meetings were detailed, and attention was drawn to the Management Objectives Workshop scheduled immediately before WCPFC9.

Discussion

Plenary noted that the request for additional research on North Pacific albacore reference points is not part of the ISC work plan and noted that the ALBWG previously provided a suite of candidate reference points to the NC. The ISC Chair pointed out that research on albacore reference points does not appear to be an NC request. The ISC Chair will follow up on this matter.

Regarding the SC request for a North Pacific swordfish stock assessment, the ISC Chair reminded participants that requests to the ISC come through the WCPFC NC, not the WCPFC SC.

6 REPORTS OF WORKING GROUPS AND REVIEW OF ASSIGNMENTS

6.1 Albacore

J. Holmes, ALBWG Chair, reported on the activities of the ALBWG over the past year *(ISC/12/ANNEX/11*). The ALBWG did not schedule an intercessional workshop between ISC11 and ISC12 as many Members were tasked with completing other assessments for ISC12. The ALBWG scheduled a two day meeting, but only required one day (July 14, 2012) to review and update fisheries data for 2011, consider recommendations from the Center for Independent Experts (CIE) review of the 2011 stock assessment, review progress on high priority research identified in the 2011 stock assessment document, develop work plans for 2012-2014 leading into the next stock assessment, and develop recommendations for advice on stock status and conservation of north Pacific albacore tuna.

Accomplishments of the ALBWG over the past year include:

1. An independent desktop review of the 2011 stock assessment, coordinated by the CIE and sponsored by the US, was completed.
2. Recommendations for improvements to the assessment model and modeling process from the CIE reviews were incorporated into the work plans of the ALBWG.
3. Work plans for the incorporation of research and improvements to the assessment model were developed and a schedule of meetings approved for 2012-2014 period, leading up to and including the next assessment, which is anticipated in 2014;
4. National fishery statistics for countries harvesting north Pacific albacore (both ISC Member countries and non-member countries) were updated through 2011.
5. Recommendations on stock status and conservation advice were developed.
6. J. Holmes was reelected Chair of the ALBWG.
7. The work plans of the ALBWG through 2014 were reviewed. Three intercessional workshops are scheduled to complete the next stock assessment in early 2014; March 2013 (Nanaimo, Canada) to review and incorporate high priority research results; November 2013 data preparation workshop; and April 2014 stock assessment workshop.

The ALBWG offered the following recommendations concerning an independent stock assessment review process based on its experience with the CIE reviews of the 2011 assessment:

1. Improved documentation of the assessment process relative to current practice is needed, especially data review and preparation.
2. A face-to-face review would be preferable to the desktop approach that was used, despite the logistical and financial challenges this would present to the ISC.
3. There was a difference in the quality of the reviews and the ALBWG recommends that future stock assessment reviews consider the inclusion of reviewers with more knowledge of tunas and tuna stock assessment methodologies.

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

1. The need to develop procedures 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, and where they are archived.
2. The need to verify the accuracy of the 2010 and 2011 data obtained from the WCPFC data manager because catches for some countries are much higher than historical figures for those countries.
3. The need to develop and implement an exchange of data inventories with the IATTC, as is done with the WCPFC, to ensure that species working groups have complete catch histories.

Discussion

The Chair noted that progress has been made on all Plenary issues identified in the CIE report.

A question was raised concerning the choice of reviewers by the CIE. The ISC Chair reported that scientists from the WCPFC and IATTC were excluded from the CIE review panel because the ISC wanted to ensure a fully independent review. Since many of the scientists in the IATTC and WCPFC (or SPC-OFP as science provider) are involved in ISC WGs their inclusion would not demonstrate sufficient independence.

Concern was expressed about added workload for the WGs due to new documentation procedures for stock assessments, especially without a Secretariat that can assist in this task. The ISC Chair noted that it is common practice for tuna RFMOs to produce stand alone stock assessment reports and indicated that ISC must adopt such practices to ensure scientific credibility and promote transparency. By starting with the objective of a standalone document, the amount of work involved should not be substantial.

Regarding the need for archiving data, the STATWG is developing procedures and the approach will be presented during the STATWG report. Verifying the accuracy of the 2010 and 2011 data obtained from WCPFC will be the responsibility of the STATWG. Finally, the ISC Chair will discuss the need for a regular data inventory exchange with the IATTC Director.

6.2 Pacific bluefin tuna

Y. Takeuchi, PBFWG Chair, summarized the activities of the WG (*ISC/12/ANNEX/06; ISC/12/ANNEX/08*). The WG met twice in January-February 2012 in La Jolla, California, USA, and in May-June 2012 in Shimizu, Japan. The January-February workshops focused on data preparation to finalize input data for the stock assessment. In May-June the PBFWG met to conduct the stock assessment, which was not completed due to differing interpretations of input data and assessment model assumptions. The WG proposed holding a stock assessment workshop in November 2012 in Honolulu, Hawaii, USA to complete the stock assessment and submit the Stock Assessment Report to ISC Plenary for its adoption by the end of 2012.

Discussion

Plenary discussed how outstanding issues would be resolved before the next PBFWG meeting scheduled for 9-16 November 2012, and the process for completing the stock assessment by the end of 2012. Reports from prior WG meetings will be finalized as of the ISC12 Plenary and the results adopted by the ISC. Only catch and effort data already reviewed by the WG will be used in the assessment. Outstanding issues related to fishery characterizations will be resolved before the 9-16 November 2012 WG meeting, recognizing that data issues are interrelated with issues of model structure. The modeling will occur at the 9-16 November 2012 meeting and the Stock Assessment Report will be provided to the ISC Chair no later than December 7 for distribution to Members for review. An intercessional Plenary meeting is scheduled sometime during the week of 17-20 December 2012, preferably by webinar or other electronic means, to adopt the assessment and related scientific advice. It was agreed that the November 2012 PBFWG Stock Assessment Report should follow best available scientific information (BASI) guidelines following the same format used in the 2011 North Pacific albacore and 2012 WCNPO striped marlin stock assessment.

Plenary also endorsed an age and growth workshop to be conducted jointly with the ALBWG in 2013 (see 11.8.1).

6.3 Billfish

J. Brodziak, BILLWG Chair, provided a summary of the status of BILLWG work assignments (*ISC/12/ANNEX/05; ISC/12/ANNEX/07*). The WG completed three primary assignments: the

WCNPO striped marlin (MLS) stock assessment, preparation of catch and fishery information for the Pacific blue marlin (BLZ) stock assessment, and updates to billfish fishery and life history data for striped marlin, swordfish, and blue marlin.

The future work plan of the BILLWG was reviewed. The work plan includes two intercessional meetings in order to complete the BLZ stock assessment: 22-29 January 2013 in Honolulu and 21-29 May 2013 in Shimizu. BILLWG members are expected to present completed working papers on BLZ standardized CPUE at the January 2013 intercessional BILLWG workshop. The BILLWG plans to complete data preparation for the BLZ stock assessment at the January 2013 meeting. The BILLWG is expected to conduct the BLZ stock assessment at the May 2013 meeting. The BLZ stock assessment information is expected to be reviewed by the Plenary at ISC 13.

There are two ongoing challenges for ISC BILLWG efforts to conduct and successfully complete stock assessments. First, some ISC countries are not providing catch data on a regular basis to the BILLWG. Second, some Member countries are not participating in BILLWG meetings. The lack of current data is expected to increase uncertainty about current stock status and future stock projections.

Discussion

The ISC Chair noted that the request for Category III size data highlighted by the BILLWG Chair has already been made by the STATWG Chair, consistent with ISC procedures. He also noted some of the problems in coordinating MLS assessments with the IATTC in particular past IATTC assessments have used a stock boundary inconsistent with that used by ISC. Further communication and coordination will be needed leading up to the next MLS assessment 3 years hence.

6.4 Shark

S. Kohin, SHARKWG Chair, reported on the activities of the SHARKWG over the past year (*ISC/12/ANNEX/04*, *ISC/12/ANNEX/09*). The Working Group advanced efforts to compile shark data and work toward a blue shark (BSH) stock assessment. The WG held a workshop in November 2011 followed immediately by an ISC sponsored Shark Age and Growth Workshop, in La Jolla, California, USA; the blue shark data preparatory meeting was held in May 2012 in Shizuoka, Japan; the SHARKWG met in advance of the Plenary in Sapporo, Japan for one day to finalize some unresolved work from the May meeting and to conduct work for the Plenary. Active participants to the meetings have included Canada, Chinese Taipei, Japan, Mexico, USA, IATTC and SPC. In general, the SHARKWG has made significant progress in compiling information on life history aspects of and fisheries catching blue and shortfin mako (SMA) sharks and establishing collaborations on biological and assessment research.

The first ISC Shark Age and Growth Workshop brought together age-and-growth specialists from most ISC Member nations and the IATTC. Participants exchanged information on regional studies and methodologies and established collaborations to advance the SHARKWG's efforts to reduce uncertainty in ageing pelagic sharks. The Working Group has begun to compile both retained and total estimated BSH catch from Member nations. In addition, the WG has received

cooperation from IATTC and WCPFC in identifying fisheries of non-Member nations that target billfish and tunas, and also catch shark in their respective convention areas; obtaining effort information for those fisheries is ongoing in order to estimate catch for non-Member nations.

The SHARKWG noted the challenges in conducting their work related to the lack of good shark catch and biological data collection. The SHARKWG had hoped to have at least the preliminary data for the BSH assessment ready by the Plenary meeting; however, given the challenges associated with shark data, much of the data are still incomplete. The SHARKWG Chair requested assistance from the ISC Chair to encourage Members to provide the data needed for assessments.

The SHARKWG proposed a revised work plan for completing the BSH assessment that includes another data meeting in the winter followed by the BSH assessment in spring 2013. The WG will use a production model for the base-case assessment and conduct alternative modeling in parallel. The revised work plan is provided as Attachment 5 to *ISC/12/ANNEX/09*.

Discussion

SHARKWG priorities were clarified by the Plenary. The ISC Chair noted that the SHARKWG Report included recommendations coming out of the Shark Age and Growth Workshop and also recommendations for long-term research. He wondered if the latter incorporated the former. Age and growth research is an ongoing research priority until definitive information on blue and mako shark age and growth has been compiled, but this long-term objective will be guided by the recommendations from the Shark Age and Growth Workshop.

The ISC Chair emphasized the need for Members to provide the data needed to compile the shark catch tables and reiterated that Members need to provide shark discard data for the upcoming blue and mako shark stock assessments. The difficulties in providing accurate and precise data on shark catches were noted.

Shark catch data are generally less accurate than for the major tuna target species. For this reason these data should be carefully reviewed using fishery-independent sources such as observer or research data. Plenary noted that while the SHARKWG needs species-specific data on shark catches for conducting an effective stock assessment, many countries only have data combined by species or even by different gear types. Nonetheless, these data can provide information on time periods for catch and serve as a proxy for maximum catch estimates. Combined data could be useful in some circumstances. In the absence of species-specific data, combined data should be provided by Members.

It was noted that the shark catch tables in the Plenary Report report retained (landed) catch. However, data on estimated total catch, including discards, and estimated discard mortality are also needed to complete the assessments. While Members will not submit retained catch data for sharks again before the 1 July 2013 submission, Members should submit the estimated catch data to the SHARKWG by 31 August 2012 for use in the BSH assessment.

6.5 Seminar

H. Nakano convened a seminar at ISC12 focusing on population resiliency (*ISC/12/ANNEX/12*). The presentations on resiliency spanned a range of topics including fish, fisheries, and ecosystem resiliency, as well as human resiliency. Summaries of each presentation follow.

A. Kimoto made a presentation entitled *The tragedy and thereafter: Damage and recovery of Japan's fisheries after 11 March 2011*. Damage to fisheries caused by the tsunami that occurred on 3 March 2011 included impacts to fishing effort, facilities, and processing industries. Because vessels from fleets such as distant-water longline were generally not from ports in the areas affected by the tsunami, fewer were affected compared to coastal fishing fleets. The fish processing sector appears to be the slowest to recover from tsunami damage due to the prioritization of facility reconstruction in rebuilding plans for the cities affected by the disaster.

J. Brodziak presented *Modeling resilience of fish stocks: binding limitations and open possibilities*. It was noted that steepness (a parameter of the stock-recruitment function that relates adult spawning biomass to corresponding production of young fish) is key to understanding the resilience of fish stocks to exploitation and environmental change. Meta-analysis approaches can be applied to estimate steepness and characterize uncertainty about the parameter estimate through the combination of data from many studies. Alternatively, steepness may be directly estimated using life history parameters and information about the reproductive ecology of a fish stock where data are sufficient. Early life stages are certainly important but it is not yet known which stage is the most crucial for determination of steepness. Although the environment almost certainly plays an important role in determining steepness, more work will be necessary to understand its role.

H. Nakano presented *Effect of regime shift on Northern tuna stocks*. Regime shifts, which are decadal changes, may affect Pacific Bluefin tuna, albacore, and blue sharks. Stock management options appropriate for these naturally fluctuating populations were briefly introduced. New data will need to be collected to improve our understanding of the links between ocean and ecosystem dynamics.

M. Kaeriyama presented *How to establish the sustainable adaptive management of Pacific salmon under the changing climate***.** Global warming has positively affected age-1 growth and survival of Hokkaido chum salmon. In the future, however, global warming will decrease both the carrying capacity and the distribution area of chum salmon in the North Pacific Ocean. Adaptive management and application of the precautionary principle are essential for protecting Pacific salmon in a changing climate.

It was noted that the causes of larger-scale shifts in climate and oceanic conditions varied, ranging from natural to anthropogenic in origin. The role these shifts play in influencing population resilience is an area ripe for research. A combination of groups including ISC and PICES will need to consider these factors when assessing stocks and ultimately embrace a more holistic approach within an ecosystem management framework.

Discussion

The ISC Chair thanked H. Nakano for organizing an insightful seminar and the four presenters for contributing. He also thanked the rapporteurs for their assistance in compiling the report.

7 STOCK STATUS AND CONSERVATION ADVICE

7.1 Albacore

J. Holmes presented updated recommendations for stock status and conservation information for Pacific albacore (*ISC/12/ANNEX/11*). These recommendations are based on a qualitative review of catch and nominal effort (number of vessels by major gear types) data in 2011. Estimated total catch in 2011 was 83,142 t, which is above the 30-yr average of 72,454 t (1981-2010) and 21% higher than the total reported catch for 2010 (68,932 t). There are two reasons for the increased catch in 2011: (1) target switching from skipjack tuna to albacore in the Japanese pole-and-line fleet, which led to an increase of about 9,000 t in this fleet relative to 2010, and (2) catches obtained for China and a non-ISC Member country through the WCPFC were several times higher than historical catches for these countries and need verification to ensure their accuracy. Excluding the Chinese and non-ISC Member catch data for 2011 results in a total catch estimate of 72,912 t, which is a 5.8% increase relative to 2010. Examination of catch by major gears (troll, longline, pole-and-line) shows that catches by troll gear have been relatively stable since the mid-2000s, averaging about 18,535 t since 2006, while pole-and-line catches have been quite variable due to target switching between skipjack and albacore, ranging from 15,000 to 37,000 t since 2006, and longline catches have decreased slightly over the same period, with the exception of an increase in 2011, which reflects Chinese and non-ISC Member country data. If the Chinese and non-ISC Member country data are excluded, then longline catches for ISC Member countries maintained the long-term declining trend in 2011. Nominal effort (measured as the number of vessels) of ISC Member countries were either stable (troll, pole-and-line) or declining (longline).

Discussion

The ISC Chair thanked the ALBWG Chair for his presentation and the ALBWG for their hard work. Plenary confirmed that the conservation advice adopted at ISC11 should be maintained. Plenary also agreed with the concern raised by the ALBWG Chair regarding the increased catch of North Pacific albacore by non-ISC Member countries and tasked the STATWG Chair with confirming the validity of these data with WCPFC

Stock Status and Conservation Advice

Stock Status

Given no new information, the ALBWG recommended no changes to its stock status determination in 2011, i.e., the stock is considered healthy and neither overfished nor experiencing overfishing.

Conservation Advice

The ALBWG noted that it has not received any new information since the 2011 stock assessment that would require a change to previous (2011) conservation information. Therefore, the ALBWG offers no new recommendations on conservation above, beyond that provided by ISC11 (see below):

1. **The stock is considered to be healthy at average historical recruitment levels and fishing mortality ($F_{2006\text{-}2008}$).**
2. **Sustainability is not threatened by overfishing as the $F_{2006\text{-}2008}$ level (current F) is about 71% of $F_{SSB\text{-}ATHL}$ 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 $F_{2006\text{-}2008}$ levels increases to 54% indicating that the impact on the stock is unlikely to be sustainable.**
4. **Increasing F beyond $F_{2006\text{-}2008}$ 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.**

7.2 Pacific Bluefin Tuna

Y. Takeuchi summarized recent stock assessment research conducted by the PBFWG to assess stock status (*ISC/12/ANNEX/06 and ISC/12/ANNEX/08*). Fishery-associated data through the first half of 2011 were frozen for use in a length-based, age structured population dynamics models within the Stock Synthesis software (version 3.23b). A single pan-Pacific stock of PBF is assumed. The model used quarterly catch-at-length data; 13 fisheries defined by gear, location and season; and six abundance indices.

The PBFWG recognized the substantial uncertainty in input data, including fishery data and biological parameters. After considering a wide range of model configurations, including input data as well as model parameterizations, the PBFWG could not reach consensus on a base model describing the stock status due to differing interpretations of data and model structure. As a result the PBFWG could not provide a definitive determination of stock status.

Based on the exercise to develop a base-case model and the fishery-associated data (e.g., CPUE), the PBFWG notes that SSB may have continued declining since the last stock assessment (2010; Figure 7.1). Also, recruitment appears to be fluctuating annually with no specific trend (Figure 7-2b). Until new stock assessment results become available, the WG agreed to carry over its previously recommended advice on stock status on PBF, albeit with the precautionary note that the uncertainty in stock status has increased with the passage of time and that the condition of the stock may have deteriorated since the last assessment.

Given that SSB may have continued to decline since the last stock assessment and because of the increased uncertainty concerning stock status, the WG noted it is even more important to reemphasize the previous conservation advice.

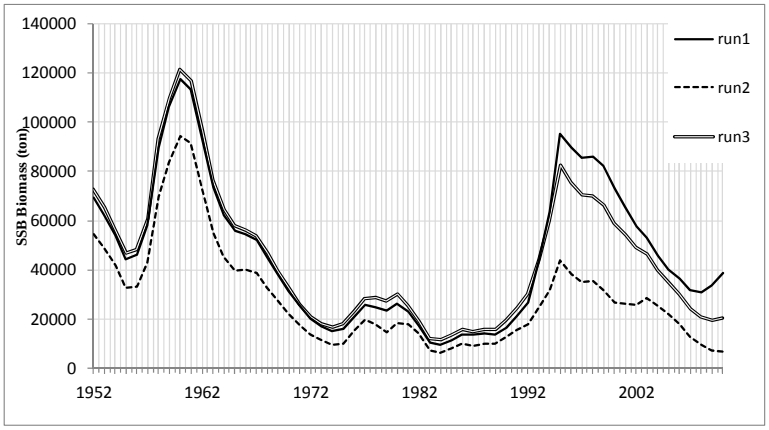

Figure 7-1.PBF spawning stock biomass estimate of three runs the WG considered.

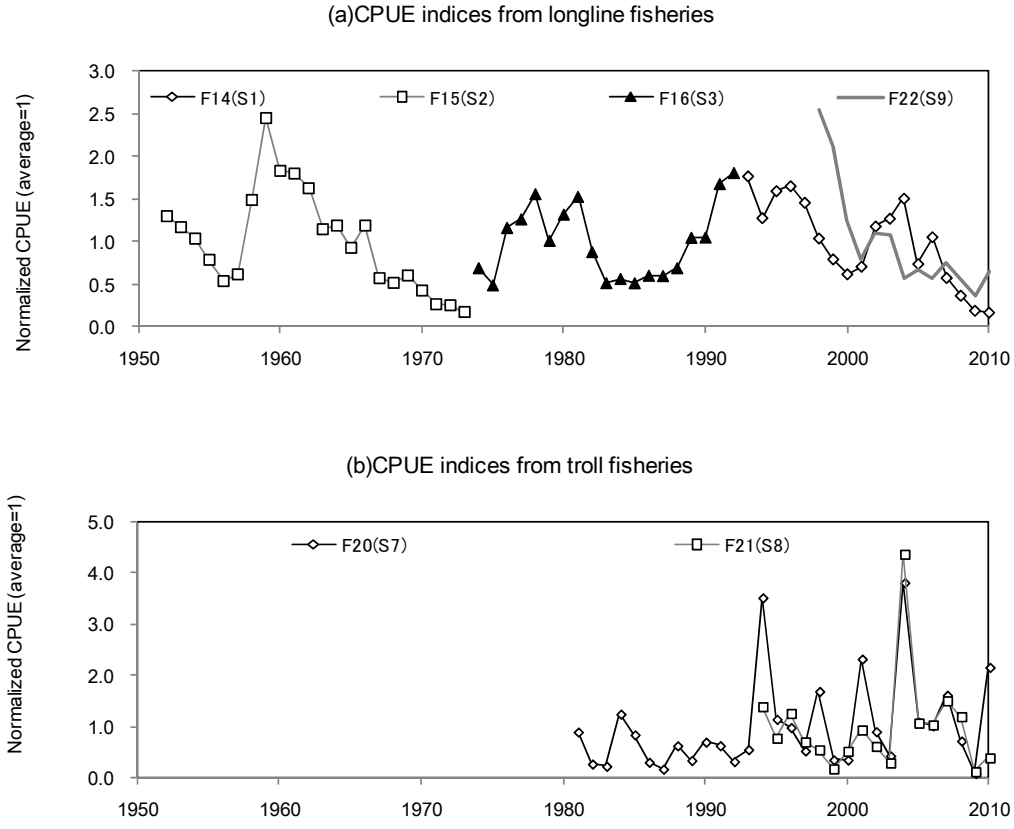

Figure 7-2. PBF CPUE time series from longline (a) and troll fisheries (b) which are agreed to be used for the base case assessment.

Discussion

The ISC Chair thanked the PBFWG Chair for his presentation and the PBFWG for their hard work.

The high steepness value used in the assessment model (h=0.999) was questioned. The PBFWG studied this issue in past workshops and concluded, based on Mangel *et al.* (2010), [2] that there is a low probability that steepness is lower than 0.999 (see *ISC/12/ANNEX/06 working paper PBF-1/15*). It was noted that the potential for a continued decline in SSB and CPUE since the last assessment is cause for concern. Managers should note this as they deliberate on the development of management measures. Plenary requests the WG clarify the steepness value at its November 2012 meeting.

Stock Status and Conservation Advice

Stock Status

ISC12 noted that since the last assessment (2010) there appears to be a continuing decline in SSB and CPUE, as was projected in the 2010 assessment.

Conservation Advice

Until a new stock assessment result becomes available, ISC12 agreed to carry over the previous advice, albeit with the precautionary note that the uncertainty in the stock status has increased through the passage of time and SSB may have declined since the last stock assessment. The advice on PBF stock status from ISC11 is:

> **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

The BILLWG Chair presented the ISC12 conservation information for Western and Central North Pacific striped marlin (MLS) prepared by the BILLWG to the Plenary (*ISC/12/ANNEX/05 and ISC/12/ANNEX/07*). This was:

> *Reducing fishing mortality would likely increase spawning stock biomass and would improve the chances of higher recruitment. If one uses the median to measure the central tendency of the distributions of projected spawning biomass (Annex 1), then the projection results suggest that fishing at F_{MSY} would lead to spawning biomass increases of roughly 45% to 72% from 2012 to 2017. Fishing at a constant catch of 2,500 mt would*

[2] Mangel, M., Brodziak, J., and DiNardo, G. 2010. Reproductive ecology and scientific inference of steepness: a fundamental metric of population dynamics and strategic fisheries management. Fish and Fisheries 11:89-104.

lead to potential increases in spawning biomass of 133% to 223% by 2017. In comparison, fishing at the current fishing mortality rate would lead to spawning biomass increases of 14% to 29% by 2017, while fishing at the average 2001-2003 fishing mortality rate would lead to a spawning biomass decrease of 2% under recent recruitment to an increase of 6% under the stock-recruitment curve assumption by 2017 (see ISC/12/ANNEX/07 Appendix 1).

Discussion

The ISC Chair thanked the BILLWG Chair for his presentation and the BILLWG for their hard work.

The reliability of the Japanese longline CPUE index was discussed, given that MLS is not a target in the fishery. The WG Chair explained the methods used to stratify data for use in developing the index in order to address this issue. It was agreed that fishery-independent data would improve indices.

Stock Status and Conservation Advice

Given the new information, Plenary concluded the following regarding stock status and conservation advice:

Stock Status

The WCNPO stock of MLS is overfished and experiencing overfishing (Figure 7-3**). Reducing fishing mortality would likely increase spawning stock biomass and may improve the chances of higher recruitment.**

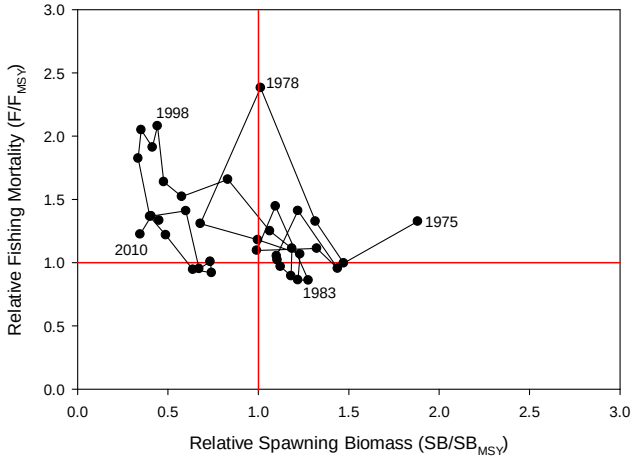

Figure 7-3. Kobe plot of the trends in estimates of relative fishing mortality and relative spawning biomass of Western and Central North Pacific striped marlin (*Kajikia audax*) during 1975-2010.

Conservation Advice

The ISC provides the following scientific information as conservation advice:

- **Fishing at F_{MSY} would lead to spawning biomass increases of roughly 45% to 72% from 2012 to 2017.**
- **Fishing at a constant catch of 2,500 mt would lead to potential increases in spawning biomass of 133% to 223% by 2017.**
- **Fishing at a constant catch of 3,600 mt would lead to potential increases in spawning biomass of 48% and 120% by 2017.**

In comparison

- **Fishing at the current fishing mortality rate would lead to spawning biomass increases of 14% to 29% by 2017,**
- **Fishing at the average 2001-2003 fishing mortality rate would lead to a spawning biomass decrease of 2% under recent recruitment to an increase of 6% under the stock-recruitment curve assumption by 2017.**

The median may be used as the measure of central tendency of the distributions of projected spawning biomass. Using the median, and based on the projection results that commence in 2010, examples of different F levels representing potential reference points are shown in Table 7-1.

Table 7-1. Percentiles of projected relative spawning stock biomass (SB_{2017}/SB_{2012}) in 2017.

	Recent Recruitment					Stock-Recruitment Curve				
Harvest Scenario	5th	25th	50th	75th	95th	5th	25th	50th	75th	95th
(1) F = $F_{current}$	0.85	1.03	1.14	1.23	1.36	0.83	1.09	1.29	1.51	1.82
(2) F = F_{MSY}	1.12	1.32	1.45	1.55	1.69	1.14	1.47	1.72	1.98	2.34
(3) F = $F_{2001\text{-}2003}$	0.72	0.87	0.98	1.06	1.18	0.66	0.88	1.06	1.25	1.52
(4) F = F20%	1.26	1.48	1.62	1.72	1.88	1.32	1.68	1.95	2.24	2.62
(5) F = F30%	1.90	2.18	2.35	2.48	2.68	2.08	2.56	2.91	3.28	3.79
(6) F = 0	4.93	5.49	5.82	6.06	6.47	5.43	6.33	7.07	7.81	8.72
(7) Catch = 2500 mt	1.41	1.97	2.33	2.67	3.1	1.63	2.49	3.23	4.03	5.28
(8) Catch = 3600 mt	0.98	1.18	1.48	1.80	2.25	1.05	1.51	2.20	3.01	4.37

Tables A1 and A2 in the *Executive Summary of the Western and Central North Pacific Striped Marlin Stock Assessment* (see Annex 1 of Appendix 1 in *ISC/12/ANNEX/07*) provide the information in response to WCPFC's request for the ISC to provide catch levels corresponding to various potential F reference points (WCPFC7 report, paragraph 114.ix.b) .

The Plenary notes that the choice of F or catch levels should be left to the discretion of fishery managers, given the ISC's science role. The purpose of the information provided here is to support informed decision making by managers.

7.4 Swordfish

The BILLWG Chair noted that there was no new assessment information for the North Pacific swordfish stock. In addition, following the March 2011 tsunami, catches of swordfish by Japanese longline vessels had declined and that the condition of both swordfish stocks was unlikely to have changed given the relatively high biomasses indicated in the 2009 stock assessment. The BILLWG Chair presented the ISC12 conservation information for Western and Central North Pacific swordfish to the Plenary and recommended that the conservation information from ISC11 be maintained.

Discussion

The ISC Chair thanked the BILLWG Chair for his report and the BILLWG for their hard work.

Plenary agreed with the BILLWG recommendation concerning conservation advice for the North Pacific swordfish stock.

Conservation Advice

Noting that the catch by Japan has decreased and there is no new stock assessement information, ISC12 agreed to maintain the advice from ISC11, namely:

> **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 Ocean – Yellowfin, Bigeye, and Skipjack Tunas

M. Dreyfus summarized the status of yellowfin , bigeye and skipjack tuna stocks in the Eastern Pacific Ocean (EPO) (*ISC/12/PLENARY/INFO/08-10*). The EPO fishery for YFT, SKJ and BET is dominated by the purse seine fleets, which have achieved a maximum fleet capacity in recent times. In contrast, longline fishery effort (measured in number of hooks) has been decreasing from a record level in 2002. The most important species components of catch in the EPO by weight are YFT and SKJ. For YFT, sets associated with dolphins produce the highest catch. For BET, since 1994 fish aggregation device (FAD) sets have replaced longline as the main fishing method in terms of catch. For SKJ both floating objects and unassociated sets in the purse seine fishery account for the majority of the catch.

Catches of YFT in 2011 amounted to 202,000 t, equal in value to the mean catch in the EPO for the period 2006-2010. At the same time, SKJ catches increased 20% from the average 2006-2010 catch of 236,000 t and BET decreased 20% compared to the catches in the same period of time previously. The total number of purse seine sets is close to 25,000 for 2011.

IATTC recruitment estimates show that YFT had a period of high recruitment from 1984 to 2002. Recruitment might now be at the average of levels seen since 1975 but it is too early to confirm that. Spawning stock biomass (SSB) is around the level necessary to obtain MSY and fishing mortality is below F_{MSY}. Fishing mortality by each of the three types of purse seine sets has an almost equally important impact on the resource. Future projections given current F show an increase in SSB.

For BET, recent recruitment estimates are above average, SSB is above SSB_{MSY} but fishing mortality is also above F_{MSY}. Using current F, forward projections show a decrease in SSB levels but attenuated by the recent above average recruitment. The highest impact to the resource is by far produced by the floating object fishery.

The SKJ assessment is based on relative reference points and until now there is no concern for this stock.

Discussion

The ISC Chairman thanked M. Dreyfus for the presentation.

8.2 Western and Central Pacific Ocean – Bigeye, Yellowfin, Skipjack, and South Pacific Albacore Tunas

A. Beeching (WCPFC Secretariat) presented the current stock status for BET, YFT, SKJ in the WCPO and South Pacific albacore (*ISC/12/PLENARY/INFO/03-06*). The latter three tuna species are not thought to be in an overfished state nor are they experiencing overfishing. BET is considered to be experiencing overfishing and approaching an overfished state. A recent peer review of the BET 2011 stock assessment is timely and will be presented to the Eighth Scientific Committee meeting (SC8). The presentation was concluded with an outline of the 2012 stock assessments which will also be presented at SC8.

Discussion

Plenary discussed the peer review of the BET stock assessment. It was noted that the review panel met with relevant assessment scientists in April at SPC to conduct the review with three objectives in mind, evaluating the appropriateness of the models used, the assumptions behind the models, and the outputs. In response to the review the SPC is also investigating the effect of using tagging data in the assessment and will report on this at SC8. Going forward, the WCPFC is likely to conduct future peer reviews. It was noted that the final report of the review can be found on the WCPFC website.

9 REVIEW OF STATISTICS AND DATA BASE ISSUES

9.1 Report of the STATWG

R.-F. Wu, Chairman of the STATWG, presented the summary of the activities of the WG since ISC11 (*ISC/12/ANNEX/10*). The STATWG Steering Committee was established at ISC11, and conducted its first intercessional meeting in Chinese Taipei, in 31 August-1 September 2011. The second STATWG Steering Committee meeting was in Shimizu, Japan, in 29-30 May 2012; and a meeting of the entire STATWG was held in Sapporo, Japan, in 11-12 July 2012, prior to ISC12.

Accomplishments of the STATWG over the past year include:

1. Continuing with the successful exchange of data inventories with the WCPFC that was initiated in 2010.
2. Securing 2 terabytes of storage space for archiving species working group stock assessment files.
3. Development of graphs of ISC annual catch data (public domain) by Member country for major species of interest, updated annually on the ISC website.
4. Substantial improvements and updates to the ISC website, and new profiles for billfish and sharks developed on a test site, to be published in 2012. Additional details were provided by the Webmaster in her presentation (see Section 11.5).
5. Progress has also been made with metadata formats, the online data submission system, and standardizing database codes.

Performance of Member countries was discussed in the following areas:

1. Updates on Member data collection systems
2. Comparison of catch tables from the ISC database, National Reports, and Working Groups
3. Submission of 2011 data and ISC report cards

The 2012 work plan for the STATWG was presented, as well as recommendations to the 2012 Plenary. The national contacts list for the STATWG was also presented (*ISC/12/ANNEX/10*). The STATWG Steering Committee will schedule their next meeting in Chinese Taipei, in September 2012, with a follow up meeting in April or May 2013.

9.2 Annual Catch Table Update

The Database Administrator reported on the discrepancies between the annual catch data (Category Ic) from the ISC database, the National Reports, and the Species Working Groups for the last 5 years for five ISC species of interest: albacore, Pacific bluefin tuna, swordfish, striped marlin, and blue sharks. The matching status for the three data sources was classified into five categories: A) all tables completely matched; B) database and WG tables matched; C) database and National Report tables matched; D) National Report and WG tables matched; E) no tables matched. The results of the comparison of catch tables were clearly different for each species. For albacore and Pacific bluefin tuna, complete matches between the data tables were common. There appears to be more data issues for billfish and sharks. For blue sharks, catch data was primarily provided to the Working Group, but data collection for this species has only recently started. It is expected that data reporting for sharks will improve in the near future.

Discussion

The ISC Chair thanked the Chair of the STATWG and the Database Administrator for their presentations and the members of the WG for their hard work.

The Plenary endorsed three recommendations:

1. The ISC Chair, under the Memorandum of Cooperation, will initiate discussion with the IATTC Director to facilitate an annual data inventory exchange.
2. Direct ISC Members to provide shark catch data at the lowest taxonomic level possible (i.e., species), but if shark species data are unavailable to provide combined catch data, and to provide associated discard data in Category I and II.
3. In order to correct inconsistencies and errors in the ISC database, direct Members to provide their entire historical time series of Category I, II, and III data online for ISC species of interest by 1 July 2013.

Plenary noted that the data submission report card indicated continued improvement in the quality of submitted data. Some discrepancies between ISC database records and National Reports were noted, however. Submission of historical data by Members will help resolve such discrepancies.

It was noted that the STATWG Chair should follow up with the WCPFC data manager to validate reported catches of ALB by China and Vanuatu (non-Member).

10 REVIEW OF MEETING SCHEDULE

10.1 Time and Place of ISC13

The ISC Chair announced that ISC13 will be convened in the Republic of Korea and provisional dates are 17-22 July 2013. The ISC Chair thanked the Republic of Korea for their invitation and noted that prior to the Plenary Meeting the ISC WGs will likely convene administrative meetings.

10.2 Working Group Intercessional Meetings

The Plenary discussed schedules for WG intercessional meetings and agreed on the tentative scheduled presented in Table 10-1. It was noted that conflicts in dates may still exist, and that WG Chairs will resolve these issues.

Table 10-1. Tentative schedule of ISC meetings for 2012-2014.

Date	Meeting	Contact
2012		
10-12 Sep	STATWG Steering Committee - Taipei, TW (ISC Data Enterprise System)	R.-F. Wu/G.DiNardo fan@ofdc.org.tw
9-16 Nov	PBFWG - Honolulu, HI (Assessment)	Y. Takeuchi Yukiot@fra.affrc.go.jp
17-21 Dec	Plenary Meeting (Emergency)	G. DiNardo Gerard.DiNardo@noaa.gov
2013		
Jan	SHARKWG - USA (Blue shark data preparation)	S. Kohin Suzanne.Kohin@noaa.gov
22-29 Jan	BILLWG - Honolulu, HI (Blue marlin data preparation)	J. Brodziak Jon.Brodziak@noaa.gov
19-25 Mar	ALBWG (Workshop)	J. Holmes John.Holmes@dfo-mpo.gc.ca
Apr	SHARKWG - Shimizu, Japan (Blue shark assessment)	S. Kohin Suzanne.Kohin@noaa.gov
21-29 May	BILLWG - Japan (Blue marlin assessment)	J. Brodziak Jon.Brodziak@noaa.gov
10-11 Jul	STATWG (Workshop)	R.-F. Wu fan@ofdc.org.tw
12 Jul	SHARKWG	S. Kohin Suzanne.Kohin@noaa.gov
13-14 Jul	ALBWG	J. Holmes John.Holmes@dfo-mpo.gc.ca
15-16 Jul	BILLWG	J. Brodziak Jon.Brodziak.noaa.gov
15-16 Jul	PBFWG	Y. Takeuchi Yukiot@fra.affrc.go.jp
17-22 Jul	ISC13 - Republic of Korea (Plenary)	G. DiNardo Gerard.DiNardo@noaa.gov
Oct	ALBWG (Data preparation)	J. Holmes John.Holmes@dfo-mpo.gc.ca
Nov	ALBWG/PBFWG (Tuna Age and Growth Workshop)	J. Holmes/Y. Takeuchi John.Holmes@dfo-mpo.gc.ca/Yukiot@fra.affrc.go.jp
Nov	PBFWG (Data preparation)	Y. Takeuchi Yukiot@fra.affrc.go.jp
Nov	SHARKWG (Shortfin mako shark data preparation)	S. Kohin Suzanne.Kohin@noaa.gov
Dec	BILLWG (Swordfish data preparation)	J. Brodziak Jon.Brodziak.noaa.gov
2014		
14-28 Apr	ALBWG - La Jolla, CA (Assessment)	J. Holmes John.Holmes@dfo-mpo.gc.ca
16-21 Jul	ISC14 (Plenary)	G. DiNardo Gerard.DiNardo@noaa.gov

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

Concern was expressed regarding the number of working group meetings held each year. The ISC Chair urged WG Chairs to keep this in mind when scheduling meetings and to make sure time is used efficiently. It was suggested that WGs explore the use of webinar technology and similar meeting tools as alternatives to face-to-face meetings.

11 ADMINISTRATIVE MATTERS

11.1 Peer review of Function and Process

The ISC Rules and Procedures stipulate that every five years the function of the ISC committee and subsidiary bodies would be reviewed by three recognized peers. To meet this requirement, ISC11 developed a Terms of Reference for the peer review and Korea, Japan and the USA each agreed to sponsor a reviewer. Since then, reviewers were selected and the peer review team was formed. Dr. Jerry Ault was selected as the peer review team Chair. Other reviewers include C. Zhang and H. Matsuda. To date, reviewers have attended at least one WG meeting each and all attended ISC12. One reviewer will attend NC8 in September 2012. Dr. Ault presented the progress of the peer review team to date. The peer-review team noted that ISC is an especially unique science organization due to its science-driven mission and because it is operationally independent from the RFMOs it serves. ISC has built a special role that covers the gaps and helps to plan the necessary future science with a vision to support next-generation stock assessments. The peer review team also noted that their recommendations would focus on improvements to the ISC operational guidelines, managing data information systems, working group and stock assessment report format, clarification of assessment assumptions, outreach, research science, science administration and funding mechanisms of ISC. The peer review of ISC's function is expected to be completed by the end of 2012 and recommendations considered at ISC13.

Discussion

Plenary and the ISC Chair thanked the peer review team for their presentation and hard work. The ISC Chair thanked Japan, Republic of Korea and the US for each sponsoring a peer review team member.

Plenary discussed a change in the scope of ISC functions as suggested in the peer review team's progress report and agreed that priorities would have to be set. Plenary also agreed that the peer review report outlined an expansive vision for ISC. To realize this transformation ISC will have to proceed incrementally. The Plenary noted that a suggested prioritization of improvements to ISC functions would be useful in the peer review report. Plenary agreed that a draft budget would also be useful for ISC13 when it discusses the recommendation and full peer review report in July 2013.

11.2 Best practices on Science Reporting

The ISC Chair noted that this was the topic of the seminar at ISC11 and ISC11 agreed that the seminar recommendations for best practices should be incorporated into the Operations Manual for review and adoption by ISC12. These recommendations were incorporated into the draft Operations Manual and reviewed by ISC12 (see Section 11.6). These procedures will provide a

consistent structure for WG products and stock assessments. They should also help address some of the criticisms leveled by the CIE review panel that reviewed the North Pacific albacore assessment. Adopting these procedures will enhance the transparency of the ISC and is consistent with the direction in which RFMOs are moving with respect to the Kobe process. Finally, it supports improvements in ISC function that the peer review team has identified.

11.3 Working Group Chairperson Elections and Terms

The ISC Chair congratulated J. Holmes on being re-elected for his second term as the ALBWG Chair. The ISC Chair also reviewed the terms of the ALBWG, BILLWG, PBFWG, SHARKWG, and STATWG chairs, as well as the terms of the ISC Chair and Vice Chair. It was noted that the ISC Chair will be up for reelection for his second term and the PBFWG Chair will be ending his second term at ISC13.

11.4 Organizational Chart and Contact Persons

The ISC Organization Chart was considered and updated (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.

It was noted that Korea will be making additional changes to the Organizational Chart regarding their representatives in the WGs and will send those changes to the Secretariat. The ISC Chair encouraged the PBFWG and SHARKWG Chairs to consider identifying a data manager for their respective WGs.

ISC Organizational Chart (July 2012)

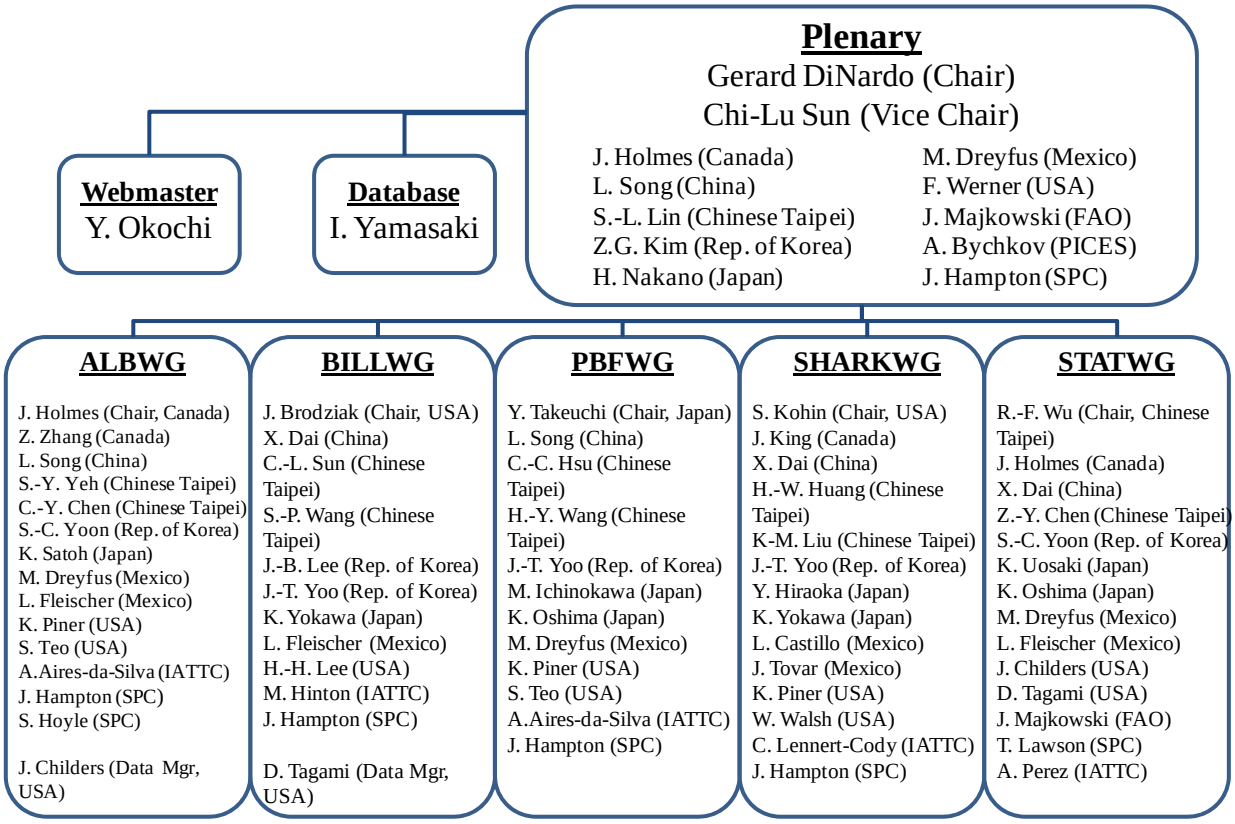

Figure 11-1. ISC Organizational Chart (July 2012).

11.5 Website

Y. Okochi, ISC Webmaster, reported on website improvements. Since ISC11 the following improvements have been implemented:

- Meeting schedules, and Working Group documents and papers are updated regularly to the website.
- The structure of the pages “Fisheries Statistics,” “Organization Chart,” and “Recommendation” has been updated and improved based on the ISC11 Plenary Report and discussion with Members.
- Test pages for species Working Group pages have been developed with substantial assistance from the WG Chairs and members. These pages will be publicly available on the website soon after the ISC12 Plenary meeting.
- The functioning of the side calendar has been improved.

In addition, the architecture of the website has been optimized, allowing for enhanced user access to ISC information and documents.

Discussion

The ISC Chair and Members thanked the Webmaster for her excellent work on website improvements. Plenary made two recommendations: (1) Replace the "@" symbol in email addresses listed on the website with the text "AT" to prevent unwanted automatic harvesting of addresses; (2) Add a new page summarizing the schedule of future stock assessments.

Concern was raised about certain geographic place names used on maps on the website. The ISC Chair will investigate the matter and report back to the Members.

11.6 Update of Operations Manual

ISC has been working to update its Operations Manual (*ISC/12/Plenary/05*) in order to clarify roles and tighten procedures. Changes over the past few years have included the addition of the Database Administrator and Webmaster position descriptions, style guidelines for Working Group reports, and the IATTC-ISC Memorandum of Cooperation. ISC11 proposed two areas of changes: (1) change the data reporting protocol to include discards (this was done) and (2) incorporate suggestions proposed by the seminar on best available scientific information (BASI), especially those related to best practices for management advice. Major changes incorporated into the Operations Manual include: Purpose and goals of stock assessments, guidelines for developing BASI, format for species stock assessment reports that are separate from WG reports, addition of executive summaries of stock assessments, and working paper style guidelines. The goals are to provide clear scientific information that managers can use and to document the scientific processes that ISC working groups use in developing assessments. Many of these changes reflect processes being adopted by the other tuna RFMOs. These changes also address concerns about the transparency and documentation of ISC assessment work and reflect general scientific reporting standards. Members were asked to consider these changes and consider adopting the revised Operations Manual (July 2012).

Discussion

The ISC Chair stressed the importance of adopting the updated Operations Manual this year so that ISC products remain scientifically creditable. The proposed changes address many of the concerns identified during the external review of the North Pacific albacore stock assessment and preliminary results of the ISC Function Review

After confirming that the proposed BASI guidelines in the Operations Manual are recommended guidance for scientists in developing assessment reports and working papers, Plenary generally endorsed the updates, but asked for more time for Members to review the changes. It was agreed that the changes would be finalized at the 17-21 December 2012 intercessional Plenary meeting. Plenary also recommended the inclusion of additional discussion about the advisory nature of the section on the incorporation of BASI into stock assessment reports, because it may not be possible to include all of the recommended components in every report. The Office of the Chair will circulate revisions to address this concern by 30 August 2012. Members will provide comments by 15 October 2012.

11.7 Peer review of assessments

Independent peer reviews of research, including stock assessments, bolster an organization's credibility. The ISC Chair discussed the need to develop a regular stock assessment peer review process that is both efficient and cost effective. The approach used for the North Pacific albacore stock assessment (a "desktop" review) does not allow review of the data underlying the assessment. Addressing data issues in a peer review process will be important. The ISC Chair will continue to work on developing terms of reference for future peer reviews. Members were encouraged to provide examples of effective processes used by other organizations.

11.8 Other Administrative Matters

11.8.1 Tuna Age and Growth Workshop

Plenary heard a presentation from O. Abe, NRIFSF, describing a proposal for ISC to sponsor a technical workshop, *Age and Growth Estimation of Pacific Bluefin and North Pacific Albacore*. Population size estimates are highly sensitive to the growth curve function parameters employed and existing uncertainty in the current growth curves should be addressed. In particular, the difficulty of accurately and consistently reading annual/daily rings requires validation and cross-checking of results. A workshop and manual are recommended to tackle these issues. The workshop would be an opportunity to share information about aging techniques among specialists and to standardize aging methods in order to establish more reliable growth curves of both species. A manual will document methods for use by other scientists.

The Workshop will be a joint collaboration between the ALBWG and PBFWG.

The Plenary endorsed the proposal as well as the tentative November-December 2013 time frame for the workshop.

11.8.2 International Billfish Symposium

C-L. Sun reported on plans for Chinese Taipei to host the next International Billfish Symposium, 6-10 May 2013. It was agreed that the ISC should play a sponsorship role in this meeting, given the organization's competence in the assessment of Pacific billfish stocks. Members were also encouraged to investigate whether their governments could participate as sponsors and participate in the Symposium as well.

11.8.3 Membership

The need for formal documentation of ISC membership by Members was raised. The ISC Chair was tasked with searching the archives for documentary evidence of membership beyond the original agreement between Japan and the United States. If documentation cannot be found it may be necessary to formalize membership by developing a signed agreement among member countries. It was pointed out that most Members are signatories to the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention) and that the ISC is the established scientific provider to the WCPFC NC. Whether this agreement implies membership to ISC will also be explored.

12 ADOPTION OF REPORT

A draft Report of the Twelfth 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 ISC12 Plenary, subject to editorial corrections to be made by the ISC Chair.

13 CLOSE OF MEETING

G. DiNardo thanked the National Research Institute of Far Seas Fisheries for hosting the meeting, with special thanks to Hideki Nakano, Hidetada Kiyofuji, and Yumi Okochi who did an excellent job with meeting arrangements and logistics. He also expressed his appreciation to the Office of the Chair including Sarah Shoffler, Lyn Katahira, Lynne Nakamura, and Chi-Lu Sun for their outstanding support. He also thanked Kit Dahl for taking on the rapporteuring duties and producing a well-written report, as well as sponsors including the Fisheries Research Agency for hosting receptions. G. DiNardo closed the successful 12th meeting of the ISC at 11:20am on 23 July 2012.

14 CATCH TABLES

Table 14-1. [1]North albacore landings (in metric tons by fisheries, 1952-2011. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

Year	Japan							Korea		Chinese-Taipei		
											Longline	
	Purse Seine	Gill Net	Set Net	Pole and Line	Troll	Longline	Other	Gill Net	Longline	Gill Net [2]	Distant Water	Offshore
1952	154		55	41,787	--	26,687	182					
1953	38		88	32,921	--	27,777	44					
1954	23		6	28,069	--	20,958	32					
1955	8		28	24,236	--	16,277	108					
1956			23	42,810	--	14,341	34					
1957	83		13	49,500	--	21,053	138					
1958	8		38	22,175	--	18,432	86					
1959			48	14,252	--	15,802	19					
1960			23	25,156	--	17,369	53					
1961	7		111	18,639	--	17,437	157					
1962	53		20	8,729	--	15,764	171					
1963	59		4	26,420	--	13,464	214					
1964	128		50	23,858	--	15,458	269					
1965	11		70	41,491	--	13,701	51					
1966	111		64	22,830	--	25,050	521					
1967	89		43	30,481	--	28,869	477				330	
1968	267		58	16,597	--	23,961	1,051				216	
1969	521		34	31,912	--	18,006	925				65	
1970	317		19	24,263	--	16,222	498				34	
1971	902		5	52,957	--	11,473	354		0		20	
1972	277	1	6	60,569	--	13,022	638		0		187	
1973	1,353	39	44	68,767	--	16,760	486		3		--	
1974	161	224	13	73,564	--	13,384	891		114		486	
1975	159	166	13	52,152	--	10,303	230		9,575		1,240	
1976	1,109	1,070	15	85,336	--	15,812	270		2,576		686	
1977	669	688	5	31,934	--	15,681	365		459		572	
1978	1,115	4,029	21	59,877	--	13,007	2,073		1,006		6	
1979	125	2,856	16	44,662	--	14,186	1,139	0			81	
1980	329	2,986	10	46,742	--	14,681	1,177	6	402	--	249	
1981	252	10,348	8	27,426	--	17,878	699	16		--	143	
1982	561	12,511	11	29,614	--	16,714	482	113	5,462	--	38	
1983	350	6,852	22	21,098	--	15,094	99	233	911	--	8	
1984	3,380	8,988	24	26,013	--	15,053	494	516	2,490	--	--	
1985	1,533	11,204	68	20,714	--	14,249	339	576	1,188	--	--	
1986	1,542	7,813	15	16,096	--	12,899	640	726	923	--	--	
1987	1,205	6,698	16	19,082	--	14,668	173	817	607	2,514	--	
1988	1,208	9,074	7	6,216	--	14,688	170	1,016	175	7,389	--	
1989	2,521	7,437	33	8,629	--	13,031	433	1,023	27	8,350	40	
1990	1,995	6,064	5	8,532	--	15,785	248	1,016	1	16,701	4	
1991	2,652	3,401	4	7,103	--	17,039	395	852	0	3,398	12	
1992	4,104	2,721	12	13,888	--	19,042	1,522	271	1	7,866	--	
1993	2,889	287	3	12,797	--	29,933	897		21		5	
1994	2,026	263	11	26,389	--	29,565	823		54		83	
1995	1,177	282	28	20,981	856	29,050	78		14		4,280	
1996	581	116	43	20,272	815	32,440	127		158		7,596	
1997	1,068	359	40	32,238	1,585	38,899	135		404		9,119	337
1998	1,554	206	41	22,926	1190	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	482
2006	364	221	55	15,400	460	21,027	42		138		3,848	469
2007	5,682	226	30	37,768	519	22,336	44		56		2,465	451
2008	825	1,531	101	19,060	549	19,092	15		365		2,490	579
2009	2,076	149	33	31,172	410	21,995	43		365		1,866	512
2010	330	24	42	19,561	588	21,167	37		109		2,281	(537)
2011	(330)	(24)	(42)	(28,610)	(588)	(21,882)	(37)		(87)	(3)	(2,972)	(462)

1 Data are from the ISC Albacore Working Group,July 14, 2012 except as noted.

2 Chinese-Taipei gill net catches for 2011 include 2 t from Offshore Other gear category.

Table 14-1. (continued)

Year	United States [3]								Mexico		Canada	Grand Total
	Purse Seine	Gill Net	Pole and Line	Albacore Troll [4]	Tropical Troll & Handline	Sport	Longline	Other [5]	Purse Seine	Pole and Line [6]	Troll	
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	62,469
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		2,718	15	24	177	4	2	0	302	53,693
1991	0	17		1,845	72	6	312	71	2	0	139	37,320
1992	0	0		4,572	54	2	334	72	10	0	363	54,833
1993		0		6,254	71	25	438		11	0	494	54,125
1994		38		10,978	90	106	544	213	6	0	1,998	73,187
1995		52		8,125	177	102	882	1	5	0	1,761	67,852
1996	11	83		16,962	188	88	1185		21	0	3,321	84,008
1997	2	60		14,325	133	1,018	1653	1	53	0	2,166	103,594
1998	33	80		14,489	88	1,208	1120	2	8	0	4,177	92,017
1999	48	149		10,120	331	3,621	1542	1	0	57	2,734	119,008
2000	4	55		9,714	120	1,798	940	3	70	33	4,531	81,012
2001	51	94		11,349	194	1,635	1295		5	18	5,248	88,488
2002	4	30		10,768	235	2,357	525		28	0	5,379	104,058
2003	44	16		14,161	85	2,214	524		28	0	6,861	90,095
2004	1	12		13,473	157	1,506	361		104	0	7,857	86,251
2005		20		8,479	175	1,719	296		0	0	4,888	59,023
2006		3		12,547	95	385	270		109	0	6,008	61,441
2007	77	4		11,908	98	461	250		40	0	6,667	89,082
2008	--	1		11,761	29	418	353	0	10		5,476	62,655
2009	39	4		12,938	100	677	201	0	17		5,690	78,287
2010	--	5		12,634	55	704	405	19	25		6,552	65,075
2011	(41)	(8)		(11,172)	(88)	(424)	(687)	(37)	(0)		(5,393)	(72,887)

3 USA estimates updated July 2012.

4 Albacore Troll estimates include catches caught with Pole-and-Line gear.

5 Other includes catches by Purse Seine.

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

Table 14-2. Annual landings of Pacific bluefin tuna (*Thunnus orientalis*) in metric tons for fisheries monitored by ISC for assessments of North Pacific Ocean stocks, 1952-2011. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

Year	Japan[1]								Korea[3]	
	Purse Seine		Longline		Troll[2]	Pole and Line	Set Net	Others	Purse Seine	Trawl
	Tuna PS	Small PS	Distant & Offshore	Coastal						
1952	7,680		2,694		667	2,198	2,145	1,700		
1953	5,570		3,040		1,472	3,052	2,335	160		
1954	5,366		3,088		1,656	3,044	5,579	266		
1955	14,016		2,951		1,507	2,841	3,256	1,151		
1956	20,979		2,672		1,763	4,060	4,170	385		
1957	18,147		1,685		2,392	1,795	2,822	414		
1958	8,586		818		1,497	2,337	1,187	215		
1959	9,996		3,136		736	586	1,575	167		
1960	10,541		5,910		1,885	600	2,032	369		
1961	9,124		6,364		3,193	662	2,710	599		
1962	10,657		5,769		1,683	747	2,545	293		
1963	9,786		6,077		2,542	1,256	2,797	294		
1964	8,973		3,140		2,784	1,037	1,475	1,884		
1965	11,496		2,569		1,963	831	2,121	1,106		
1966	10,082		1,370		1,614	613	1,261	129		
1967	6,462		878		3,273	1,210	2,603	302		
1968	9,268		500		1,568	983	3,058	217		
1969	3,236		313	565	2,219	721	2,187	195		
1970	2,907		181	426	1,198	723	1,779	224		
1971	3,721		280	417	1,492	938	1,555	317		
1972	4,212		107	405	842	944	1,107	197		
1973	2,266		110	728	2,108	526	2,351	636		
1974	4,106		108	1,069	1,656	1,192	6,019	754		
1975	4,491		215	846	1,031	1,401	2,433	808		
1976	2,148		87	233	830	1,082	2,996	1,237		
1977	5,110		155	183	2,166	2,256	2,257	1,052		
1978	10,427		444	204	4,517	1,154	2,546	2,276		
1979	13,881		220	509	2,655	1,250	4,558	2,429		
1980	11,327		140	671	1,531	1,392	2,521	1,953		
1981	25,422		313	277	1,777	754	2,129	2,653		
1982	19,234		206	512	864	1,777	1,667	1,709	31	
1983	14,774		87	130	2,028	356	972	1,117	13	
1984	4,433		57	85	1,874	587	2,234	868	4	
1985	4,154		38	67	1,850	1,817	2,562	1,175	1	
1986	7,412		30	72	1,467	1,086	2,914	719	344	
1987	8,653		30	181	880	1,565	2,198	445	89	
1988	3,583	22	51	106	1,124	907	843	498	32	
1989	6,077	113	37	172	903	754	748	283	71	
1990	2,834	155	42	267	1,250	536	716	455	132	
1991	4,336	5,472	48	170	2,069	286	1,485	650	265	
1992	4,255	2,907	85	428	915	166	1,208	1,081	288	
1993	5,156	1,444	145	667	546	129	848	365	40	
1994	7,345	786	238	968	4,111	162	1,158	398	50	
1995	5,334	13,575	107	571	4,778	270	1,859	586	821	
1996	5,540	2,104	123	778	3,640	94	1,149	570	102	
1997	6,137	7,015	142	1,158	2,740	34	803	811	1,054	
1998	2,715	2,676	169	1,086	2,865	85	874	700	188	
1999	11,619	4,554	127	1,030	3,387	35	1,097	709	256	
2000	8,193	8,293	121	832	5,121	102	1,125	689	2,401	0
2001	3,139	4,481	63	728	3,329	180	1,366	782	1,176	10
2002	3,922	4,981	47	794	2,427	99	1,100	631	932	1
2003	956	4,812	85	1,152	1,839	44	839	446	2,601	0
2004	4,934	3,323	231	1,616	2,182	132	896	514	773	0
2005	4,034	8,783	107	1,818	3,406	549	2,182	548	1,318	
2006	3,644	5,236	63	1,058	1,544	108	1,421	777	1,012	
2007	2,965	3,875	83	2,004	2,385	236	1,503	1,209	1,281	
2008	3,029	7,192	19	1,476	2,074	64	2,358	1,192	1,866	
2009	2,127	5,950	8	1,304	1,875	50	2,236	913	936	
2010	1,122	2,620	4	904	1,301	83	1,603	918	1,196	
2011	2,194	6,137	-[5]	(727)	1,688	63	1,957	572	670	

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 The catch for Japanese coastal longline in 2011 includes that for the distant water and offshore lonliners.
6 Revision of annual catch was made for Mexican PS in 2006 due to observer information that was not considered before.

Table 14-2. (continued)

Year	Taiwan				United States[4]			Mexico		Grand Total
	Longline	Purse Seine	Distant Driftnet	Others	Purse Seine	Others	Sport	Purse Seine	Others	
1952					2,076		2			21,115
1953					4,433		48			22,062
1954					9,537		11			30,501
1955					6,173		93			33,943
1956					5,727		388			42,100
1957					9,215		73			38,499
1958					13,934		10			30,543
1959					3,506	56	13	171	32	21,933
1960					4,547	0	1			27,846
1961					7,989	16	23	130		32,771
1962					10,769	0	25	294		34,745
1963					11,832	28	7	412		36,995
1964					9,047	39	7	131		30,480
1965	54				6,523	77	1	289		28,994
1966					15,450	12	20	435		32,953
1967	53				5,517	0	32	371		22,668
1968	33				5,773	8	12	195		23,584
1969	23				6,657	9	15	260		18,368
1970					3,873	0	19	92		13,391
1971	1				7,804	0	8	555		19,060
1972	14				11,656	45	15	1,646		23,161
1973	33				9,639	21	54	1,084		21,529
1974	47			15	5,243	30	58	344		22,616
1975	61			5	7,353	84	34	2,145		22,883
1976	17			2	8,652	25	21	1,968		21,274
1977	131			2	3,259	13	19	2,186		20,766
1978	66			2	4,663	6	5	545		28,834
1979	58				5,889	6	11	213		33,659
1980	114			5	2,327	24	7	582		24,573
1981	179				867	14	9	218		36,593
1982	207		2		2,639	2	11	506		31,349
1983	175	9	2		629	11	33	214		22,532
1984	477	5		8	673	29	49	166		13,534
1985	210	80	11		3,320	28	89	676		18,064
1986	70	16	13		4,851	57	12	189		21,239
1987	365	21	14		861	20	34	119		17,461
1988	108	197	37	25	923	50	6	447	1	10,947
1989	205	259	51	3	1,046	21	112	57		12,900
1990	189	149	299	16	1,380	92	65	50		10,616
1991	342		107	12	410	6	92	9		17,750
1992	464	73	3	5	1,928	61	110	0		15,970
1993	471	1		3	580	103	298			12,788
1994	559				906	59	89	63	2	18,887
1995	335			2	657	49	258	11		31,209
1996	956				4,639	70	40	3,700		25,502
1997	1,814				2,240	133	156	367		26,602
1998	1,910				1,771	281	413	1	0	17,731
1999	3,089				184	184	441	2,369	35	31,114
2000	2,780			2	693	61	342	3,019	99	35,872
2001	1,839			4	292	48	356	863		20,657
2002	1,523			4	50	12	654	1,708	2	20,891
2003	1,863			21	22	18	394	3,211	43	20,350
2004	1,714			3		11	49	8,880	14	27,275
2005	1,368			2	201	7	79	4,542		30,950
2006	1,149			1		2	96	9,928 [6]		18,117
2007	1,401			10	42	2	14	4,147		(23,163)
2008	979			2		1	93	4,392	15	(26,760)
2009	877			11	410	5	176	3,019		(21,906)
2010	373			36		(0)	(122)	7,745		(20,037)
2011	(292)			(24)	(99)	(18)	(456)	(2,730)		(19,638)

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 The catch for Japanese coastal longline in 2011 includes that for the distant water and offshore lonliners.
6 Revision of annual catch was made for Mexican PS in 2006 due to observer information that was not considered before.

Table 14-3. Annual landings of Swordfish (*Xiphias gladius*) 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. Provisional estimates in ().

Year	Japan[1]							Mexico	United States[6]				
									Hawaii	California			
	Longline		Squid Driftnet & Driftnet	Harpoon[3]	Bait Fishing	Trapnet	Other[4]	All Gears	Longline	Longline	Gill Net	Harpoon	Unknown[7]
	Distant & Offshore[2]	Coastal & 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	-	-	-	-	-	-
1960	20,058	51	1	1,191	23	67	7	-	-	-	-	-	-
1961	19,715	51	2	1,335	19	15	11	-	-	-	-	-	-
1962	10,607	78	0	1,371	26	15	18	-	-	-	-	-	-
1963	10,322	98	0	747	43	17	16	-	-	-	-	-	-
1964	7,669	91	4	1,006	40	16	26	-	-	-	-	-	-
1965	8,742	119	0	1,908	26	14	182	-	-	-	-	-	-
1966	9,866	113	0	1,728	41	11	4	-	-	-	-	-	-
1967	10,883	184	0	891	33	12	5	-	-	-	-	-	-
1968	9,810	236	0	1,539	41	14	9	-	-	-	-	-	-
1969	9,416	296	0	1,557	42	11	14	-	-	-	-	-	-
1970	7,324	427	0	1,748	36	9	3	-	5	-	-	612	10
1971	7,037	350	1	473	17	37	31	-	1	-	-	99	3
1972	6,796	531	55	282	20	1	2	2	0	-	-	171	4
1973	7,123	414	720	121	27	23	2	4	0	-	-	399	4
1974	5,983	654	1,304	190	27	16	2	6	0	-	-	406	22
1975	7,031	620	2,672	205	58	18	2	-	0	-	-	557	13
1976	8,054	750	3,488	313	170	14	12	-	0	-	-	42	13
1977	8,383	880	2,344	201	71	7	2	-	17	-	-	318	19
1978	8,001	1,031	2,475	130	110	22	1	-	9	-	-	1,699	13
1979	8,602	1,038	983	161	45	15	4	7	7	-	-	329	57
1980	6,005	849	1,746	398	29	15	1	380	5	-	160	566	62
1981	7,039	727	1,848	129	58	9	3	1,575	3	0	473	271	2
1982	6,064	874	1,257	195	58	7	1	1,365	5	0	945	156	10
1983	7,692	999	1,033	166	30	9	2	120	5	0	1,693	58	7
1984	7,177	1,177	1,053	117	98	13	0	47	3	12	2,647	104	75
1985	9,335	999	1,133	191	69	10	0	18	2	0	2,990	305	104
1986	8,721	1,037	1,264	123	47	9	0	422	2	0	2,069	291	109
1987	9,495	860	1,051	87	45	11	0	550	24	0	1,529	235	31
1988	8,574	678	1,234	173	19	8	0	613	24	0	1,376	198	64
1989	6,690	752	1,596	362	21	10	0	690	218	0	1,243	62	56
1990	5,833	690	1,074	128	13	4	0	2,650	2,436	0	1,131	64	43
1991	4,809	807	498	153	20	5	0	861	4,508	27	944	20	44
1992	7,234	1,181	887	381	16	6	0	1,160	5,700	62	1,356	75	47
1993	8,298	1,394	292	309	43	4	1	812	5,909	27	1,412	168	161
1994	7,366	1,357	421	308	37	4	0	581	3,176	631	792	157	24
1995	6,422	1,387	561	423	34	7	0	437	2,713	268	771	97	29
1996	6,916	1,067	428	597	45	4	0	439	2,502	346	761	81	15
1997	7,002	1,214	365	346	62	5	0	2,365	2,881	512	708	84	11
1998	6,233	1,190	471	476	68	2	0	3,603	3,263	418	931	48	19
1999	5,557	1,049	724	416	47	5	0	1,136	3,100	1,229	606	81	27
2000	6,180	1,121	808	497	49	5	0	2,216	2,949	1,885	646	90	9
2001	6,932	908	732	230	30	15	0	780	220	1,749	375	52	5
2002	6,230	965	1,164	201	29	11	0	465	204	1,320	302	90	3
2003	5,376	1,063	1,198	149	28	4	0	671	147	1,812	216	107	0
2004	5,395	1,509	1,062	229	30	4	0	270	213	898	169	62	37
2005	5,359	1,294	956	187	337	3	0	235	1,622		220	76	0
2006	6,181	1,507	796	244	342	5	1	347	1,211		444	71	2
2007	6,109	2,016	829	122	367	2	1	383	1,735		484	58	0
2008	(4,402)	(1,787)	(648)	(173)	(349)	(3)	(0)	84	1,980		280	33	1
2009	(4,400)	(1,602)	(682)	(239)	(249)	(3)	(0)	-	(1,813)		(172)	(34)	(1)
2010	(4,235)	(1,131)	(483)	(110)	(230)	(8)	(0)	-	(1,654)		(33)	(22)	(4)
2011	(3,182)	(785)	(200)	(0)	(200)	(0)	(0)	-	-	-	-	-	-

[1] Japan provide catch data update 2010 and 2011 data in July 2012 BILLWG meeting. These data are not inculded in 2012 BILWG April report.

[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] Contrains 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 includes pole and line, purse seine, troll and troll/handline, half ring, and unspecified gears.

only one vessel fished so combined with Hawaii longline

Table 14-3. (continued)

Year	Chinese Taipei[5]										Korea		Grand Total
	Longline			Gillnet		Coastal Harpoon	Coastal Setnet	Other			Longline	High-seas Drift Gillnet	
	Distant	Offshore	Coastal	Offshore	Coastal & Other Net			Offshore Others	Coastal Others	Other			
1951											-	-	13,629
1952	-	-									-	-	13,643
1953	-	-									-	-	14,361
1954	-	-									-	-	15,564
1955	-	-									-	-	16,066
1956	-	-									-	-	17,442
1957	-	-									-	-	17,208
1958	-	-									-	-	21,692
1959	-	427								91	-	-	20,744
1960	-	520								127	-	-	24,007
1961	-	318								73	-	-	23,499
1962	-	494								62	-	-	14,633
1963	-	343								18	-	-	13,568
1964	-	358								10	-	-	11,184
1965	-	331								27	-	-	13,314
1966	-	489								31	-	-	14,249
1967	-	646								35	-	-	14,656
1968	-	763								12	-	-	14,392
1969	0	843								7	-	-	14,155
1970	-	904								5	-	-	13,053
1971	-	992								3	0	-	11,015
1972	-	862								11	0	-	10,709
1973	-	860								119	0	-	11,789
1974	1	880								136	0	-	11,601
1975	29	899								153	0	-	14,232
1976	23	613								194	0	-	15,662
1977	36	542								141	219	-	15,157
1978	-	546								12	68	-	16,095
1979	7	661								33	-	-	13,928
1980	10	603								76	64	-	12,949
1981	2	656								25	-	-	14,801
1982	1	855								49	48	-	13,872
1983	0	783								166	11	-	14,757
1984	-	733								264	48	-	15,552
1985	-	566								259	24	-	17,990
1986	-	456								211	9	-	16,756
1987	3	1,328								190	44	-	17,470
1988	-	777								263	27	-	16,016
1989	50	1,491								38	40	-	15,308
1990	143	1,309								154	61	-	17,723
1991	40	1,390								180	5	-	16,302
1992	21	1,473								243	8	-	21,842
1993	54	1,174								310	15	-	22,376
1994	-	1,155								219	66	-	18,288
1995	50	1,135								225	10	-	16,564
1996	9	701	-	2	-	19	10	-	-		15	-	15,953
1997	15	1,358	24	1	-	27	8	1	-		100	-	19,086
1998	20	1,178	-	8	1	17	15	-	-		153	-	20,112
1999	70	1,385	-	4	1	51	5	-	-		132	-	17,624
2000	325	1,531	1	5	1	74	5	-	-		202	-	20,599
2001	1,039	1,691	1	17	1	64	8	-	-		438	-	17,288
2002	1,633	1,557	1	7	1	1	16	1	-		439	-	16,642
2003	1,084	2,196	-	3	-	-	8	-	-		381	-	16,446
2004	884	1,828	-	5	1	-	7	-	3		410	-	15,020
2005	437	1,813	-	1	2	-	5	-	18		434	-	15,004
2006	-	-	-	-	-	-	-	-	-	-	477	-	13,635
2007	-	-	-	-	-	-	-	-	-	-	452	-	14,565
2008	-	-	-	-	-	-	-	-	-	-	-	-	(11,748)
2009	-	-	-	-	-	-	-	-	-	-	-	-	(11,204)
2010	-	-	-	-	-	-	-	-	-	-	-	-	(9,920)
2011	-	-	-	-	-	-	-	-	-	-	-	-	(6,378)

Table 14-4. Annual landings 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. Provisional estimates in ().

Year	Japan[1]						Mexico		United States			
	Longline			Gillnet		Other[3]	Longline	Sport[2]	Longline	Troll	Handline	Sport[2]
	Distant-water & Offshore	Coastal	Other	Small Mesh	Large Mesh							
1951	2,494	-	673	-	0	1,281						
1952	2,901	-	722	-	0	1,564						23
1953	2,138	-	47	-	0	954						5
1954	3,068	-	52	-	0	1,088						16
1955	3,082	-	28	-	0	1,038						5
1956	3,729	-	59	-	0	1,996						34
1957	3,189	-	119	-	0	2,459						42
1958	4,106	-	277	-	3	2,914						59
1959	4,152	-	156	-	2	3,191						65
1960	3,862	-	101	-	4	1,937						30
1961	4,420	-	169	-	2	1,797						24
1962	5,739	-	110	-	8	1,912						5
1963	6,135	-	62	-	17	1,910						68
1964	14,304	-	42	-	2	2,344						58
1965	11,602	-	19	0	1	2,794						23
1966	8,419	-	112	0	2	1,570						36
1967	11,698	-	127	0	3	1,551						49
1968	15,913	-	230	0	0	1,043						51
1969	8,544	600	3	0	3	2,668						30
1970	12,996	690	181	0	3	1,032						18
1971	10,965	667	259	0	10	2,042						17
1972	7,006	837	145	0	243	993						21
1973	6,357	632	118	0	3,265	702						9
1974	6,700	327	49	0	3,112	775						55
1975	5,281	286	38	0	6,534	686						27
1976	5,136	244	34	0	3,561	585						31
1977	3,019	256	15	0	4,424	547						41
1978	3,957	243	27	0	5,593	546						37
1979	5,561	366	21	0	2,532	526						36
1980	6,378	607	5	0	3,467	536						33
1981	4,106	259	12	0	3,866	542						60
1982	5,383	270	13	0	2,351	656						41
1983	3,722	320	10	22	1,845	827						39
1984	3,506	386	9	76	2,257	719						36
1985	3,897	711	24	40	2,323	733				18		42
1986	6,402	901	33	48	3,536	577	-			19		19
1987	7,538	1,187	6	32	1,856	513	-		272	30	1	28
1988	6,271	752	7	54	2,157	668	-		504	54		30
1989	4,740	1,081	13	102	1,562	537	-		612	24	0	52
1990	2,368	1,125	3	19	1,926	545	-	181	538	27	0	23
1991	2,845	1,197	3	27	1,302	507	-	75	663	41	0	12
1992	2,955	1,247	10	35	1,169	303	-	142	459	38	1	25
1993	3,476	1,723	1	-	828	708	-	159	471	68	1	11
1994	2,911	1,284	1	-	1,443	383	-	179	326	35	0	17
1995	3,494	1,840	3	-	970	283	-	190	543	52	0	14
1996	1,951	1,836	4	-	703	152	-	237	418	54	1	20
1997	2,120	1,400	3	-	813	163	-	193	352	38	1	21
1998	1,784	1,975	2	-	1,092	304	-	345	378	26	0	23
1999	1,608	1,551	4	-	1,126	184	-	266	364	28	1	12
2000	1,152	1,109	8	-	1,062	297	-	312	200	14	1	10
2001	985	1,326	11	-	1,077	237	-	237	351	42	2	-
2002	764	796	5	-	1,264	290	-	305	226	30	0	-
2003	1,013	842	3	-	1,064	203	-	322	552	29	0	-
2004	699	1,000	2	-	1,339	92	-	-	376	34	1	-
2005	562	668	1	0	1,214	98	-	-	511	20	0	-
2006	623	539	1	0	1,190	95	-	-	611	21	0	-
2007	306	860	5	-	970	79	-	-	276	13	0	-
2008	(390)	(609)	(10)	(0)	(1,302)	(97)	-	-	426	14	0	-
2009	(166)	(621)	(21)	(0)	(821)	(90)	-	-	(256)	(10)	(0)	-
2010	(185)	(820)	(42)	(0)	(899)	(82)	-	-	(158)	(5)	(0)	-
2011	(308)	(720)	(100)	(0)	(300)	(0)	-	-	-	-	-	-

[1] Japan provide catch data update 2010 and 2011 data in July 2012 BILLWG meeting. These data are not inculded in 2012 BILWG April report.

[2] Estimated from catch in number of fish

[3] Contains bait fishing, net fishing, trapnet, trolling, harpoon, etc.

[4] Reported to the WCPFC

Table 14-4. (continued)

Year	Chinese Taipei[2]											
	Longline			Gill net		Coastal Setnet	Gillnet & Other net	Coastal Harpoon	Others			Chinese Taipei Total
	Distant-water	Offshore	Coastal	High-seas Drift Gillnet	Offshore				Offshore	Coastal	Other	
1951												
1952												0
1953												0
1954												0
1955												0
1956												0
1957												0
1958		543									387	930
1959		391									354	745
1960		398									350	748
1961		306									342	648
1962		332									211	543
1963		560									199	759
1964		392									175	567
1965		355									157	512
1966		370									180	550
1967	2	385									204	591
1968	1	332									208	541
1969	2	571									192	765
1970	0	495									189	684
1971	0	449									135	584
1972	9	380									126	515
1973	1	568									139	708
1974	24	650									118	792
1975	64	732									96	892
1976	32	347									140	519
1977	17	524									219	760
1978	0	618									78	696
1979	26	432									122	580
1980	61	223									132	416
1981	17	491									95	603
1982	7	397									138	542
1983	0	555									214	769
1984	0	965									330	1,295
1985	0	513									181	694
1986	0	179									148	327
1987	31	383									151	565
1988	7	457									169	633
1989	8	184									157	349
1990	2	137									256	395
1991	36	254									286	576
1992	1	219									197	417
1993	5	221									142	368
1994	1	137									196	334
1995	27	83									82	192
1996	26	162	-		8	3	-	30	6	-	-	235
1997	59	290	2		9	3	-	33	-	-	-	396
1998	90	205	9		15	6	1	19	-	-	-	345
1999	66	128	3		7	5	1	26	-	-	-	236
2000	153	161	1		17	6	1	29	1	-	-	369
2001	121	129	-		16	5	-	30	-	-	-	301
2002	251	226	-		14	8	1	6	-	-	-	506
2003	241	91	-		26	5	1	11	-	-	-	375
2004	261	95	-		8	5	2	7	1	1	-	380
2005	176	76	-		1	9	9	5	-	8	-	284
2006	-	-	-	-	-	-	-	-	-	-	-	123 [5]
2007	-	-	-	-	-	-	-	-	-	-	-	260 [5]
2008	-	-	-	-	-	-	-	-	-	-	-	196 [5]
2009	-	-	-	-	-	-	-	-	-	-	-	198 [5]
2010	-	-	-	-	-	-	-	-	-	-	-	183 [5]
2011	-	-	-	-	-	-	-	-	-	-	-	-

[1] Japan provide catch data update 2010 and 2011 data in July 2012 BILLWG meeting. These data are not inculded in 2012 BILWG April report.

[2] Estimated from catch in number of fish

[3] Contains bait fishing, net fishing, trapnet, trolling, harpoon, etc.

[4] Reported to the WCPFC

Table 14-4. (continued)

Year	Korea			Grand Total
	Longline	High-seas Drift Gillnet	Korea Total	
1951		-		4,448
1952	-	-	-	5,210
1953	-	-	-	3,144
1954	-	-	-	4,223
1955	-	-	-	4,153
1956	-	-	-	5,819
1957	-	-	-	5,809
1958	-	-	-	7,746
1959	-	-	-	7,920
1960	-	-	-	6,284
1961	-	-	-	6,754
1962	-	-	-	7,985
1963	-	-	-	8,391
1964	-	-	-	16,925
1965	-	-	-	14,596
1966	-	-	-	10,319
1967	-	-	-	13,632
1968	-	-	-	17,445
1969	-	-	-	12,040
1970	-	-	-	15,109
1971	0	-	0	14,095
1972	0	-	0	9,371
1973	0	-	0	11,222
1974	0	-	0	11,136
1975	0	-	0	12,948
1976	0	-	0	9,731
1977	43	-	43	8,564
1978	28	-	28	10,509
1979	-	-	-	9,164
1980	37	-	37	11,195
1981	-	-	-	8,940
1982	39	-	39	8,891
1983	19	-	19	7,018
1984	23	-	23	7,342
1985	16	-	16	7,985
1986	61	-	61	11,744
1987	1	-	1	11,615
1988	11	-	11	10,677
1989	26	-	26	8,906
1990	315	-	315	7,326
1991	141	-	141	7,099
1992	318	-	318	6,899
1993	388	-	388	7,976
1994	1,045	-	1045	7,820
1995	307	-	307	7,778
1996	429	-	429	5,805
1997	1,017	-	1017	6,121
1998	635	-	635	6,564
1999	433	-	433	5,577
2000	537	-	537	4,702
2001	254	-	254	4,522
2002	188	-	188	3,868
2003	206	-	206	4,233
2004	75	-	75	(3618)
2005	141	-	141	(3215)
2006	56	-	56	(3136)
2007	28	-	28	(2537)
2008	-	-	56 [5]	(2904)
2009	-	-	44 [5]	(2029)
2010	-	-	30 [5]	(2221)
2011	-	-	-	1,428

[1] Japan provide catch data update 2010 and 2011 data in July 2012 BILLWG meeting. These data are not inculded in 2012 BILWG April report.

[2] Estimated from catch in number of fish

[3] Contains bait fishing, net fishing, trapnet, trolling, harpoon, etc.

[4] Reported to the WCPFC

Table 14-5. Retained catches (metric tons, whole weight) of blue sharks by fishery in the North Pacific Ocean, north of the equator. Blanks indicate no effort or data not available, zero indicates less than 0.5 mt, other values rounded up to the nearest ton. Provisional estimates in ().

Year	Japan				Korea		Chinese-Taipei		United States				Mexico		Canada	China	Grand Total
	Longline		Drift Net	Other	Drift Net	Longline	Drift Net	Longline	Drift Net	Sport	Longline	Other	Longline	Drift Net	Misc. Gears	Longline	
	Offshore and Distant-water	Coastal															
1980								9,061									9,061
1981								8,223									8,223
1982								8,694									8,694
1983								7,558									7,558
1984								6,954							1		6,955
1985								8,019	0			1					8,020
1986								6,944	1			1					6,946
1987								5,536	1			1					5,538
1988								5,557	0			3					5,560
1989								5,851				6					5,857
1990								6,422	0			20					6,442
1991								6,740	0			1					6,741
1992								5,426	1			1					5,428
1993								5,299	0			0					5,299
1994	12,305	79						4,374	0			12					16,770
1995	11,201	157						7,087	0			5					18,450
1996	12,730	176						7,689	0			0					20,595
1997	15,830	75						9,512	0			0					25,417
1998	14,231	64						8,204	0			1					22,501
1999	15,751	2						10,628	0			0					26,381
2000	16,041	11						14,829	0			0					30,882
2001	16,386	5						7,580				0					23,971
2002	15,500	14						8,805				0					24,319
2003	15,456	22						8,730	0			0					24,208
2004	13,136	42						9,775				0					22,953
2005	12,624	31						10,857				0					23,513
2006	11,093	50						11,351				0					22,494
2007	8,994	41						10,906	9		8	0					19,957
2008	7,252	227						11,026			7					(134)	(18,646)
2009	(7,943)	(163)						(9,524)	1		9	0				(298)	(17,938)
2010	(7,652)	(175)						(8,411)	0		7	0				(358)	(16,603)
2011	(3,958)	(181)						(13,117)			14	0					(17,270)

All data are considered preliminary

Notes: Japan data are from WG correspondent submission